

Digital Enterprise

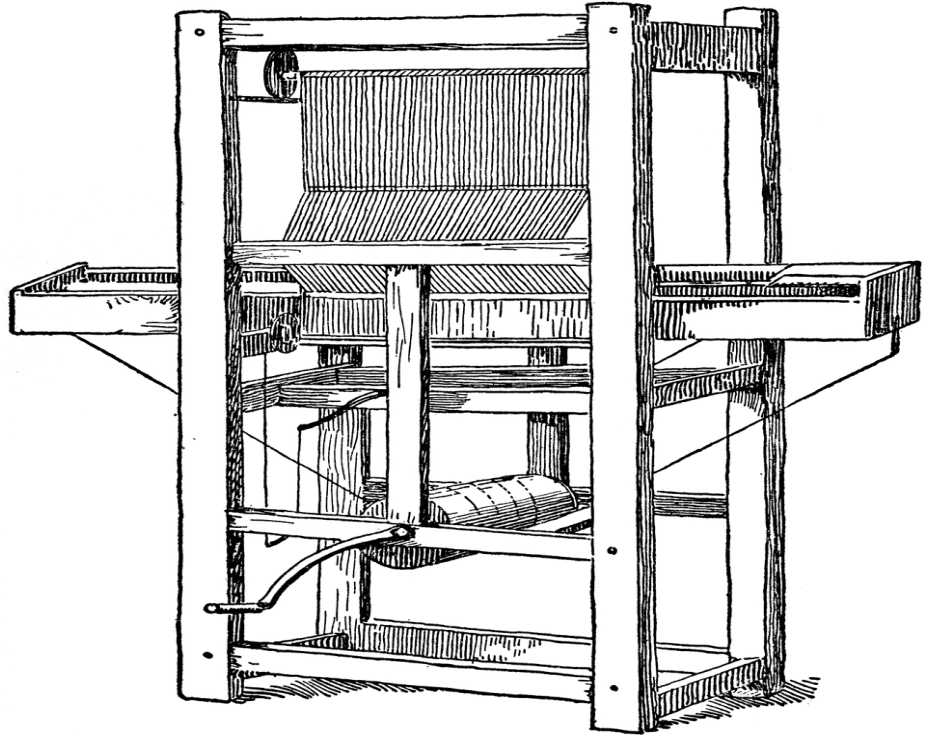
Industry 4.0



HI story?

