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DHL Trend Research

# **INNOVATION & THE FUTURE OF LOGISTICS**

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September, 2019



# OUR SUPPLY CHAINS ARE CHANGING

## Digital Freight Shipping



## Sensors & Asset Tagging



## Inventory Management



## Blockchain



## Food Supply Chain



## Supply Chain & Logistics Analytics



## Trucking Marketplace & Fleet Management



## Warehousing



## Enterprise Resource Planning



## E-Commerce Logistics



## Autonomous Trucking



## Last-Mile AV & Drones



## Last-Mile Delivery Services



Source: CB Insights 2018



# THE DIGITAL OPPORTUNITY IS HUGE...

## TECHNOLOGY



**40%**

Of all data generated  
by **2020** will come from  
**connected sensor**

Frost & Sullivan

**25  
Billion**

**Connected ,Things‘**  
will be used in **2020**

Gartner

## VALUE



**\$1.7  
Trillion**

**Worldwide  
IoT Market**  
by **2020**

IDC

**\$10-  
\$15  
Trillion**

Added to the global GDP  
by the **,Industrial  
Internet‘** market within  
the next **20** years

GE

## OPPORTUNITY



**25%  
Reduction**

in **maintenance  
costs** through IoT

U.S. Department of Energy

**Savings of  
\$90  
Billion**

Generated by **connected  
industrial machinery** to  
make oil & gas  
exploration **1%**  
more efficient

GE



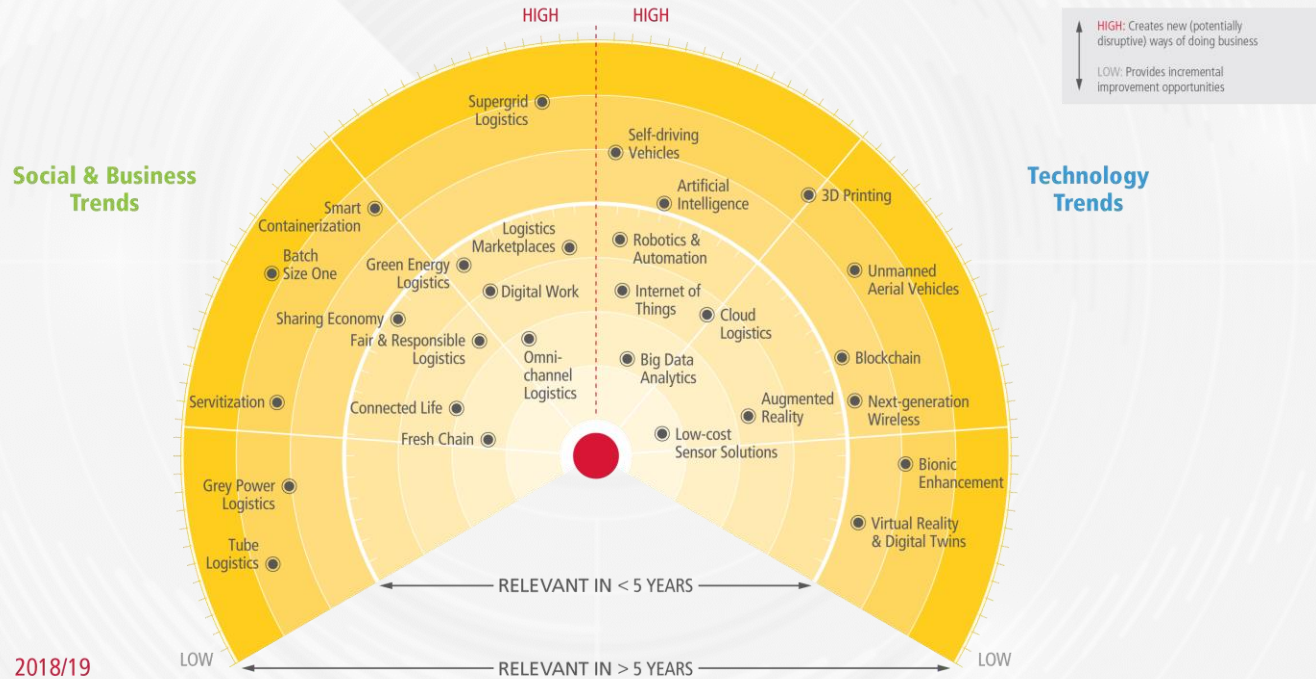
# ...BUT WHAT ABOUT **SUPPLY CHAINS?**

The biggest future impact on revenue and EBIT growth is set to occur through the digitization of Supply Chains.

