



The International Maritime Transport and logistics Conference  
Towards Global Competitiveness in Maritime Industry



“INVESTING IN PORTS”  
The Trends, The Future



## Impact of IoT and Industry 4.0 on Logistics and Supply Chain Management

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Dean, School of Innovative Design Engineering  
Egypt-Japan University of Science and Technology (E-JUST)



الجامعة المصرية اليابانية للعلوم والتكنولوجيا

**E-JUST**

Egypt-Japan University of Science and Technology

エジプト日本科学技術大学

# What is Innovation !

- **Innovation** is viewed as the application of **better solutions** that meet new requirements, unarticulated needs, or existing market needs.
- This is achieved through **more effective**:
  - Products,
  - Processes,
  - Services,
  - Technologies , or
  - Business models.







Quadrabots

MULTI-STAGE CONTROL UNIT  
ELECTRICAL GEARS/BRUSHLESS MOTOR  
ACTUATED SPINE  
MAGNETICALLY-DRIVEN CORE UNIT  
NON-LINEAR TENDON  
DIRECTIONAL ADHESION FOR ENHANCED TRACTION  
MULTI-RHYTHMIC RESPONSE  
CARBON FIBER REINFORCED LEGS



Jet packs on sale 2014



30,000 Drones by 2020



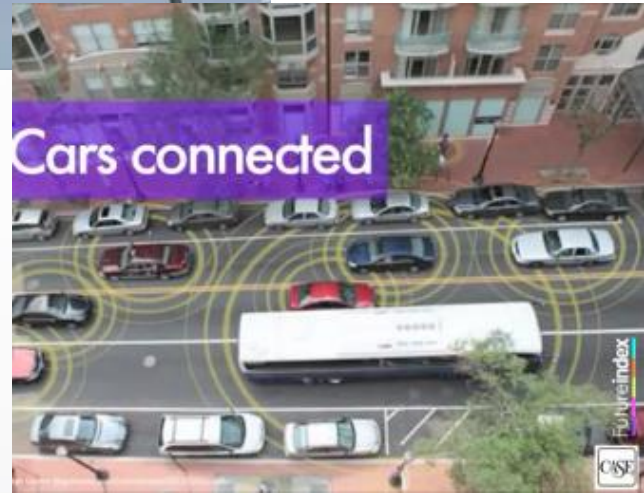
Bitcoins & digital currencies



Magic Mirrors



Graphene



Cars connected

Futureindex  
CISE

Futureindex  
CISE

Futureindex  
CISE

Futureindex  
CISE

Futureindex  
CISE

# The World Is Changing



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- Business is not as usual anymore
- Current global trends
  - Cyber-physical systems, Smart factories, smart homes, Smart grids, smart ...
  - Smart phones and Mobile Apps
  - Wearable devices
  - Electric cars, Autonomous cars
  - Big data, advanced analytics
  - Amazon *PrimeAir*
  - The hyperloop
  - ....



# The Internet of Things

# What is the Internet of Things



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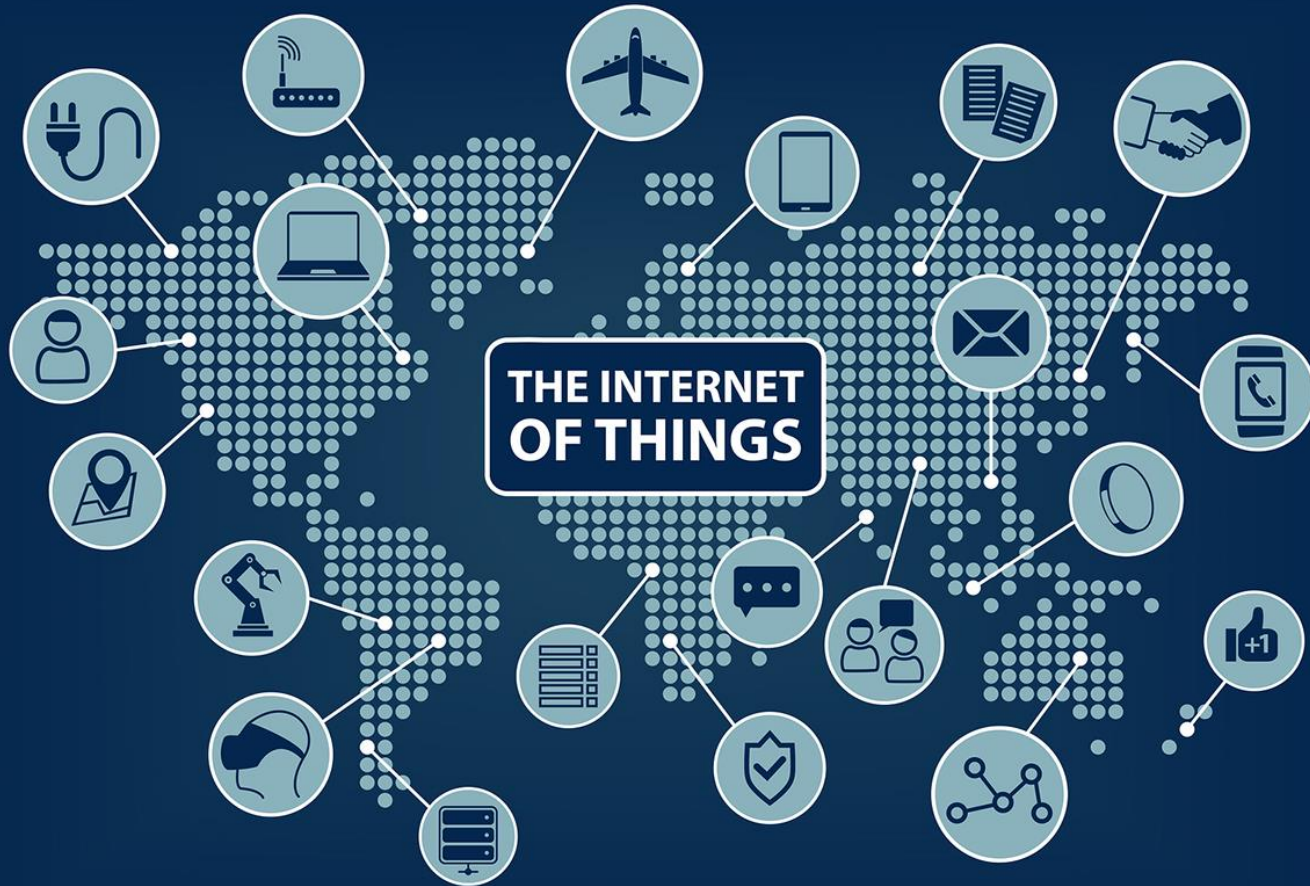
- The **Internet of Things (IoT)** is a system of **interrelated** computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network **without requiring human-to-human or human-to-computer interaction**.
- The term IoT was coined by Kevin Ashton from MIT on 2009 in his paper "That 'Internet of Things' Thing", *RFID Journal*, 22 June 2009.