First Industrial Revolution

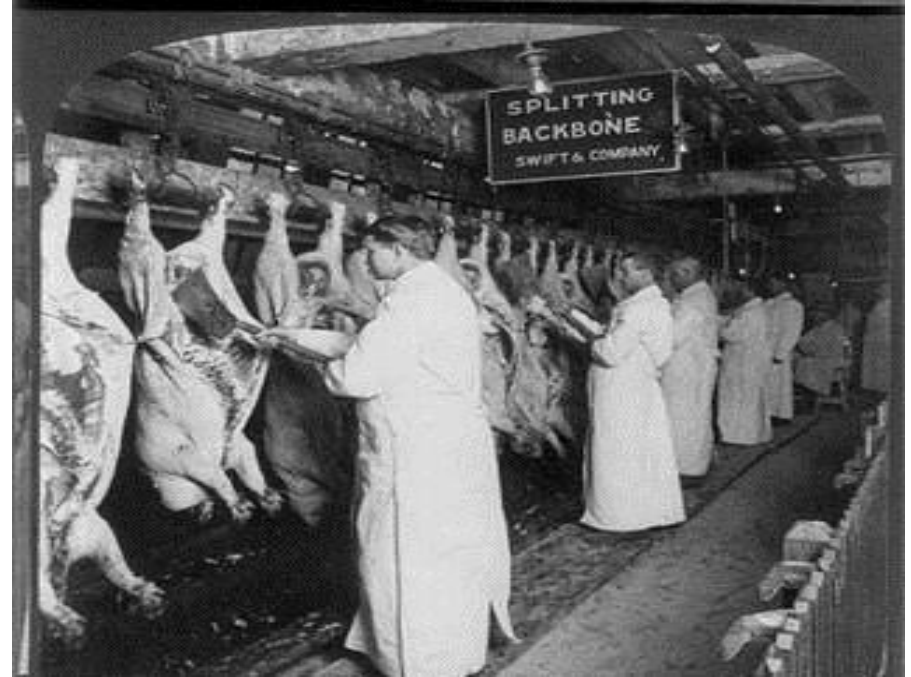
- ***Mechanical Steam Power***



***First mechanical loom
Doncaster England, 1784***

*Second Industrial
Revolution*

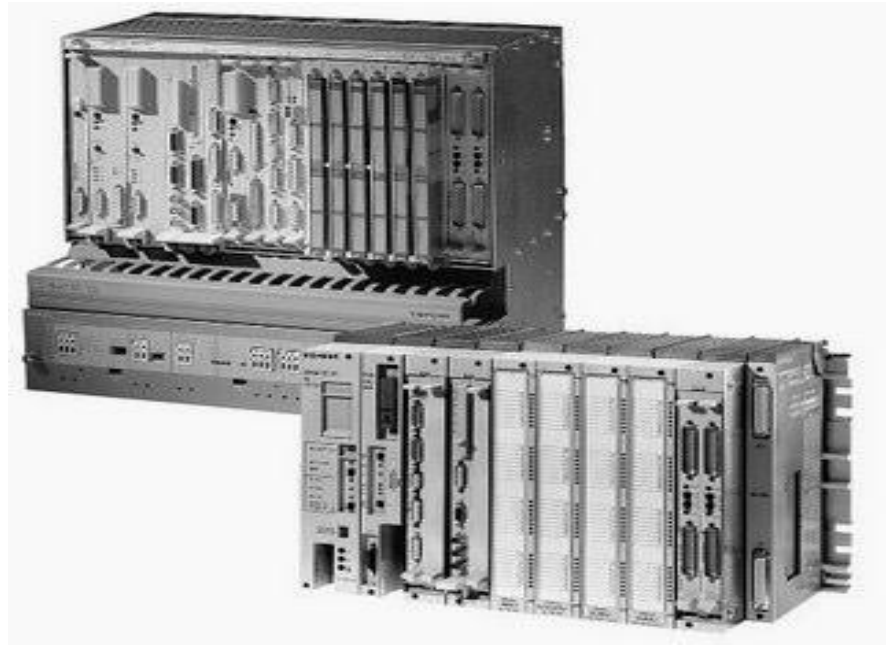
- *Electrical Energy*



***First assembly line
Cincinnati USA, 1870***

*Third Industrial
Revolution*

- *Electronic and IT Systems*



**Programmable Logic Controller (PLC)
Modicon 084
1969**



Why?

*East Manufacturing
Overwhelming West*

• *Industrial products sales*


Billion €	2006	2011
EU (27)	550	620
China	170	580
USA	280	280
Germany	190	220
Russia	10	15



*Shorten
Time to
market*

- *Shorter innovation cycles*
- *More complex products*
- *Smaller lots*





*Increase
flexibility*

- *Individualized production*
- *Volatile markets*
- *Max. automation*





- *More with less*
- *Energy efficiency*
- *Robots for redundant actions*
- *More flexible and coherent processes*



INDUSTRIE

4.