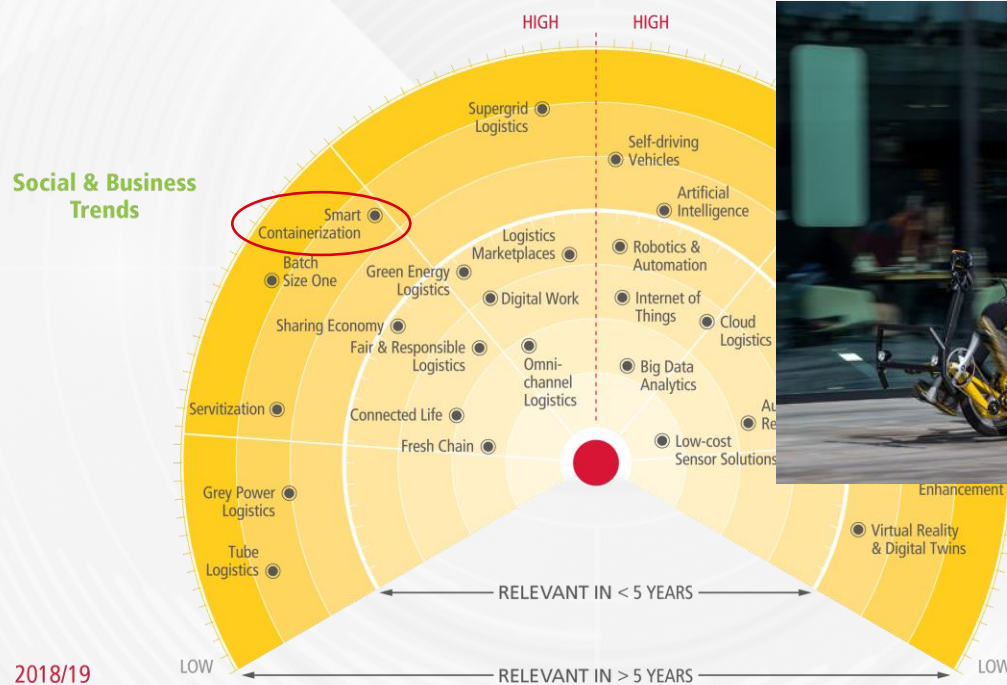
McKinsey



# THE DHL LOGISTICS TREND RADAR 4.0

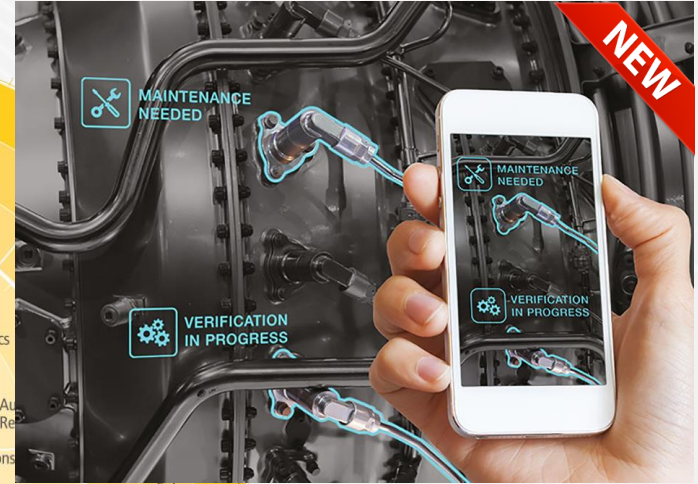
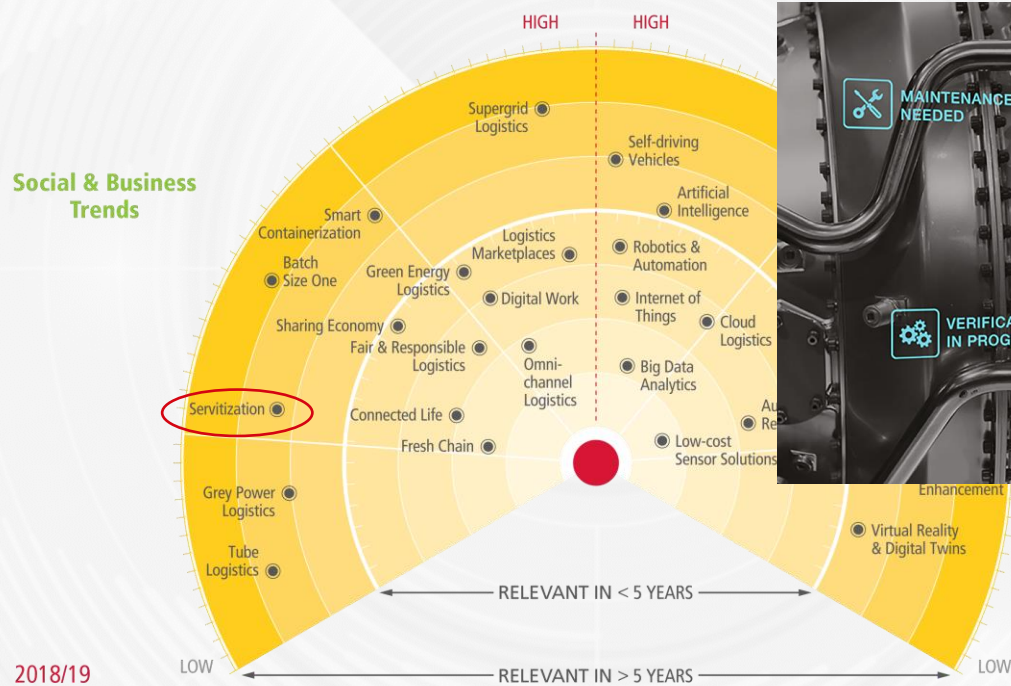


# NEW TRENDS – SMART CONTAINERIZATION





# NEW TRENDS – SERVITIZATION

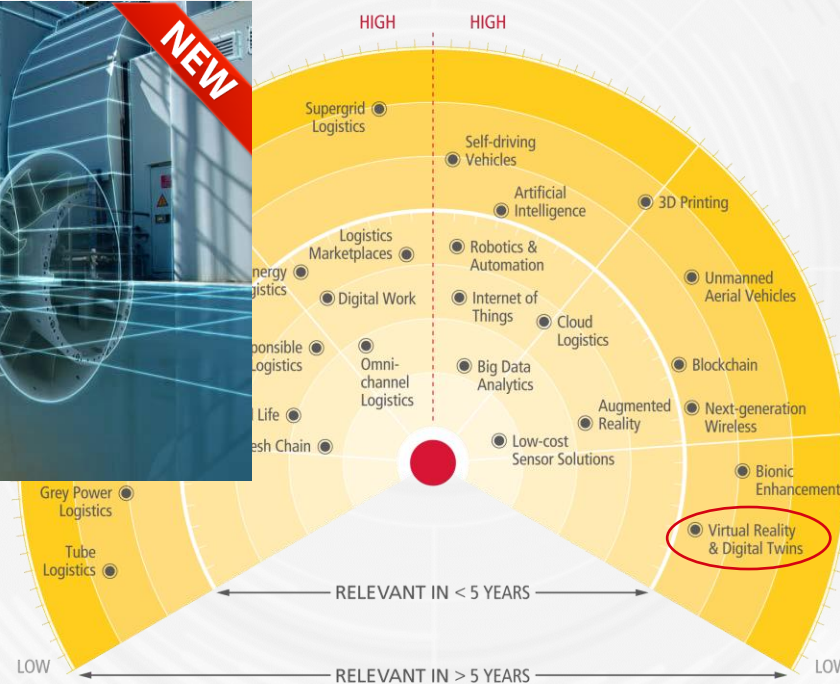
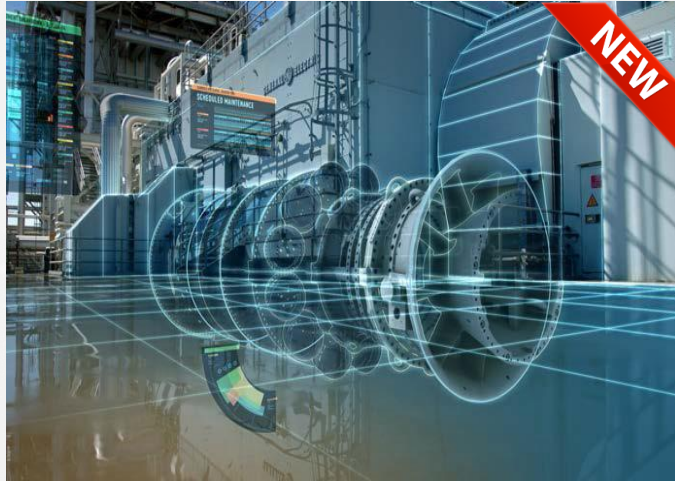