**Kevin Ashton**  
**MIT**



# How The Internet of Things Works



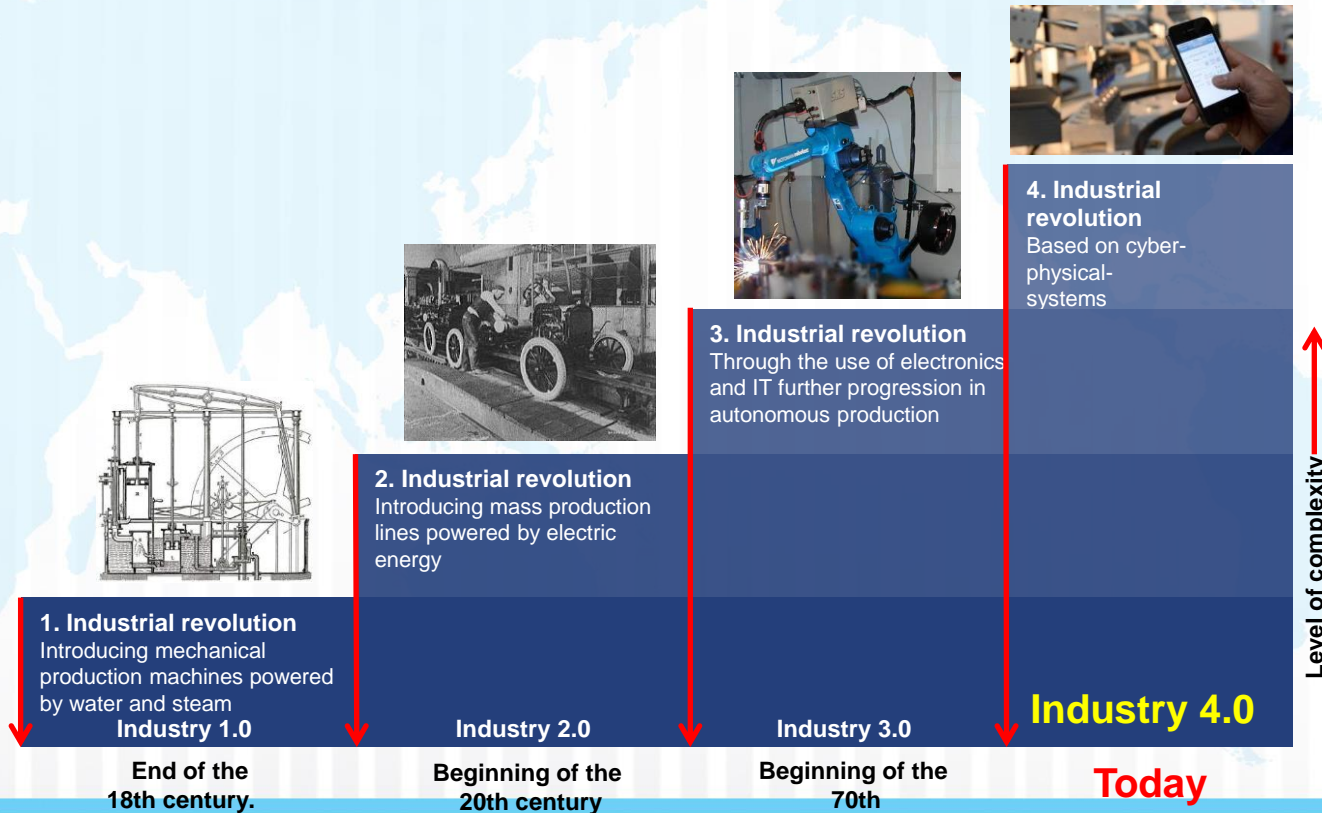
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# From the First to the Fourth industrial revolution **8** 2019



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The term Industry 4.0 was coined by the German Federal government in 2011.