0

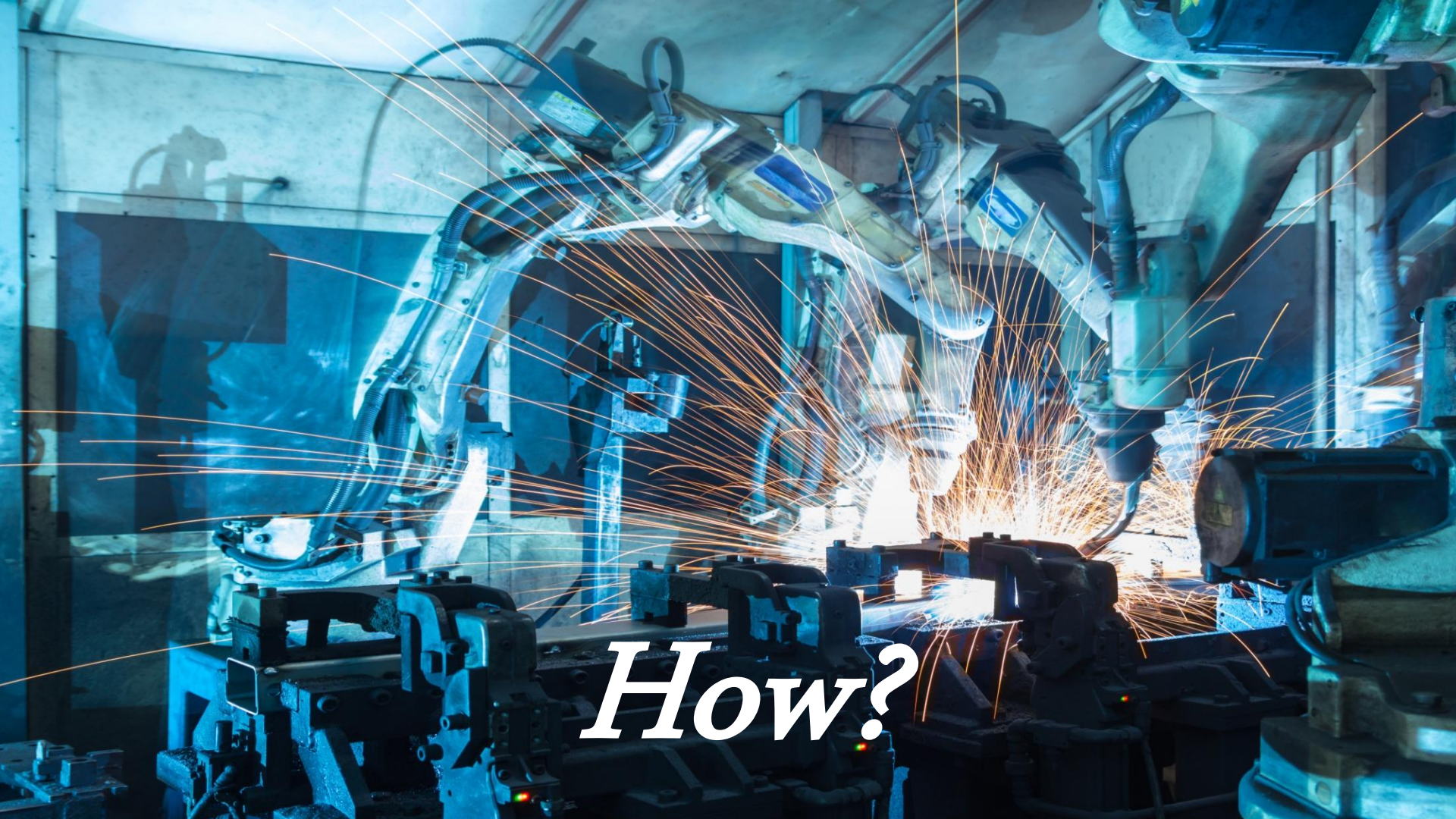
When?



- *2011 Hannover Fair*
- *2012 German Federal Government*
- *2013 GFG Strategy Report*
- *2014 Turkey Press Launch*
- *2015 Hannover Fair*