# NEW TRENDS – NEXT-GENERATION WIRELESS





# NEW TRENDS – VIRTUAL REALITY & DIGITAL TWINS



**HIGH:** Creates new (potentially disruptive) ways of doing business  
**LOW:** Provides incremental improvement opportunities

2018/19

# INNOVATION VALUE CHAIN

1

Trend Radar



2

Trend Report



3

Innovation Center Exhibit



4

Proof of Concept



Commercialization

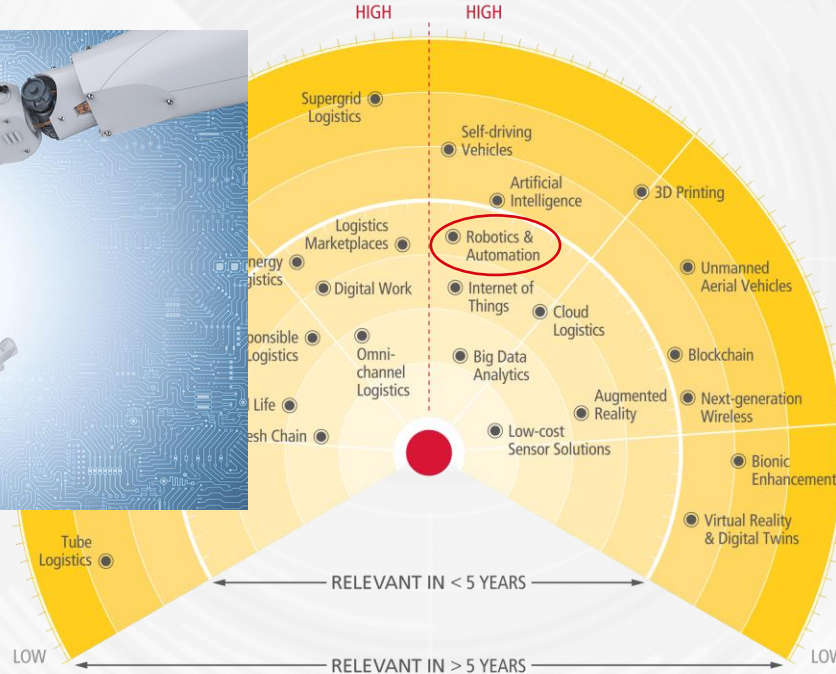
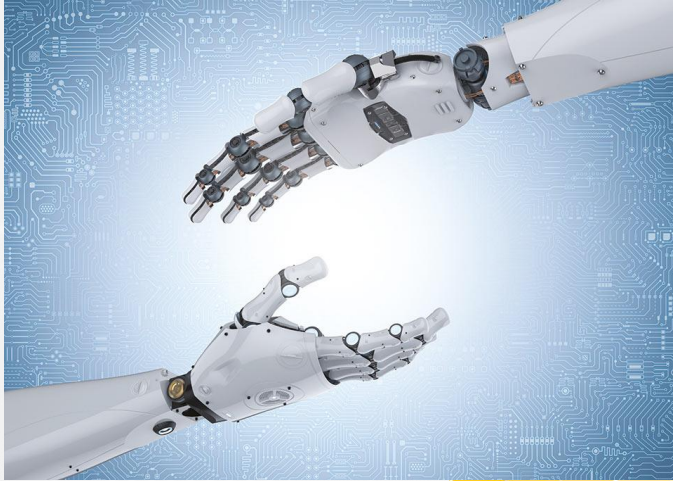