Source: DFKI/Bauer IAO

# The ABCD of IoT

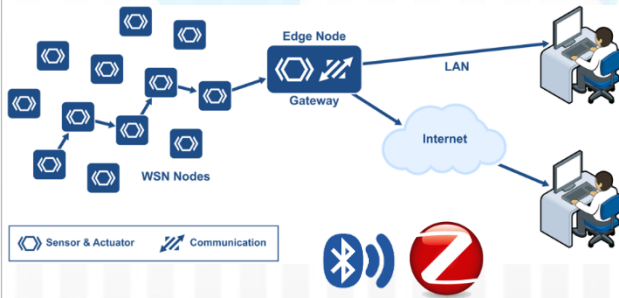
## Applications



## Big Data Analytics



## Connectivity and Communication



## Devices - that are smart!





# The Future of Smart Devices

- By **2020** the amount of devices that connect to the internet will rise to **50 billion** devices.
- By that time, **computers** (including PCs, tablets, and smartphones) will represent just **17%** of all Internet connections; the other **83%** will result from wearables and smart-home devices, and other **smart devices**.



# IoT & Sensor Technology



Accelerometer  
(4mm diameter)



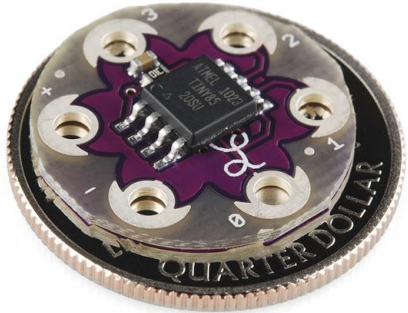
Force Sensor  
(0.1N - 10N)



Pulse Sensor

# Cheap Mini Computers

## Lily Tiny



### Key Parameters

Flash: 8 Kbytes

Pin Count: 8

Max. Operating Freq: 20 MHz

CPU: 8-bit AVR

Max I/O Pins: 6

Ext Interrupts: 6

SPI: 1

I2C: 1

<http://www.atmel.com/devices/ATTINY85.aspx?tab=parameters>





# A Day in the Life of the Internet of Things



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# Smart Electronics

The number of personal health and fitness trackers (including smart watches) in use approached **100 million in 2017**.



Health Monitoring Smart Watch



Smart Glasses



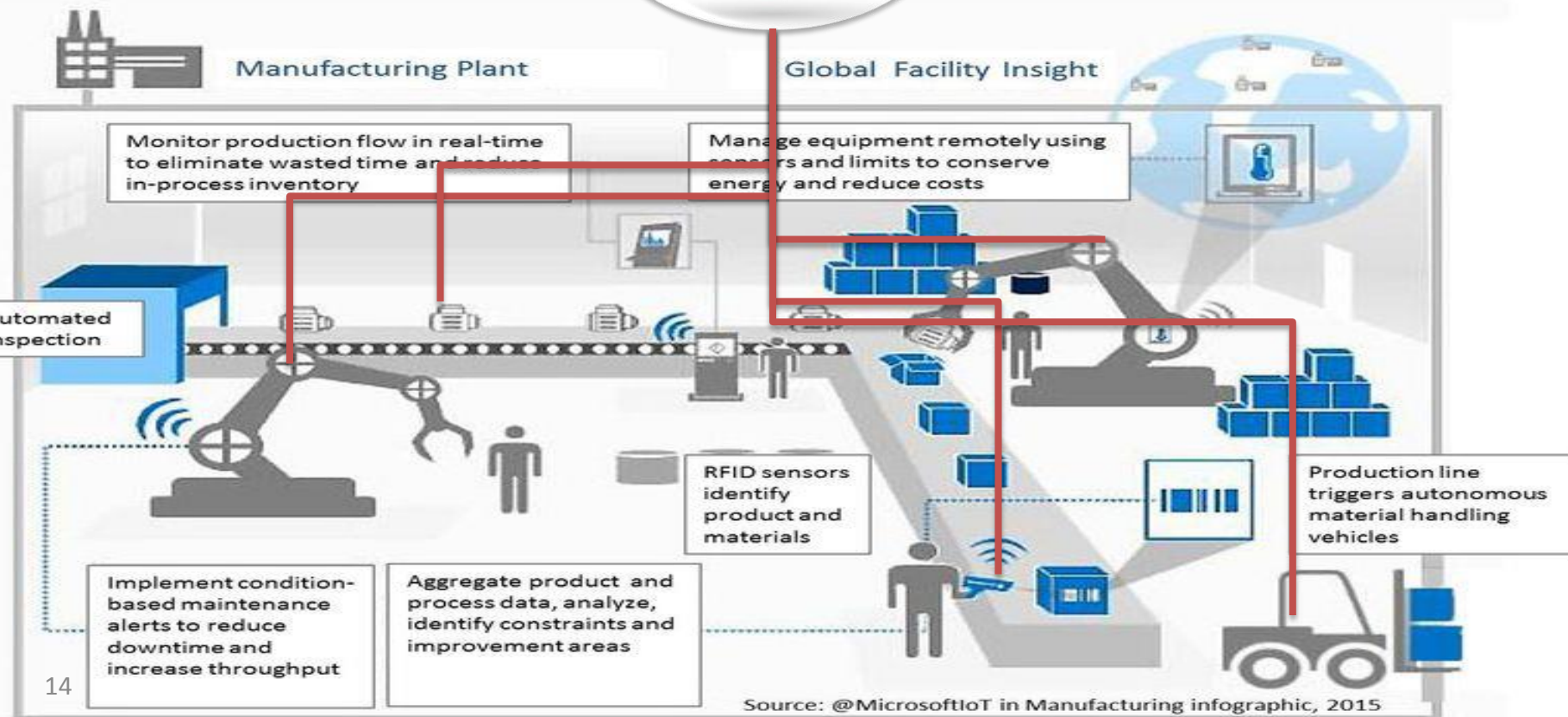
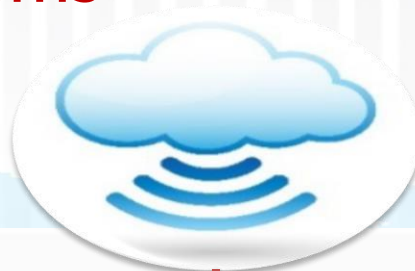
Proteus's "smart pill"

