

IoT

**THINGS WE SAY TODAY,
 WHICH WE OWE TO
 SHAKESPEARE:**

"KNOCK, KNOCK! WHO'S THERE?" "HEART OF GOLD"
 "IN A PICKLE" "SET YOUR TEETH ON EDGE"
 "FAINT HEARTED" "SO-SO" "GOOD RIDDANCE"
 "LIE LOW" "FIGHT FIRE WITH FIRE" "BAITED BREATH" "SEND HIM PACKING"
 "WEAR YOUR HEART ON YOUR SLEEVE" "COME WHAT MAY"
 "THE GAME IS UP"
 "NOT SLEPT ONE WINK" "FULL CIRCLE" "OUT OF THE JAWS OF DEATH"
 "WHAT'S DONE IS DONE" "NAKED TRUTH" "TOO MUCH OF A GOOD THING"
 "LAUGHING STOCK" "BREATHE HIS LAST" "BREAK THE ICE" "WILD GOOSE CHASE"
 "HEART OF HEARTS" "VANISH INTO THIN AIR" "MAKES YOUR HAIR STAND ON END"
 "SEEN BETTER DAYS" "FOR GOODNESS' SAKE" "LOVE IS BLIND"
 "DEAD AS A DOORNAIL" "FAIR / FOUL PLAY" "OFF WITH HIS HEAD"
 "GREEN EYED MONSTER" "BRAVE NEW WORLD" "A SORRY SIGHT"
 "THE WORLD IS MY OYSTER" "BE ALL / END ALL"