Initiate Global Accelerators

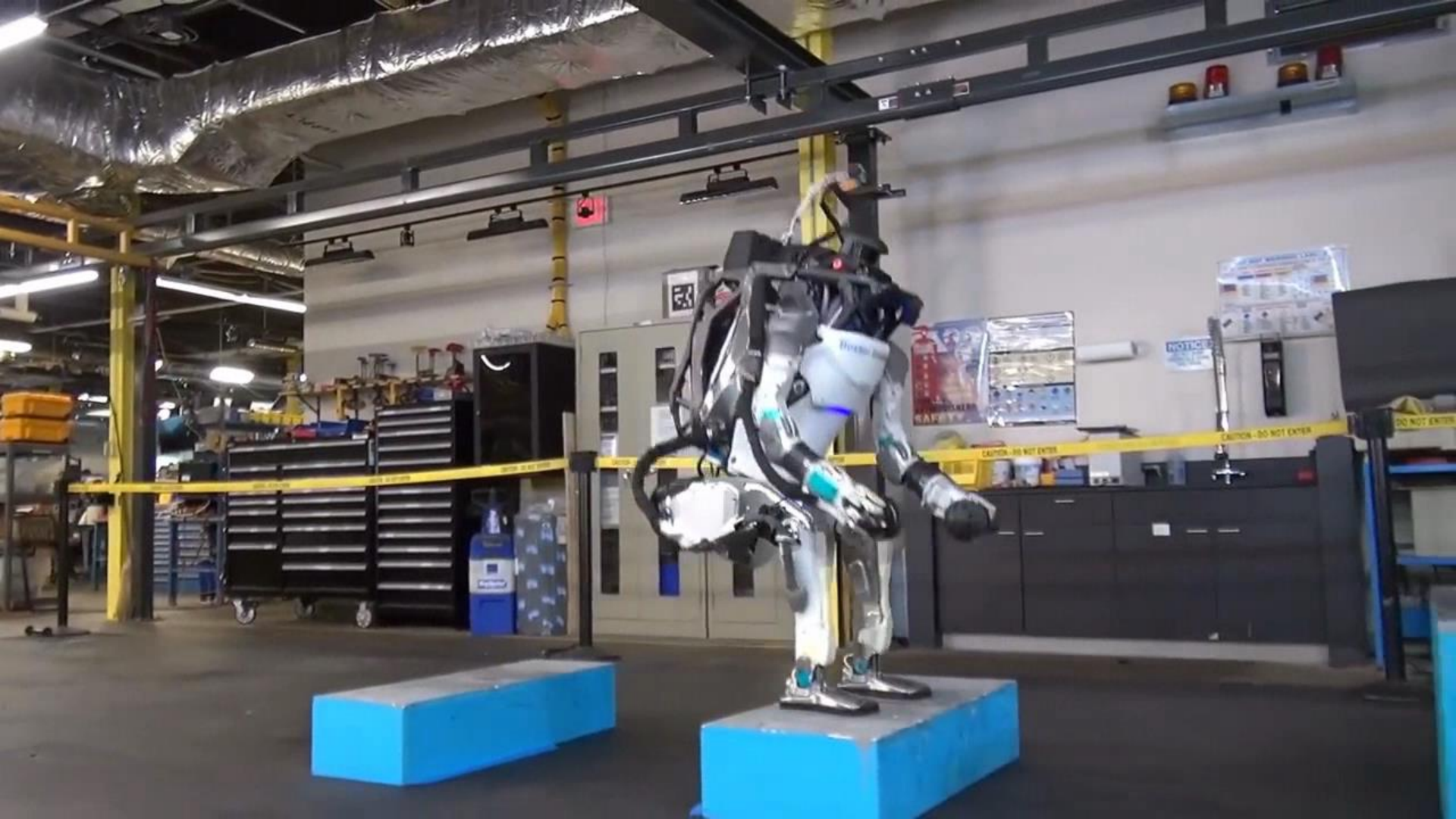




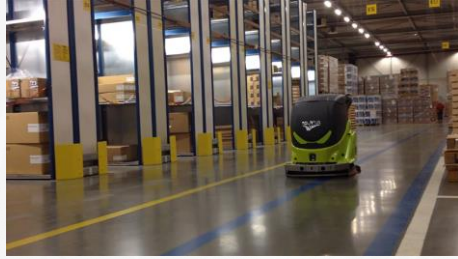
# EXPLORING TRENDS – ROBOTICS & AUTOMATION







# NEAR FUTURE – EXAMPLES IN LOGISTICS



Autonomous Cleaning



Autonomous Identification



Follow me Robots



Task to Person Robots



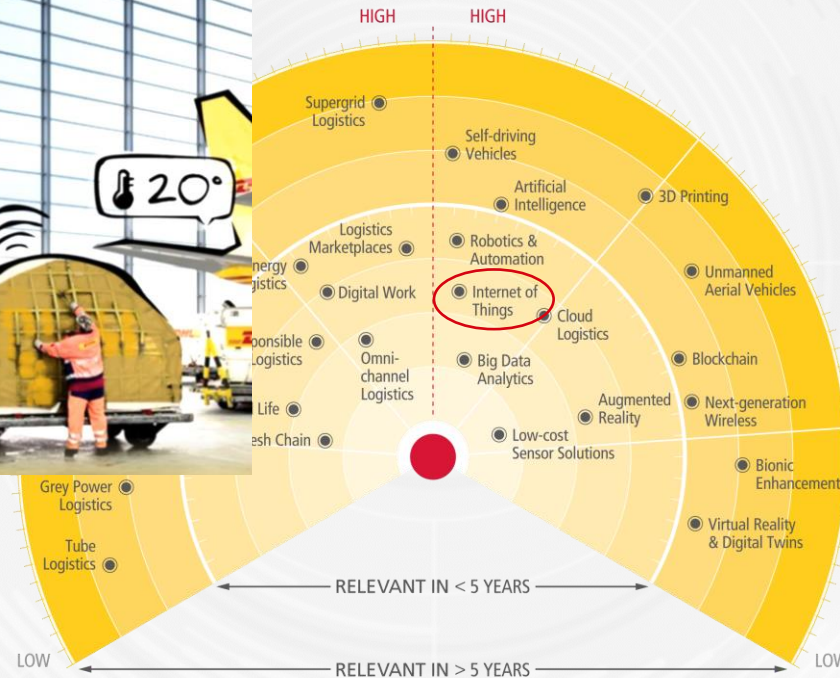
Collaborative Picking Robots



Mobile Piece Picking



# NEW ACCELERATOR – INTERNET OF THINGS

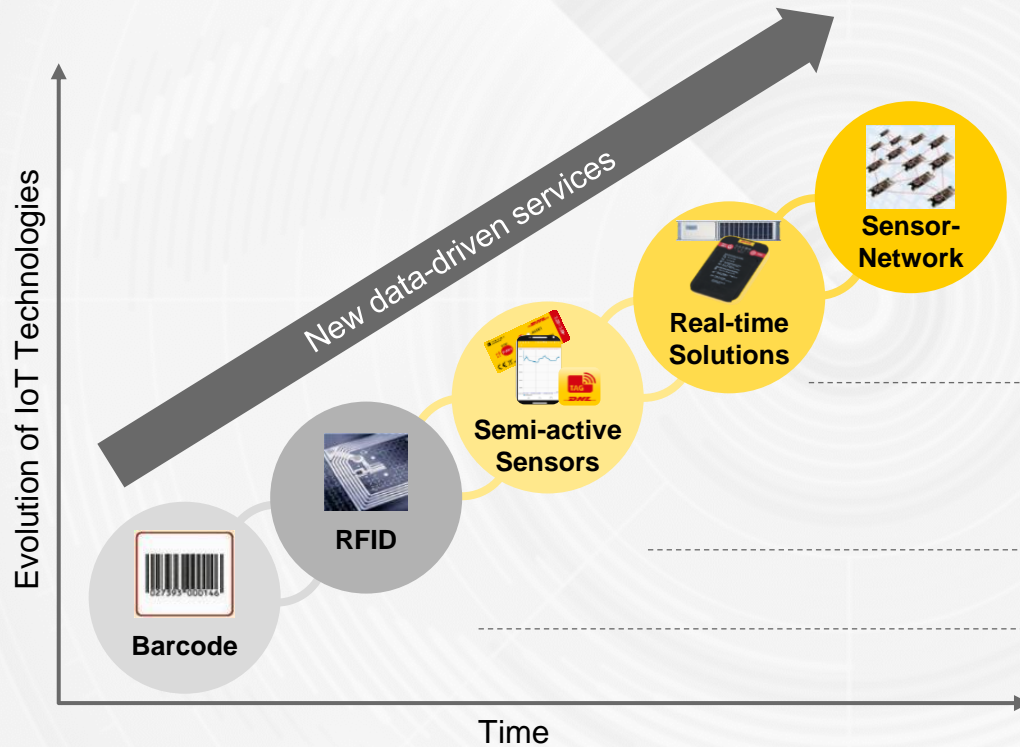


Technology Trends

HIGH: Creates new (potentially disruptive) ways of doing business  
LOW: Provides incremental improvement opportunities