# Cyber Physical Systems

## The Factory of the Future

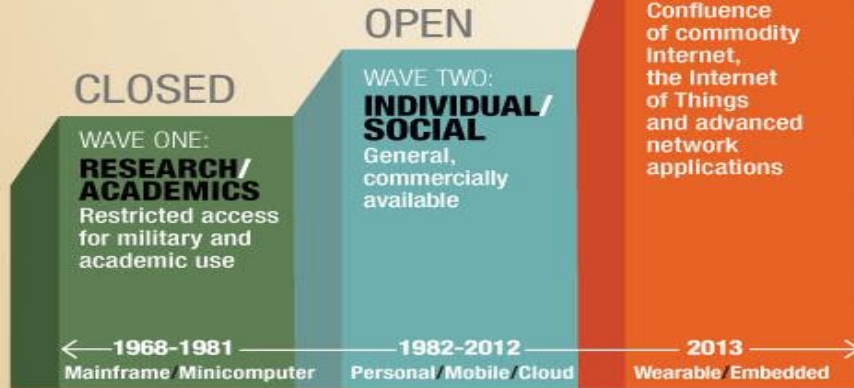
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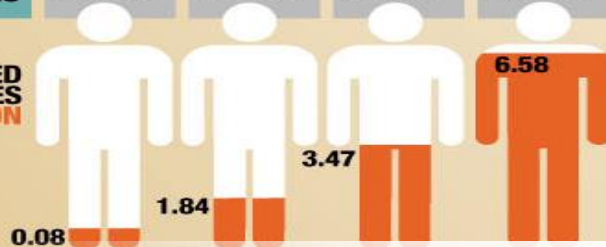
# EVOLUTION OF THE NET



## CONNECTED DEVICES

	2003	2010	2015	2020
<b>WORLD POPULATION</b>	6.3 BILLION	6.8 BILLION	7.2 BILLION	7.6 BILLION
<b>CONNECTED DEVICES</b>	500 MILLION	12.5 BILLION	25 BILLION	50 BILLION

**CONNECTED DEVICES PER PERSON**



Cisco Systems Inc.

## SMARTER STUFF INTERNET OF THINGS

It originally linked computers to computers, now billions of devices are connected to the Web: smartphones, automobiles, light bulbs, utility meters, remote sensors and more. In the coming decade, the quantity and types of devices linked to the Web and the apps that will run on this expanding "Internet of Things" will explode, driving a new Internet revolution.



**99%** of physical objects that may one day join the network are still unconnected. — Cisco Systems Inc.

## OPPORTUNITY \$

Corporations see big opportunity in helping government and business navigate the convergence of the digital with the broader physical world. A few of their initiatives:

**Smarter Planet** IBM

**Central Nervous System for the Earth** HP

**Industrial Internet**  
General Electric

**Powerful Answers** Verizon

Source: <http://www.digitalcommunities.com/articles/FutureStructure-The-New-Framework-for-Communities.html>

# Big Data & IoT



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- Every minute, we send **204 million emails**, generate **1.8 million Facebook likes**, send 278 thousand tweets, and **upload 200 thousand photos to Facebook**.
- **12 million RFID** tags (used to capture data and track movement of objects in the physical world) were sold in 2011. By **2021**, it's estimated this number will increase to **209 billion** as **IoT** takes off.
- The **BIG DATA** industry grew from US\$10.2 billion in 2013 to about US\$54.3 billion in 2017.





# What is digital transformation?



Digital transformation is the integration of digital technology into all areas of a business, fundamentally changing how you operate and deliver value to customers. It's also a cultural change that requires organizations to continually challenge the status quo, experiment, and get comfortable with failure.

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<https://enterpriseproject.com/what-is-digital-transformation>