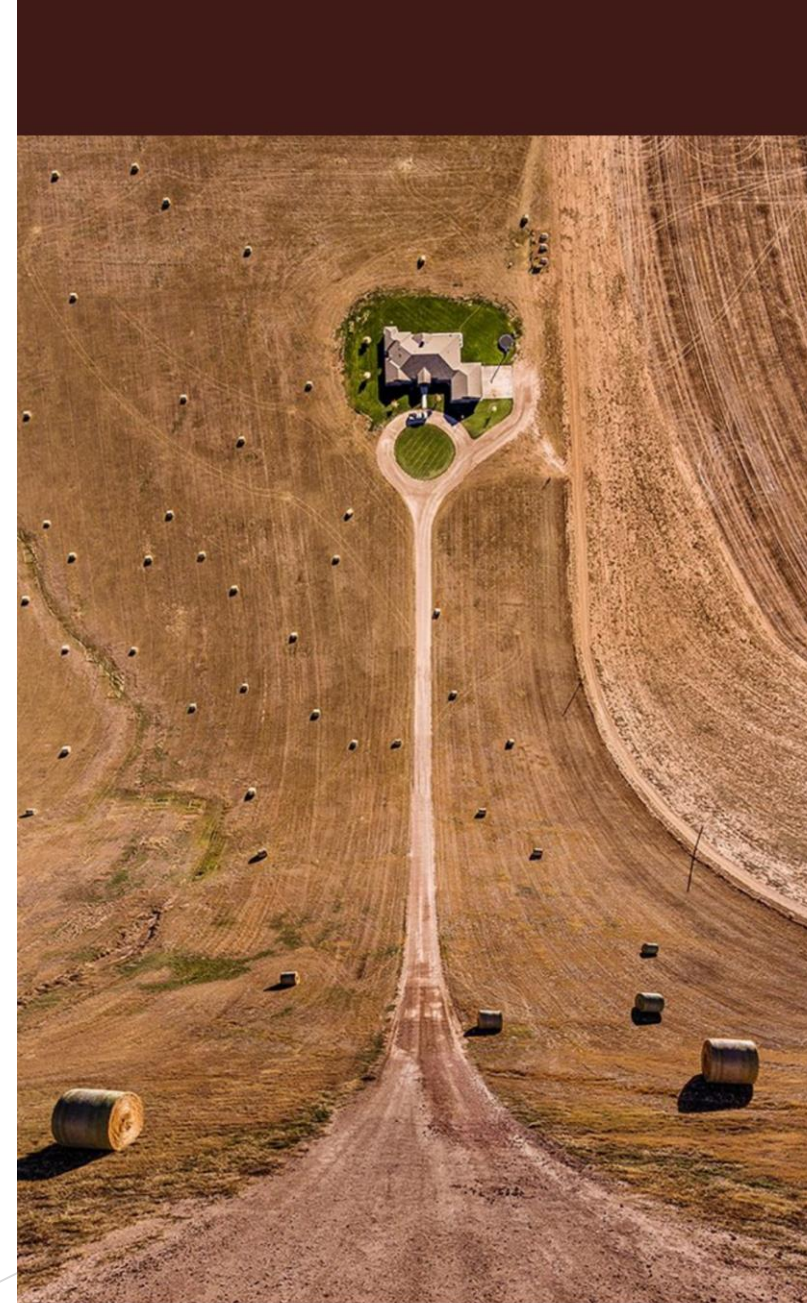
35th Road Pavement Forum_Cape Town

Krishna Naidoo
 9 May 2018

What is IoT

Network of physical devices embedded with electronics, software, sensors, actuators and connectivity which enables these objects to connect and exchange data.

The IoT integrates the interconnectedness of human culture....our “things”with the interconnectedness of our digital information system....”the internet.” That’s the IoT - Kevin Ashton 1999



FUTURE FARMS

small and smart

SURVEY DRONES

Aerial drones survey the fields, mapping weeds, yield and soil variation. This enables precise application of inputs, mapping spread of pernicious weed blackgrass could increase wheat yields by 2-5%.

FLEET OF AGRIBOTS

A herd of specialised agribots tend to crops, weeding, fertilising and harvesting. Robots capable of microdot application of fertiliser reduce fertiliser cost by 99.9%.



FARMING DATA

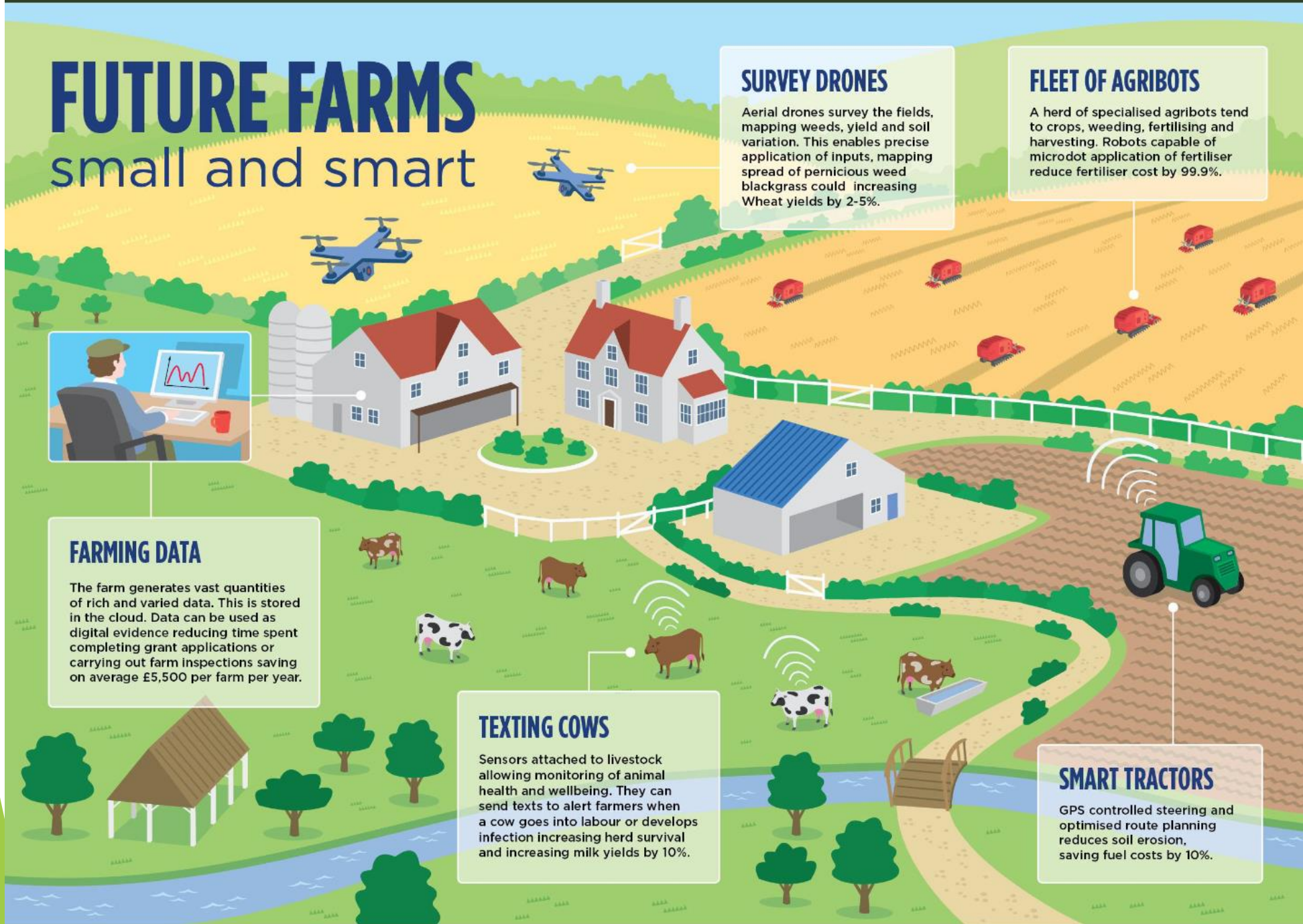
The farm generates vast quantities of rich and varied data. This is stored in the cloud. Data can be used as digital evidence reducing time spent completing grant applications or carrying out farm inspections saving on average £5,500 per farm per year.