# NEW DATA-DRIVEN SERVICES



## IoT Solutions @ DPDHL

- DHL Ocean Thermonet: GSM
- Agheera GPS Solar: GSM
- DHL Air Thermonet: NFC/RFID
- Pharma Express: NFC/RFID
- DHL-MyiD: RFID

# FROM 2G TO 3G TO FUTURE SENSOR NETWORKS



# USE CASE: SHOCK MONITORING FOR AUTOMOTIVE PARTS



## General Information

- Use Case: **Shock Monitoring for Automotive Parts**
- Objective: Detect Shock Hotspots
- Technologies: Smart Sensor



## Details

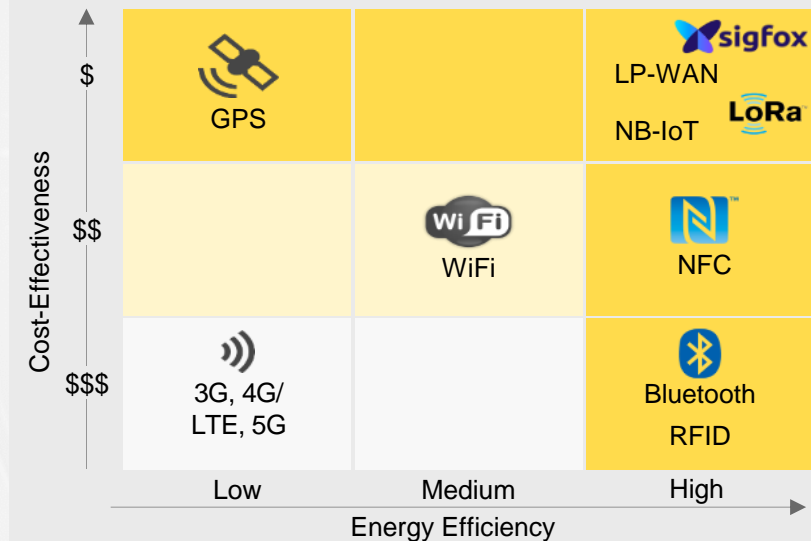
- Objectives: Shock Monitoring to avoid deformations and damages, reducing shock impact on rack
- Notifications/ alerts: Waypoints, Shock thresholds
- Special features: Identification of critical shock hotspots





# PROMISING LOW-POWER-WIDE-AREA-NETWORKS

## Overview



1) Standard for local and metropolitan area networks

## Availability



### Sigfox

*Industrialized nations  
and (Air)Ports*



### LORA

*Industrialized and emerging markets*



### NB-IoT

*Europe, China and  
South Africa*



### 2G/3G/LTE/4G

*Global*

# USE CASE: SMART BUILDING AND TEMPERATURE MONITORING



## General Information

- Location: **DHL Asia Pacific Innovation Center, Singapore**
- Use case: **Warehouse Temperature**



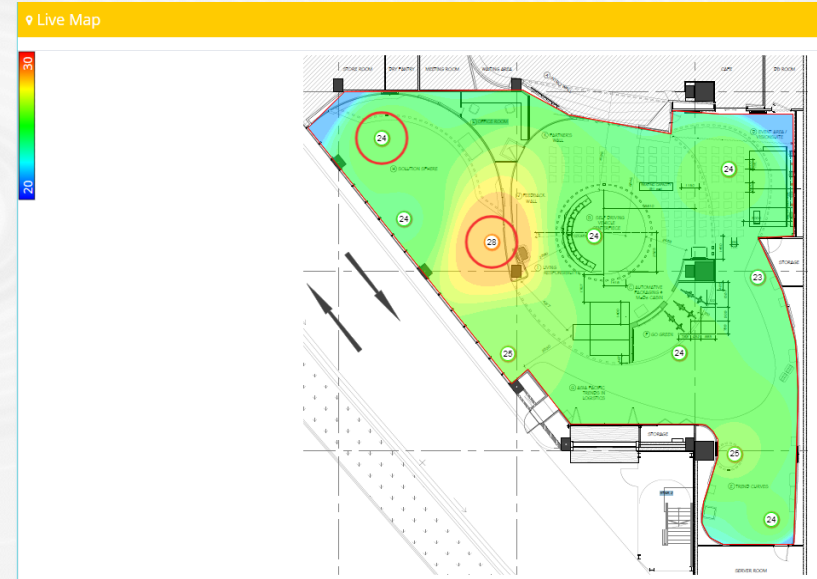
## Objectives

- Reporting intervals of **10min**;  
Battery **lifetime of 1-1.5 years**
- **Live heatmap** with configurable temperature scale as well as **automated alerts**



## Particularities

- **Reduced manual workload** in monitoring indoor conditions
- **Automated storage** of indoor conditions data for future investigations





# USE CASE: ASSET TRACKING FOR ROLLERCAGES



## General Information

- Use Case: Low Cost **Asset Tracking** for Rollercages in Europe
- Objective: Get visibility of assets europewide
- Technologies: **Sigfox**