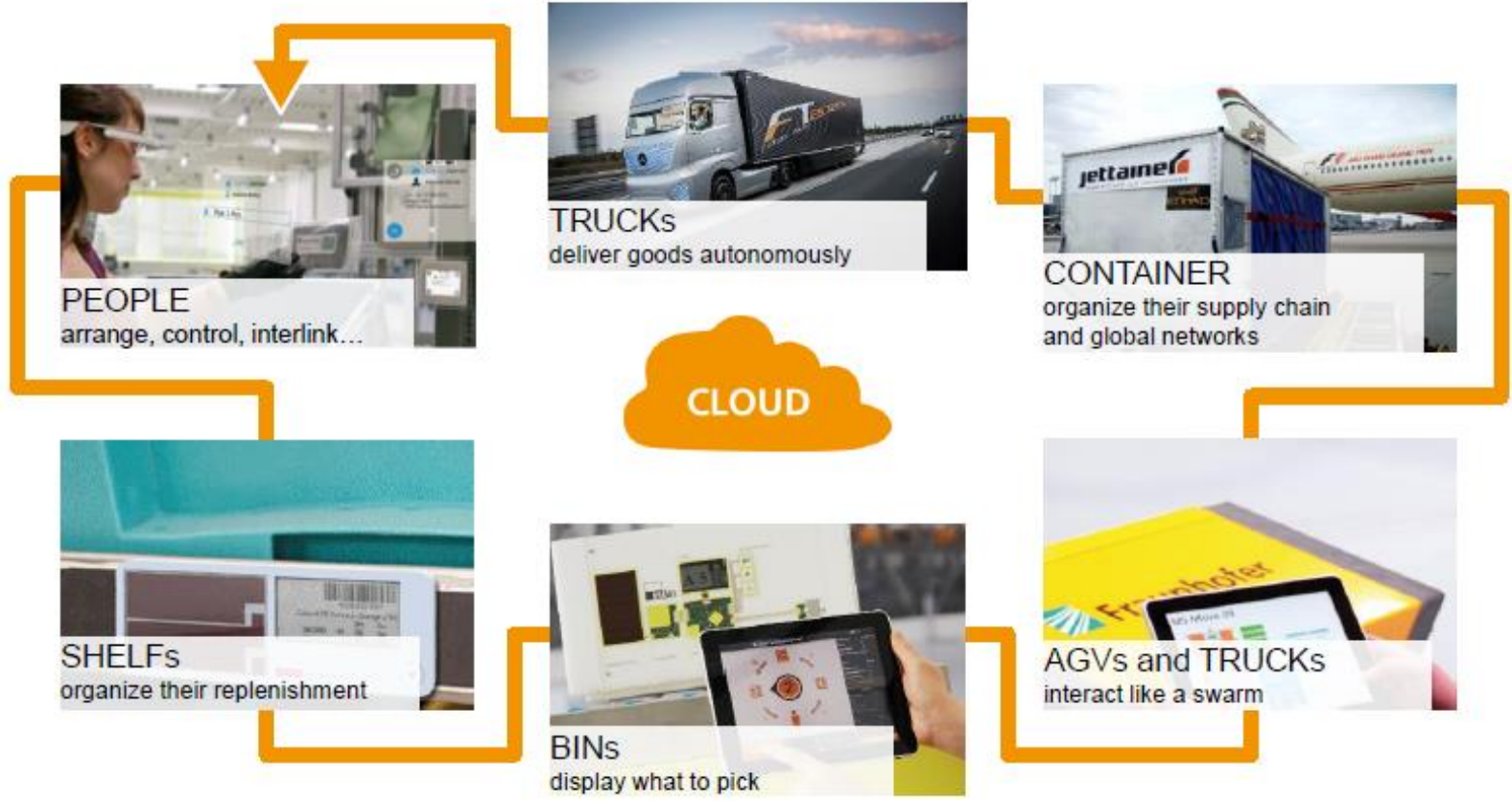


# Logistics 4.0 – Everything is connected

## In-transit visibility



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# What does the IoT means for Supply chain Operations

INTERNET OF THINGS IN LOGISTICS, **DHL Trend Research and Cisco Consulting Services, 2015**

“...This visibility, in turn, will transform **how logistics providers make decisions**, including about how goods are stored, monitored, routed, serviced, and delivered to customers, as well as operational health and safety practices.

Furthermore, **the proliferation of IoT** for our homes, work environments, cities and even ourselves (with the emergence of wearable technologies and biomedical sensors) **creates opportunities for new business models in logistics**. We believe there is hidden value yet to be realized.”



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James Macaulay  
Cisco Consulting Services



Dr. Markus Kückelhaus  
DHL Trend Research

# IoT and Supply Chain Decision Making



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“

The Internet of Things will revolutionize decision making – we know that. By connecting the previously unconnected, **we create incredible potential for businesses to improve the speed and accuracy of decision making through the analysis and application of digital information.** It enables dramatically faster cycle times, highly dynamic processes, adaptive customer experiences and, through the ecosystem of people and technology, the potential for breakthrough performance gains.



Edzard Overbeek,  
Senior Vice President,  
Cisco Services

”



Linear supply chains are evolving into...