TEXTING COWS

Sensors attached to livestock allowing monitoring of animal health and wellbeing. They can send texts to alert farmers when a cow goes into labour or develops infection increasing herd survival and increasing milk yields by 10%.

SMART TRACTORS

GPS controlled steering and optimised route planning reduces soil erosion, saving fuel costs by 10%.


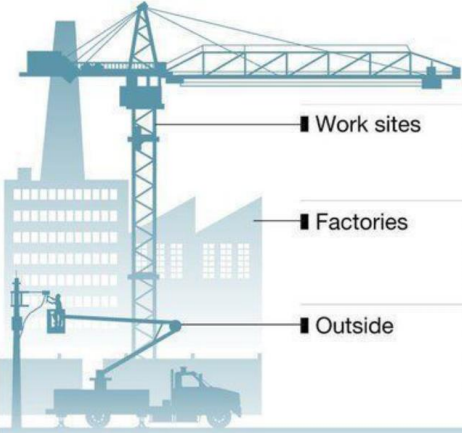




When did IoT start? “Men of Science”

“Data transmitted every half-hour from the cloud provided temperature observations to the men of science for predicting weather patterns with more accuracy than ever before” - British Association for Advanced Science (now British Science Association)

Some say we are at the beginning of the 4th Industrial Revolution

Internet of Things applications create values in nine settings.

Settings	Description	Use-case
 <ul style="list-style-type: none"> ■ Cities 	Urban environments	Public safety and health, traffic control, resource management
<ul style="list-style-type: none"> ■ Offices 	Employment locations for knowledge workers	Organizational redesign and worker monitoring, augmented reality for training
<ul style="list-style-type: none"> ■ Retail 	Locations where consumers engage in commerce	Self-checkout, layout optimization, smart customer relationship management
 <ul style="list-style-type: none"> ■ Work sites 	Custom production environments	Operations management, equipment maintenance, health and safety
<ul style="list-style-type: none"> ■ Factories 	Standardized production environments	Operations management, predictive maintenance
<ul style="list-style-type: none"> ■ Outside 	Between urban environments (and outside other settings)	Logistics routing, autonomous (self-driving) vehicles, navigation
 <ul style="list-style-type: none"> ■ Home 	Buildings where people live	Energy management, safety and security, chore automation
<ul style="list-style-type: none"> ■ Human 	Devices attached to or inside human body	Monitoring and managing illness, improving wellness
 <ul style="list-style-type: none"> ■ Automobile 	Systems inside moving vehicles	Condition-based maintenance, determining insurance premiums

What is: Industry 4.0 Internet 4.0 - the Ambient Internet (2017....)