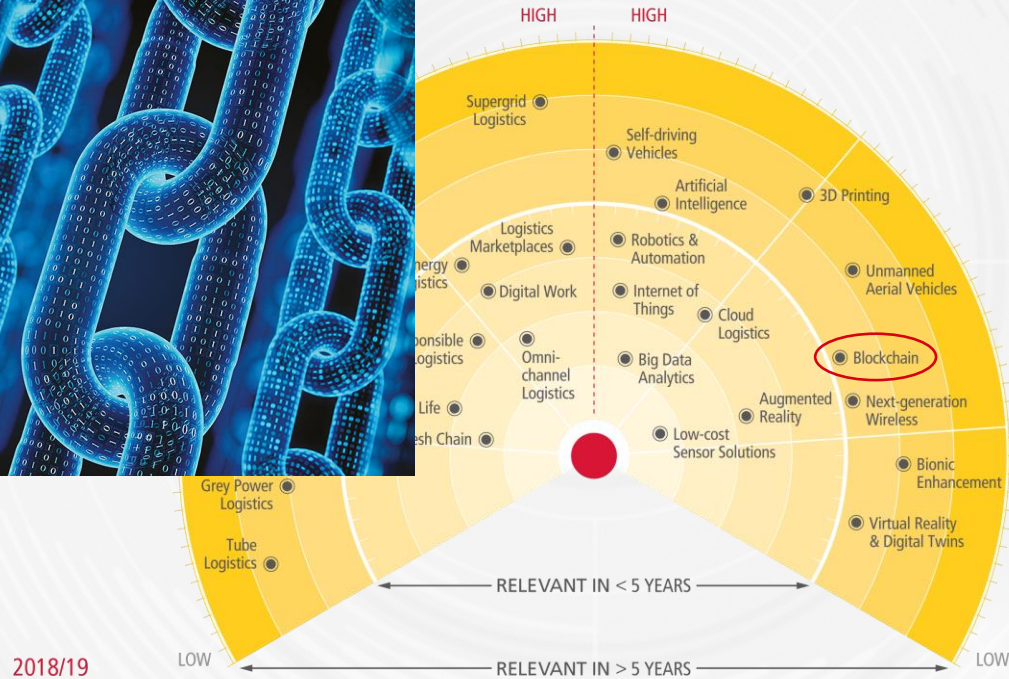


## Details

- TBM property of DHL, but in continuous exchange (internal and external)
- High cost due to loss of roller cages
- Flow visualization and resource tracking
- Improvement of relocation and utilization rates



# NEW TRENDS – BLOCKCHAIN





# WHY IS BLOCKCHAIN BEING DISCUSSED IN THE LOGISTICS INDUSTRY?



- **Industry fragmentation** is driving low levels of supply chain transparency, unstandardized processes that today are often very manual (e.g. paper-based documentation for import/export), data silos and diverse levels of technology adoption
- In the US alone, there are over 500,000 individual trucking companies demonstrating the potential value blockchain can bring to connect and streamline the logistics industry

# USE CASE: ENHANCING PARTS VISIBILITY FOR CAR DEALERS



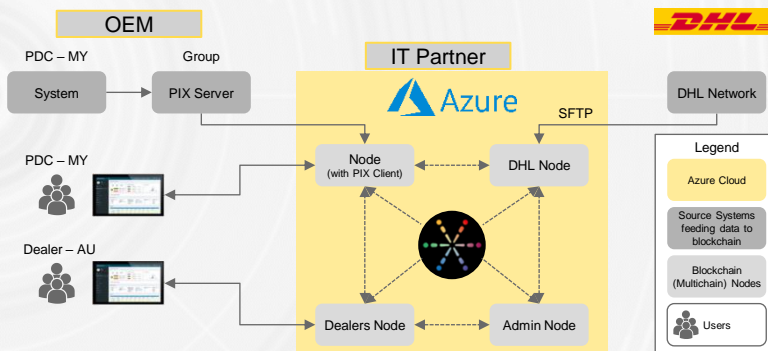
## Challenge

- Fragmentation in IT systems language/translation across different partners leads to lack of end to end visibility in order status for the dealers. Dealers have no one place to track status of all their orders



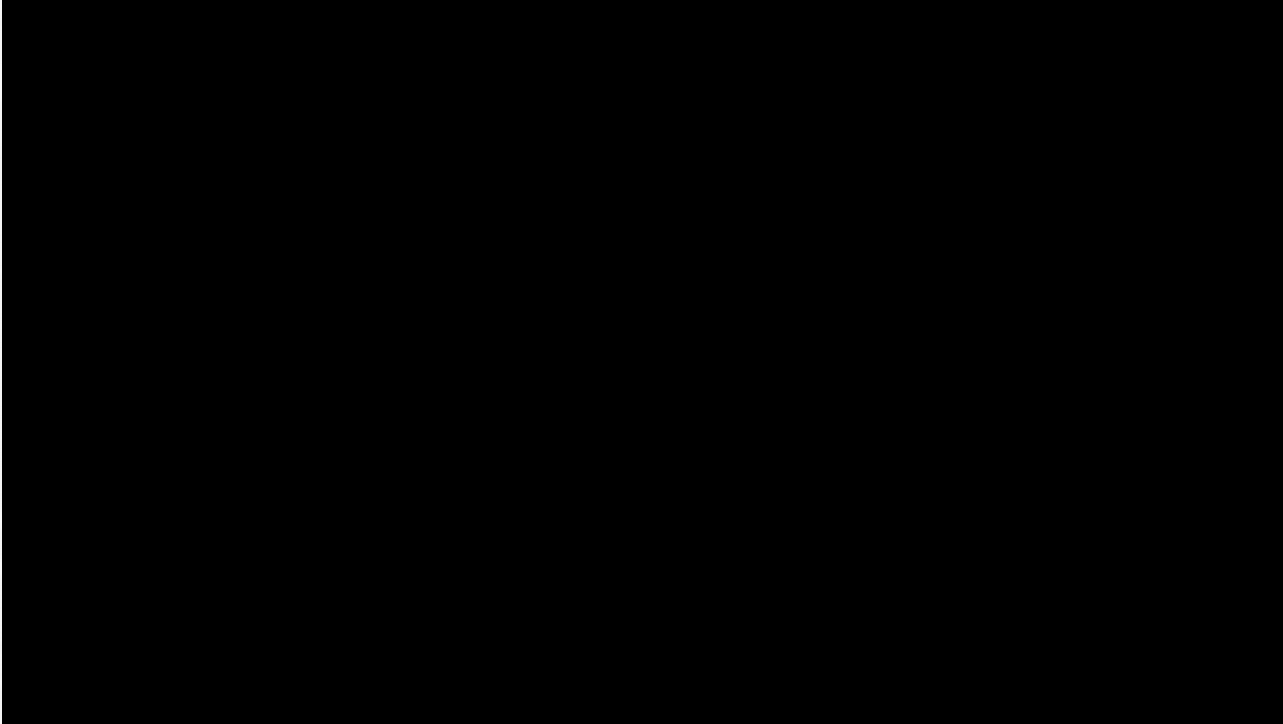
## Objectives

- To bring OEM system, PDC, DHL and AU dealers on a private blockchain platform
- Include business logic on matching data to eliminate all manual reconciliations (smart contract)
- Seamlessly integrate exiting systems with blockchain without introducing new identifiers/app
- Provide a mobile app for dealers to have full visibility