**HANNOVER
MESSE**



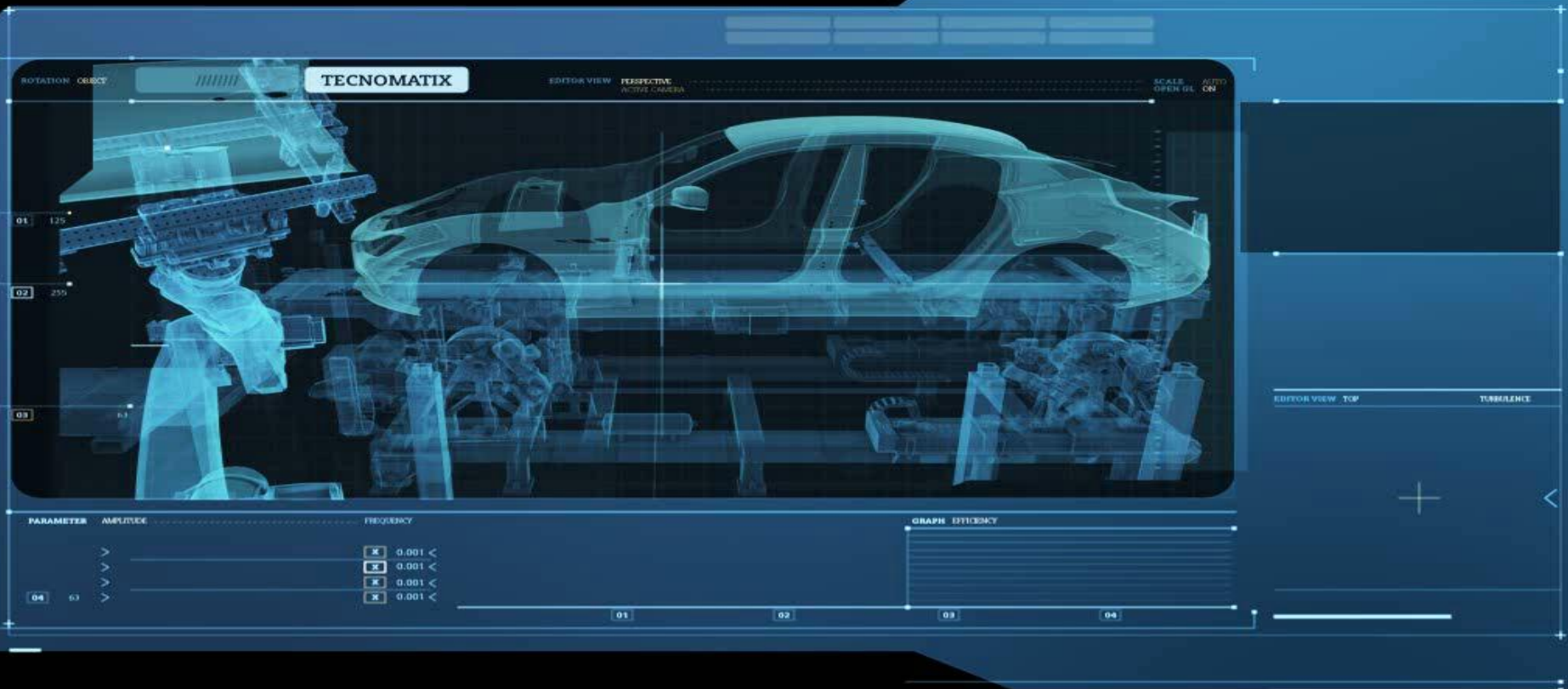
How?



Cyber - Physical Systems

- **Bits and atoms**
- **Digital 3D simulation of factories, manufacturing lines and human**
- **All on PLM-Product Lifecycle Management systems**
- **Digital 3D simulation of products**