Internet 1.0 : Pre-web internet (1968 -1995)

Connecting geeks in academia in text.

Internet 2.0 : Rise of the Web (1995 - mid 2010)

Internet 3.0 : Mobile Internet (2008 - 2017..._

Internet 4.0 : Ambient Internet (2017)

Internet is moving from being available anywhere and anytime through **specific device** to being available in all places and at all times through **most devices**.

Industry 4.0

1st Industrial Revolution : Mechanization, water power, steam power

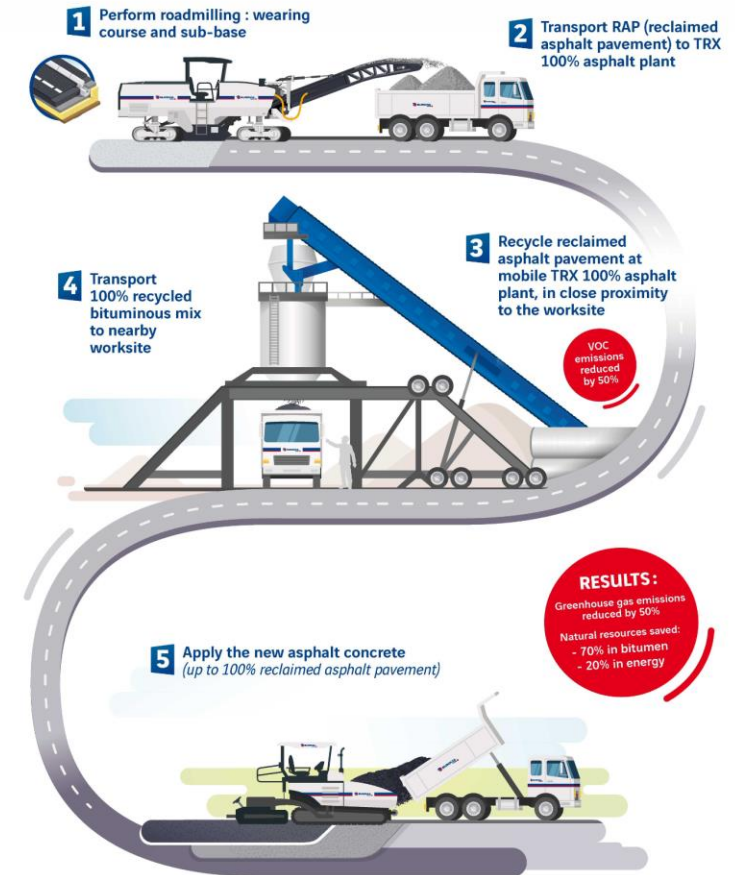
2nd Industrial Revolution : Mass production, assembly line, electricity

3rd Industrial Revolution : Computer and automation

4th Industrial Revolution : Cyber Physical Systems

Over IoT cyber-physical systems communicate and co-operate with each other and with humans in real time.....

