RETAIL SUPPLY CHAIN
CONFERENCE 2017
THE CUSTOMER CENTRIC SUPPLY CHAIN
“Emerging Technologies and Human Centered Design Principles”

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DHL Logistics Trend Radar pulls from a variety of sources
Trend radar evolves with time and relevance of innovations to industry

- **Social & Business Trends**
  - Grey Power Logistics
  - Tube Logistics
  - Multi-purpose Networks
  - De-stressing the Supply Chain
  - Fair & Responsible Logistics
  - Anticipatory Logistics
  - Batch Size One

- **Technology Trends**
  - 3D Printing
  - Internet of Things
  - Augmented Reality
  - Robotics & Automation
  - On-demand Delivery
  - Omni-channel Logistics
  - Big Data
  - Cloud Logistics
  - Low-cost Sensor Technology

- **Key Innovations**
  - Self-driving Vehicles
  - Unmanned Aerial Vehicles
  - Logistics Marketplace
  - Logistics Marketplaces
  - Supergrid Logistics
  - Logistics

- **Relevance**
  - Relevant in <5 years
  - Relevant in >5 years

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*RILA* | Retail Industry Leaders Association
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*Educate. Collaborate. Advocate.*
Trend radar evolves with time and relevance of innovations to industry

- Low-relevant in <5 years
- Relevant in >5 years
- High-relevant in >5 years

Social & Business Trends:
- Anticipatory Logistics
- Grey Power Logistics
- Shareconomy Logistics
- On-demand Delivery
- Multi-purpose Networks
- Tube Logistics
- Des-tressing the Supply Chain
- Fair & Responsible Logistics
- Convenience Logistics
- Logistics Marketplace
- Logistics Smart Energy Logistics
- Logistics

Technology Trends:
- Robotics & Automation
- Augmented Reality
- Low-cost Sensor Technology
- Self-driving Vehicles
- Unmanned Aerial Vehicles
- Cloud Logistics
- Big Data
- Omni-channel Logistics
- Internet of Things
- 3D Printing
- Sensor Technology
- Supergrid Logistics
- Logistics

On-demand Delivery

Unmanned Aerial Vehicles

Robotics & Automation

Augmented Reality
Automation in logistics

80% ...of warehouses today are manually operated
(St. Onge Company)

47% ... of all jobs will be automated by 2034 (Economist, 2014)
Why now?

**Market Challenges**
- Double-digit growth rates in labor intensive eCommerce
- Increasing customer expectations
- Aging society and lack of skilled workers

**New Business Impact**
- Increasing number of start-ups and seed-investment
- High investments from players such as Amazon or Google
- Spill-over effects from other industries

**Overcoming Barriers**
- Tremendous improvements in robot capabilities due to technological advancements
- Decreasing prices of enabling technologies and modules
DHL is piloting a number of use cases for robotics

<table>
<thead>
<tr>
<th>Storage and retrieval robots</th>
<th>Mobile piece picking robots</th>
<th>Collaborative order picking</th>
<th>Packaging &amp; additional services</th>
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</thead>
<tbody>
<tr>
<td>Robots that operate within fixed storage and retrieval systems. Generally less flexible but offer higher storage density and productivity.</td>
<td>Mobile robots autonomously navigate through traditional warehouse shelves. Focus of 2017 DHL Robotics Challenge</td>
<td>Picking carts follow order pickers autonomously, taking care of most of the physical work.</td>
<td>Collaborative piece-picking robots designed to work safely around people and support customization processes</td>
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</tbody>
</table>
Proof of Concept: Picking with Locus Robots

- Locus Robotics leverages WMS and works in a ‘task to person’ manner
  - User friendly and initiative
  - Work within existing infrastructure
  - Avoids black box syndrome
  - Scalable
- Started by the founders of Quiet Logistics, early adopter of KIVA (now Amazon Robots)
- Supports zone, cluster and batching strategies common in e-fulfillment
- DHL pilot in Zimmer commencing Q2, 2017
Proof of Concept: Testing Collaborative Robots

- Unlike large scale manufacturing, where caged industrial robots have operated for decades, warehouse applications are smaller in scale and constantly changing.
- Potential fit in packaging/kitting operations.
- DHL engineers at central laboratory perform application testing, prior to implementing at sites.
- Next generation robots will have wider applications with vision & motion recognition that greatly enhance capabilities.

Sawyer performing blister pack kitting. Robot is intuitive to operate, no programming experience required.
Proof of Concept: Drones for Cycle Counting & Security

- Within warehouses drones have seen relatively limited surveillance, and inventory cycle counting applications

- For transportation, drones have promise for autonomous point-to-point delivery in sparse populated or inaccessible areas.

Cycle Counting - drone records image of location

Security - drone sends live video feed to security monitors
After several pilots, DHL believes unique benefits to vision picking technology include:

- Training time reduction
- Preferred language by user profile
- Reduced errors and scan time through automatic pick confirmation
- Replacement of fixed capital (e.g. pick-to-light) with less expensive HMDs
- Navigation recommending best pick path
Vision Picking

- Pilot results from Columbus, Ohio Omni Channel operation
  - Productivity increase 7-12%
  - Quality increase
  - Usability score 4/5
Technology - Design - People

- What’s the point
- What it looks like
- Who benefits & how
- How we hit the target
The Point

- Effective solutions that enable organizational goals
  - Technology is defined as "the application of scientific knowledge for practical purposes"
  - Removes barriers
  - Eliminate risks
  - Facilitates scalability, responsiveness, accuracy
  - Provides simplicity
  - Allows people to do more......be more
What Does Effective Design Look Like

- Facilitates & supports a **real** business case
- Engineered with human centric considerations that leverage the best of the individual and don’t create new barriers
What Does Effective Design Look Like

- Integration into processes not simply islands of “cool”
What Does Effective Design Look Like

- Reinvention and the use of “eco technology”
What Does Effective Design Look Like

- Success not limited by age or capability
- Genius in simplicity not complexity
The Bottom Line

- Service – cost - profitability
- Business focus
- Wage constraints
- Employer of choice
- Resource availability & development
How Technology & Design Hits The Target

- Search for the right business solution not the hot gadget of the day
- Develop solutions collaboratively not in a vacuum / “over the wall”
- Viewing technology as a component and not an end in itself
- A real understanding of innovation’s common language
- Believing in and exercising the value of the individual