TECNOMATIX

ROTATION OBJECT

EDITOR VIEW PERSPECTIVE
ROTATE CAMERA

SCALE AUTO
OPEN DL ON

01 125

02 250

03 0.1

PARAMETER AMPLITUDE FREQUENCY

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04 0.1

GRAPH EFFICIENCY

01

02

03

04

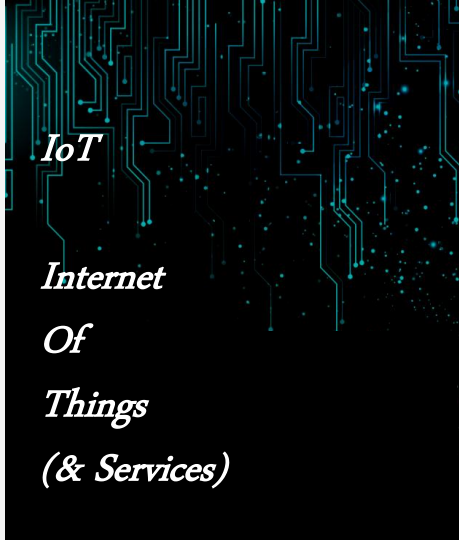
EDITOR VIEW TOP

TURBULENCE

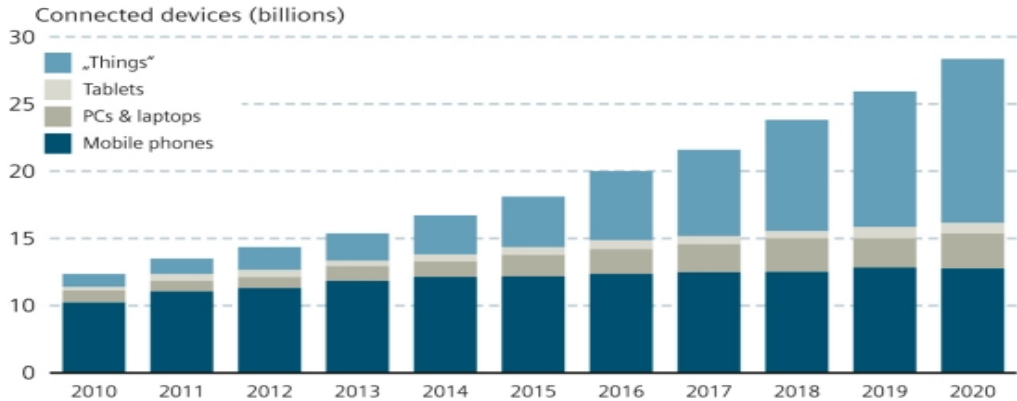
*Vertical &
Horizontal
Integration*

- **Vertical:**
*Marketing, Sales, Planning,
Production (ERP, MES)*
- **Horizontal:**
*Suppliers, Producer,
Logistics, Distributers,
Customers*
- ***No hierarchy, all distributed***





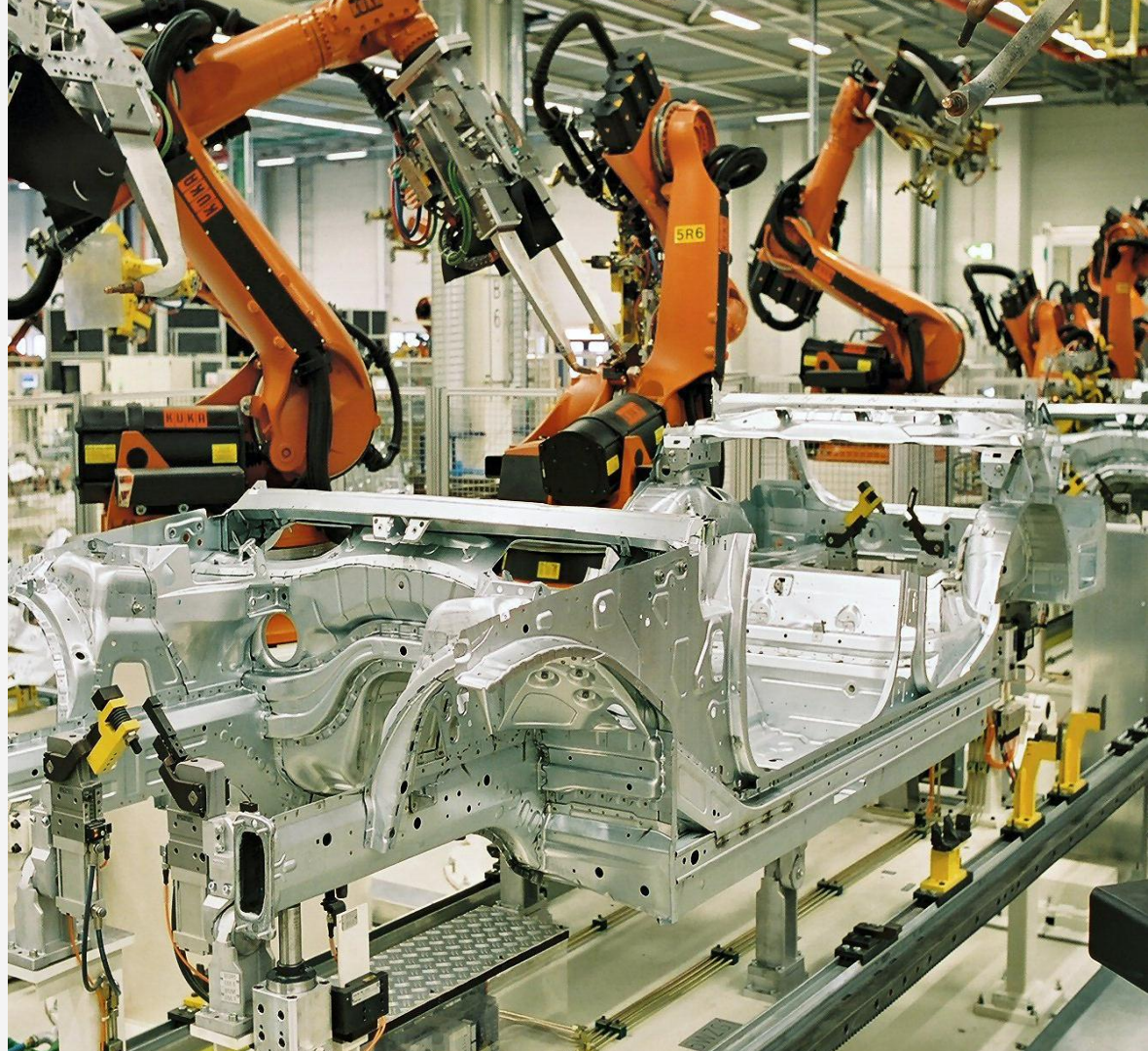
- **Unique ID for every material, machine, product and human**
- **End-to-end digital process info from supplier to customer**
- **Communicating, analyzing data, predict failure, configure trouble shooting**
- **Adapt to changes**