THE 100% RECYCLED ROAD



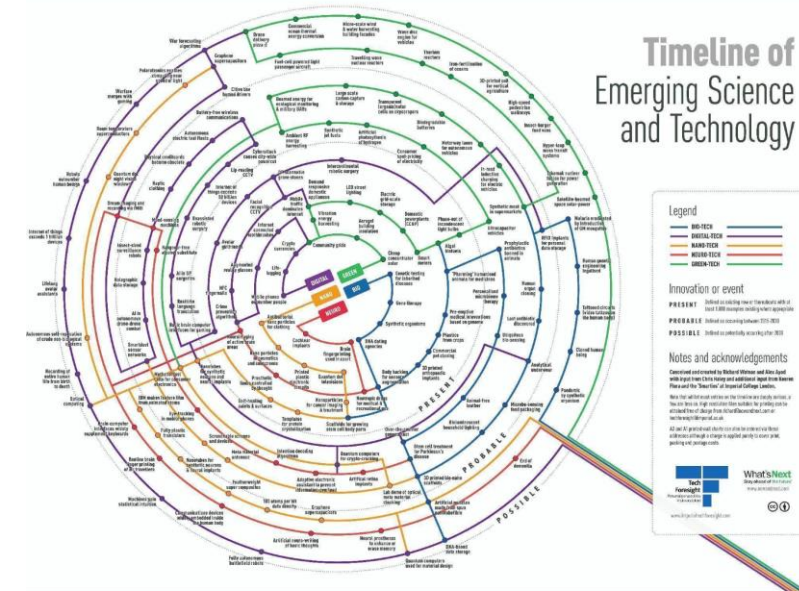
Why is it now of consequence?

5G being rolled out internationally

Sensors are changing exponentially, costs have come down

Big data analytics is now mainstream

Adoption of IPv6, an address for every device



5G - fifth gen mobile wireless network

Wireless Infrastructure Deployment - thousands of small cells integrated into physical structures vs existing monolithic cell towers.

Takes us beyond dependency on just fibre roll-out monopoly

Electromagnetic spectrum allocation / sharing

Radical download and upload speed improvements

20Gbits/s vs 1Gbit/s

Latency is almost 10 times better than on 4G

5G Rollout in South Africa

Trials have taken place:

MTN & Ericsson

Vodacom & Nokia

Telkom optimizing with 4.5G

Cell C.....

#IBMIoT

The Internet of Things is causing a connected electronics explosion

Leading electronics organization are searching for ways to capitalize on the Internet of Things

Wrap your head around these use cases

- Remote Management and Consumer Insights** for riskiness, secure and transparent lifecycle management
- Connected products** to create better client experiences
- Intelligent fulfillment** to reduce failures
- Asset optimization** for improved performance and lower costs
- Plant performance management** to increase uptime and reduce cost
- Aftermarket service** to enable new business models

5 ways the Internet of Things is about to change the electronics landscape

- 70% of global manufacturers** will offer connected products by 2022
- Hundreds of smart objects** in the typical home by 2022
- 70% of healthcare organizations** will invest in customer-facing mobile applications, wearables, remote health monitoring and virtual care by 2018
- 99.4% of physical objects** that may one day be part of the Internet of Things are still unconnected

The Internet of Things revenue from the worldwide Discrete Manufacturing vertical market
\$746.5 billion in 2018

It isn't hype, it's happening

IBM is helping electronics organizations across the globe successfully construct their IoT future and turn the IoT hype into insight

See how you can leverage the Internet of Things as a differentiator for your electronics business
<http://ibm.co/loElectronics>

IBM

Where in the world?....

does it matter though,
given

our interconnectedness

& interdependence

STATE OF IOT Healthcare

By 2019, 87% of healthcare organizations will have adopted Internet of Things (IoT) technology and 76% believe it will transform the healthcare industry. But, how are business executives using IoT today and what do they expect from it in the future? Here's what they told us.



How is IoT being used?



73%

Monitoring and maintenance



50%

Remote operation and control



47%

Location-based services



67%

Plan to connect their IoT devices using Wi-Fi

Benefits from IoT



80%

Increased innovation



76%

Visibility across the organization



73%

Cost savings

The most common IoT technology today



64%

Patient monitors



56%

Energy meters



33%

X-rays and imaging devices

Threats from IoT



89%

Have suffered an IoT-related security breach



49%

Malware



39%

Human error



22%

DDoS

"In the future IoT will allow us to..."