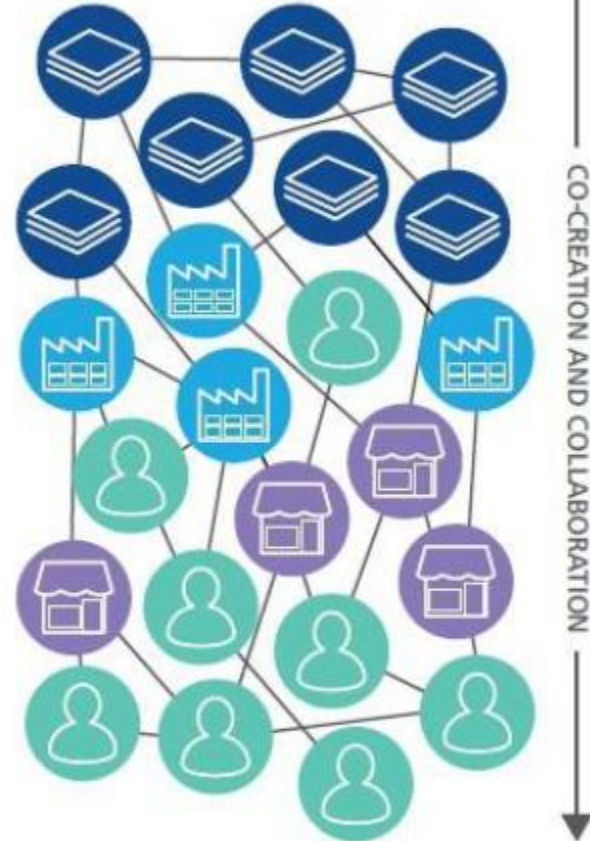
← COMPETITION →



Value is based on the production of goods and services

complex, dynamic, and connected value webs

← COMPETITION →

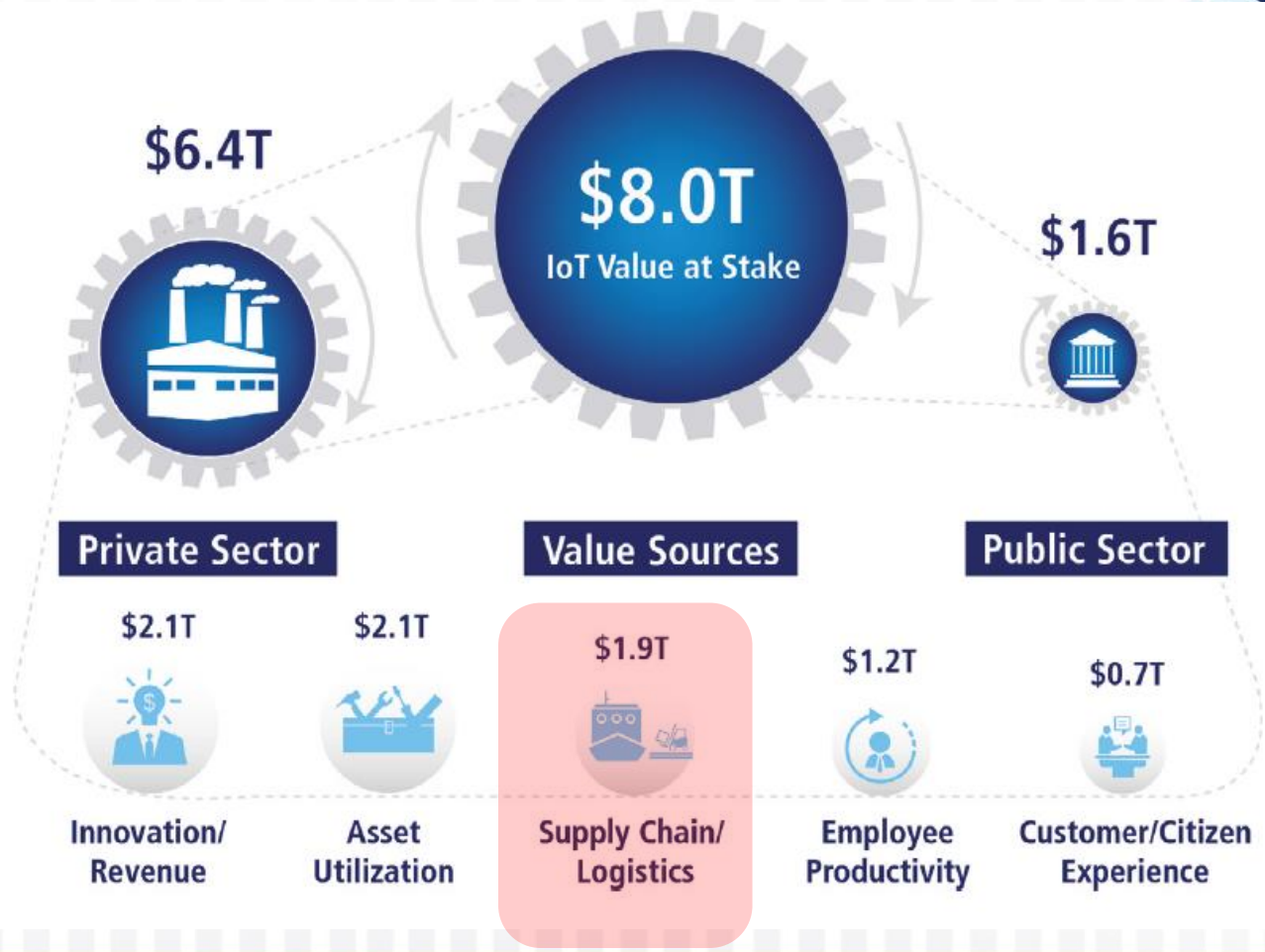


Value is based on knowledge exchange that drives proactive production of goods and services

# IoT Value at Stake in the next decade



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# Logistics 4.0 Trends

- Drone deliveries
- Autonomous cars
- Autonomous Trucks
- The hyperloop
- The future



## Travelling in a Tube

### THE TECHNOLOGY

A capsule, with passengers, travels at speeds of more than **1200 KM/H** inside a vacuum tube

Vacuum tube has an area of **LOW PRESSURE INSIDE IT**

It uses power from **RENEWABLE ENERGY** sources like solar energy, regenerative braking & wind power