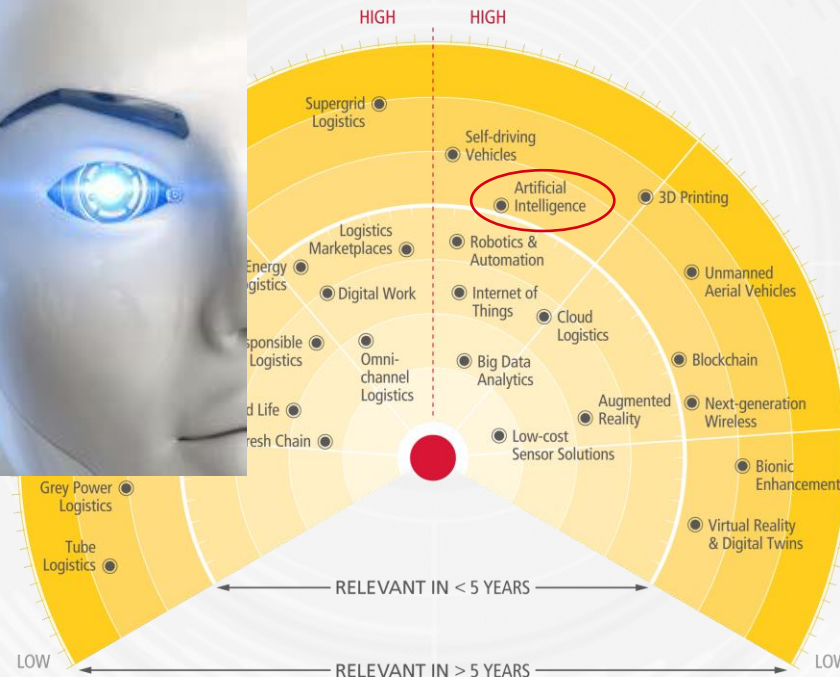
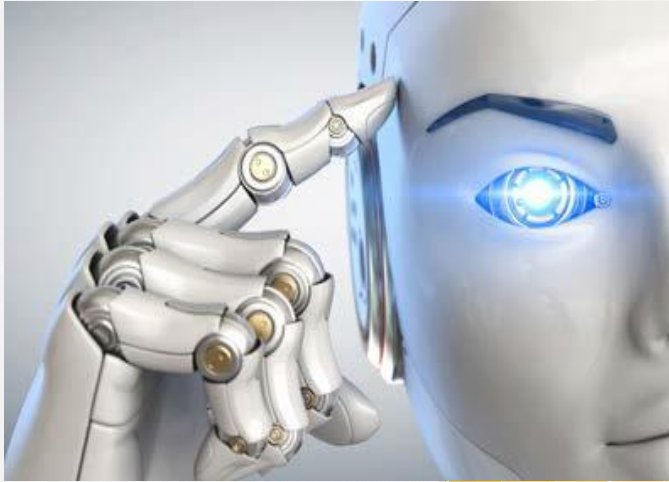