57%

Increase workforce productivity



57%

Save costs



36%

Create new business models



27%

Improve collaboration with colleagues and patients

aruba
a Hewlett Packard
Enterprise company

www.arubanetworks.com/iot
Contact Us:
1.844.473.7242 | info@arubanetworks.com

Impact projections

Number of IoT devices (Gartner):

2017 8.4 billion

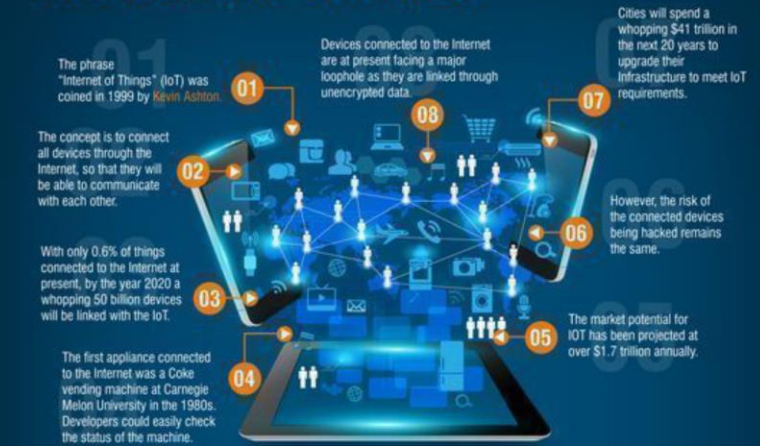
2020 20.4 billion

Financial impact:

Spend on IoT endpoints & services \$2 trillion in 2017 (Gartner)

Spend on IoT hardware \$ 239 billion (modules and sensors) in 2018 (IDC)

WHAT IS INTERNET OF THINGS?



WHAT WILL IoT DO?

1. Over 80% of IT experts believe that IoT will be beneficial to the world.
2. IoT will enhance data exchange and living standards.
3. IoT promises a high level of efficiency, and will reduce costs in our homes, workplaces and cities.
4. Nearly 24 million cars will have access to the Internet by 2016. This is from just 8.7 million cars in 2010.



IoT = Internet 4.0 = Industry 4.0

Your business is in revolution
Your world is in revolution

Your doggie as well

Your gym as well

Your fridge as well

Your car as well

Your insurance company as well

Your bank as well

Are we an open data industry ?
Do we have a choice ?
Will we have a choice?
Will we stumble into Cross industry
data analytics ?

For how long can we continue with typing a memo, printing, then scanning, then mailing the scan, then having that scan printed, completed in appropriate places, then scanned, the mailed back?

Dimension Data & Tour de France

Bikes were equipped with GPS sensors to generate live tracking data. (Data generator)

Data analysis, then packaging for broadcasters and commentators (analysis, packaging and presentation)

Enhancing fan experience (service or product user/purchaser)



#EECongress 2020

Asphalt 4.0 for future mobility

EURASPHALT & EUROBITUME INDUSTRY CONGRESS

Timeline indicates the confidence as well as extent of impact of IoT & Industry 4.0

Also suggests that IoT is already being embraced and integrated by asphalt industry.

THEME OF THE CONGRESS

Asphalt 4.0 for future mobility

E&E CONGRESS 2020 WEBSITE

The website of the E&E Congress 2020 will become available in June 2018.

The slide features a grey background with yellow text. At the top, there are social media icons (YouTube, Twitter, Facebook, Email) and a status bar showing a clock, Wi-Fi, signal strength, 47% battery, and the time 11:47. The bottom of the slide shows the Android navigation bar with back, home, and recent apps buttons.

7th E&E CONGRESS
EURASPHALT & EUROBITUME

MADRID 12-14 May 2020
Palacio Municipal de Congresos de Madrid

ASPHALT 4.0 FOR FUTURE MOBILITY

#eecongress2020
www.eecongress2020.org

The poster has a yellow and blue color scheme. It features a stylized logo at the top left, a night photograph of a city street with light trails, and the congress details in the center. The hashtag and website are at the bottom.

Texas A& M

Preparing for Connected Automation



What do we do with dis IoT ting



Next RPF presentation by Ericsson or Nokia

Become part of the international industry
using IoT - EE Congress development

Case study: Business analysis for IoT adoption

Facilitate local manufacturing of IoT of
building