These tubes stand on pylons that can **WITHSTAND** quakes & crashes

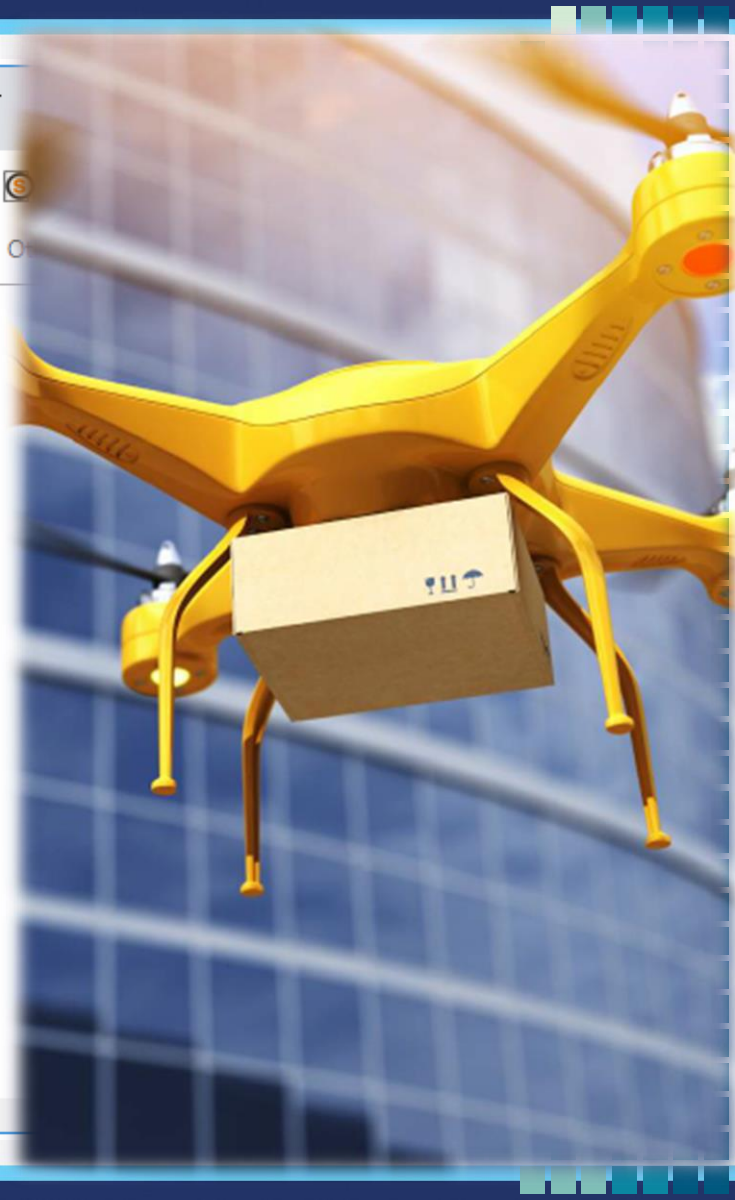
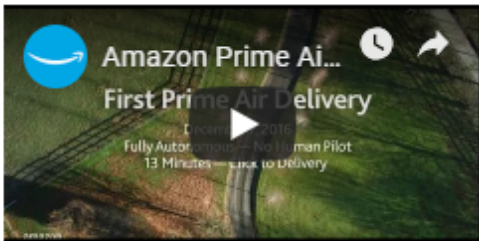




Transportation News

# From Click to Customer Delivery in 13 minutes, Amazon's Prime Air Drone Trial Begins

Amazon has started a Prime Air drone delivery trial in the UK working with two shoppers who can now order their goods by drone, over time Amazon plans to expand the trial to a dozen or more, and later to hundreds of shoppers who live within a few miles of its first Prime Air fulfillment center around Cambridge, England.



December 6<sup>th</sup>, 2018

Wing announced that it will start a new pilot in Finland beginning in the spring of 2019 in Helsinki, delivering goods and packages of up to 1.5 kilograms (about 3.3 pounds) within a distance of up to 10 kilometers (6.2 miles).

The screenshot shows a web browser window with the address bar displaying 'www.supplychain247.com/article/googles\_pa...'. The article title is 'Google's Parent Company Alphabet Will Begin 'Wing' Aerial Drone Deliveries in Finland'. Below the title is a large image of a yellow Wing drone in flight against a blue sky. The article text includes: 'Wing, the Alphabet-owned drone delivery startup, has announced that it will launch a free 10-minute trial distribution service starting in spring 2019 in Finland.' It also features a video player with the title 'Introducing Project Wing' and a play button. At the bottom, there are links for 'PINC Resources' and 'SEKO Intelligence Delivered'.

[http://www.supplychain247.com/article/googles\\_parent\\_company\\_alphabet\\_will\\_begin\\_aerial\\_drone\\_deliveries](http://www.supplychain247.com/article/googles_parent_company_alphabet_will_begin_aerial_drone_deliveries)

# Autonomous Driving

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- [Video: Audi Autonomous Driving](#)





<https://www.tesla.com/semi>



TESLA

MODEL S MODEL 3 MODEL X MODEL Y ROADSTER ENERGY

SHOP SIGN IN

# Tesla Semi

Semi is the safest, most comfortable truck ever. Four independent motors provide maximum power and acceleration and require the lowest energy cost per mile.

 <b>20s</b> 0-60 mph with 80k lbs	<b>&lt; 2 kWh/mi</b> Energy consumption	<b>0.36<sub>C<sub>d</sub></sub></b> Drag Coefficient	<a href="#">RESERVE NOW</a>
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# Tesla Orders



- The first pre-orders came in the day of the press conference and by mid-January around **450** Semis had been pre-ordered.
- The original deposit required with an order was \$5,000, which was increased to \$20,000 after the event in Nov 2017.
- In the Q1 2018 Tesla earnings call, there were about 2,000 total pre-orders of the Semi.