# **USE CASE: ENHANCING PARTS VISIBILITY FOR CAR DEALERS**



# NEW FOCUS TOPIC – ARTIFICIAL INTELLIGENCE



2018/19



# PREDICTING, SENSING, AUTONOMOUS LOGISTICS

## Prediction



Enable predictive, self-learning networks

## Sensing



See and understand the world in new ways

## Autonomous Transport



Improve operational efficiency & safety

# AI IN LOGISTICS:

## PREDICTIVE LOGISTICS

### DHL Global Trade Barometer



DHL Global Trade Barometer – World 2013–present



### DGF Air Freight Delay Prediction



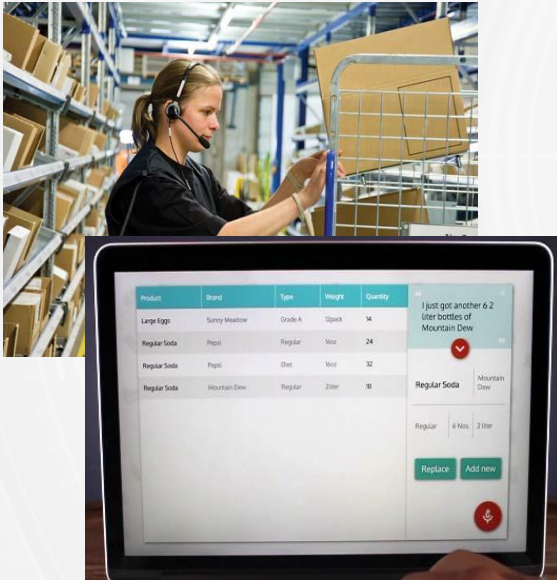
### Predictive Maintenance



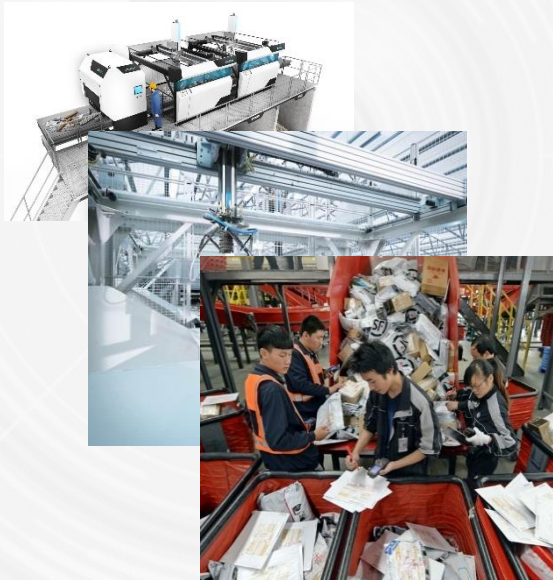


# AI IN LOGISTICS: SEEING, SPEAKING, & THINKING

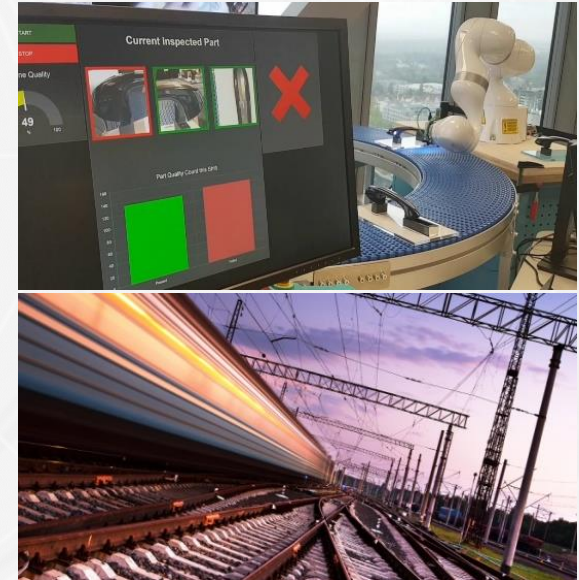
## Conversational WMS



## Vision-Based Sorting



## Visual Quality Control



# VISUAL QUALITY **CONTROL:** FREIGHT DIMENSIONING





# AI IN LOGISTICS: AUTONOMOUS LOGISTICS

## Yard Logistics

AGV's on the rise



## Line-Haul

Truck Platooning & driver assistance

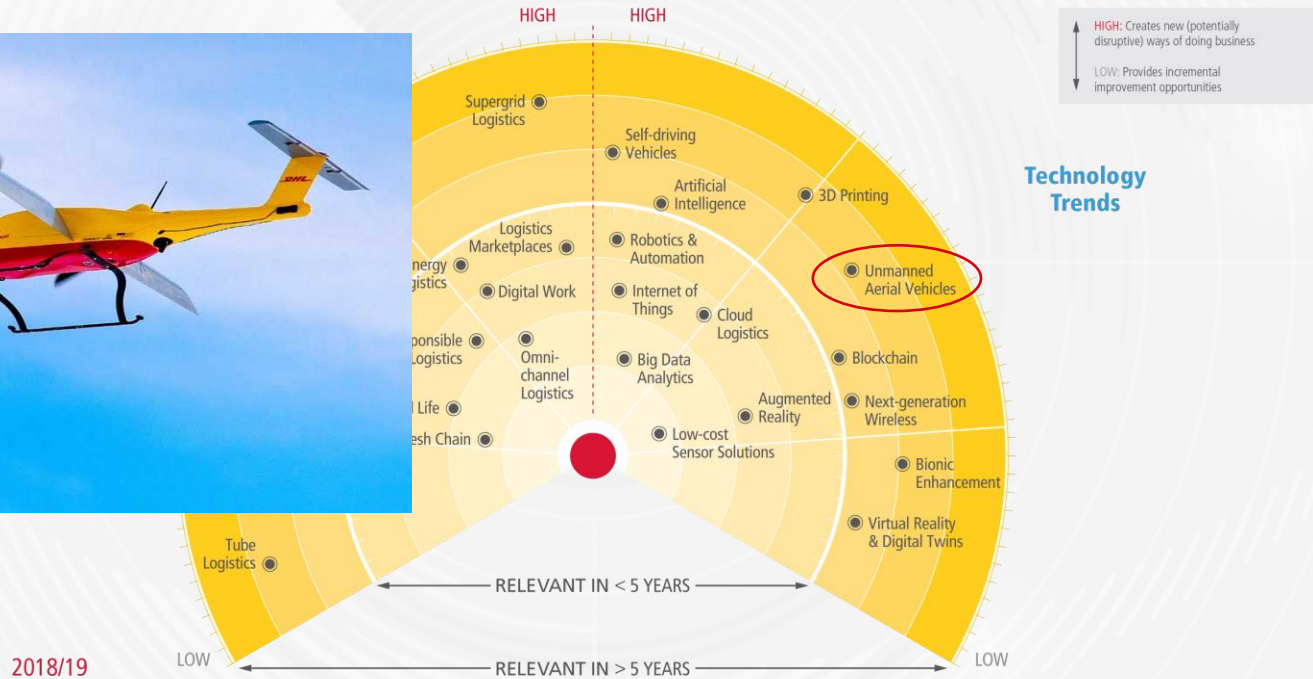


## Last Mile

from follow-me to full autonomy

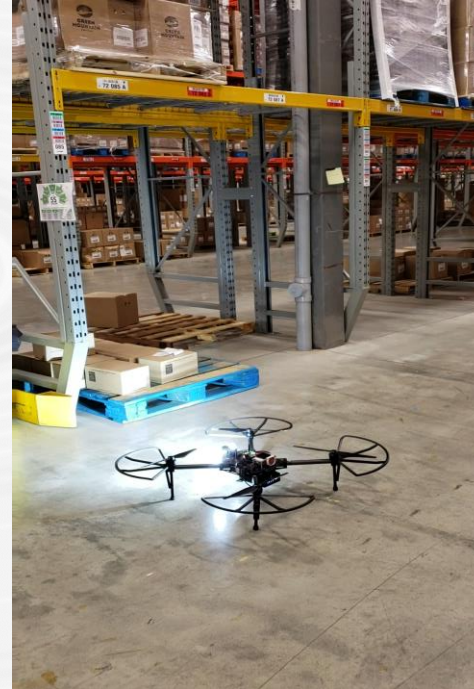


# EXPLORING TRENDS – UNMANNED AERIAL VEHICLES





# USE CASE: INVENTORY & CYCLE COUNTING



# USE CASE: DRONES FOR SURVEILLANCE IN MEXICO





# USE CASE: DRONES FOR URGENT DOCUMENT DELIVERY



# OPEN INNOVATION APPROACH



**ALL OUR TREND REPORTS ARE AVAILABLE FOR DOWNLOAD:  
[WWW.DHL.COM/INNOVATION](http://WWW.DHL.COM/INNOVATION)**



# OUR INNOVATION CENTERS – GLOBAL PRESENCE

We are looking forward to welcoming you



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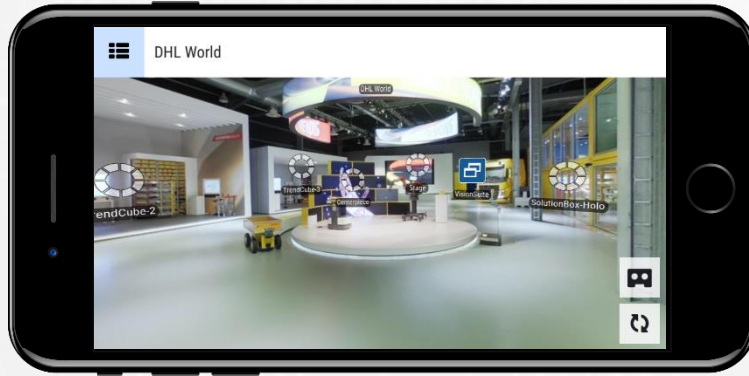
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**TOGETHER TODAY**