First Buyer	Order
Anheuser-Busch	<b>40</b>
Bee'ah	<b>50</b>
DHL Supply Chain	<b>10</b>
FedEx	<b>20</b>
Loblaw Companies	<b>25</b>
PepsiCo	<b>100</b>
Sysco	<b>50</b>
United Parcel Service	<b>125</b>
Walmart	<b>45</b>



REPORT



# DAIMLER IS BEATING TESLA TO MAKING SEMI-AUTONOMOUS BIG RIGS

*Riding in the new semi-autonomous Cascadia semi*

By Sean O'Kane | @sokane1 | Jan 11, 2019, 2:07pm EST



SHARE



Elon Musk told the world in late 2017 that Tesla was taking its automotive know-how and applying it to a totally new challenge: self-driving big rigs. But one year later, he placed the Tesla Semi fourth on a list of priorities for the company, behind the upcoming Model Y compact SUV and an electric pickup truck. This week, Daimler executed a move many years in the making by announcing its own big rig (albeit diesel-powered) outfitted with semi-autonomous technology. And others are following suit.



# Daimler Cascadia Semi Autonomous Truck



DAIMLER



# The Future .. The Hyperloop



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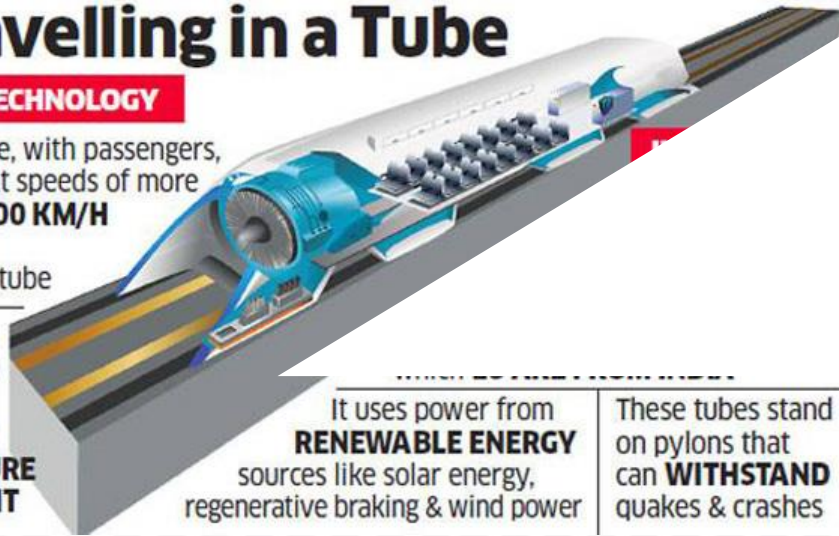
- [Video: The hyperloop](#)

## Travelling in a Tube

### THE TECHNOLOGY

A capsule, with passengers, travels at speeds of more than **1200 KM/H** inside a vacuum tube

Vacuum tube has an area of **LOW PRESSURE INSIDE IT**



It uses power from **RENEWABLE ENERGY** sources like solar energy, regenerative braking & wind power

These tubes stand on pylons that can **WITHSTAND** quakes & crashes





PREVIOUSLY RECORDED

FIRST ON  
CNBC



DAVOS  
2018

MOLLER MAERSK CEO  
DEAL WILL HELP DIGITAL

PREVIOUSLY RECORDED

FIRST ON  
CNBC



DAVOS  
2018

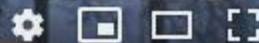
MAERSK, IBM TO LAUNCH BLOCKCHAIN  
BASED GLOBAL TRADE PLATFORM

Subscribe

CNBC



0:26 / 1:58







WELCOME TO MAERSK DIGITAL

# We are leading the digital transformation at Maersk

Read more





# Everything will be digitised

Published on 09 August 2018

Digitisation is transforming every industry and it will transform A.P. Moller – Maersk too in the coming years, with the creation of new products, better service for customers, operations that are more efficient and new sources of revenue.

## Digitisation of the container industry is still in early stages but will fundamentally change our industry

### STAGE 01

- Digital Impact primarily in **operations** and **cost reductions**
- Limited digital disruption in the industry



### STAGE 02

- **Digital engagement with customers** increasingly important
- **Increasing personalisation** of the customer experience using advanced data analytics



### STAGE 03

- **Advanced technologies** and **data analytics** constantly deployed to find competitive advantages



Digital technology will:  
 Vastly improve the customer experience  
 Enable next level optimization of operations

Fundamental and profound  
 change to our industry





### Priorities of Transport & Logistics Digital

<p><b>A one-stop-shop for container logistics</b></p> 	<p>Build a natively digital one-stop-shop for container logistics and predominately engage our customers through this online channel</p>
<p><b>Digitise all of our assets</b></p> 	<p>Digitise all of our physical assets, unleash the potential of the internet of things and increase assets under our constant monitoring/management</p>
<p><b>Deliver digital products</b></p> 	<p>Use digital technology to develop new commercial-grade software products, enable new business products (e.g. 4PL, 5PL) or enhance existing business products</p>
<p><b>Shape and influence a digital marketplace</b></p> 	<p>Shape, influence or own a digital marketplace for transport &amp; logistics</p>



# The far future of freight - 2060



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[Video: Kalmar Port 2060 Vision](#)





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This is our future ..  
Are we prepared for it ?



A light blue world map is centered on a white background. The map shows the outlines of all continents. A solid blue horizontal bar runs across the top and bottom of the image. The text "Thank you for listening !" is written in a black, sans-serif font across the middle of the map.

Thank you for listening !