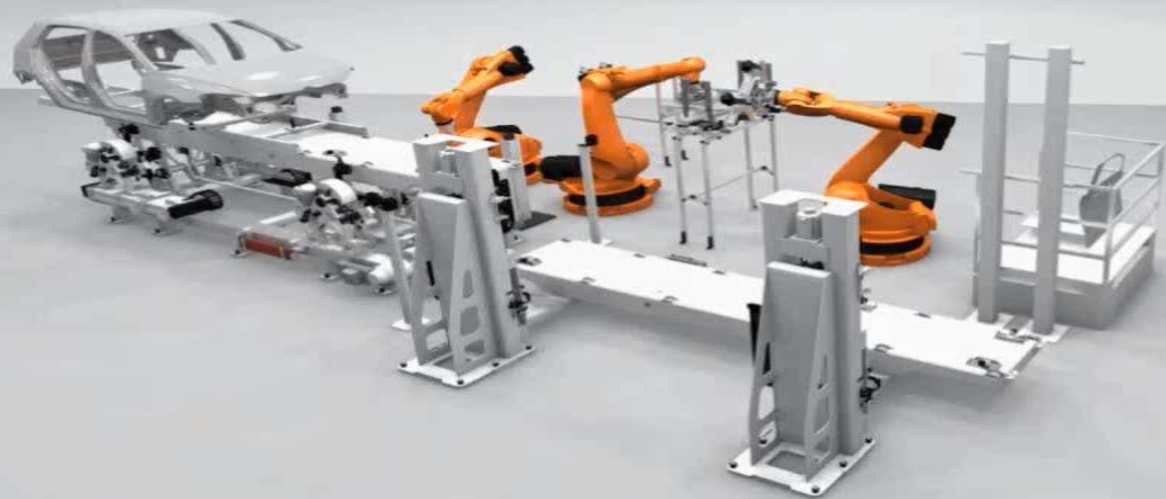


Connected “things” will double to 28 billion by 2020, human to 7,7 billion

Autonomous Robots

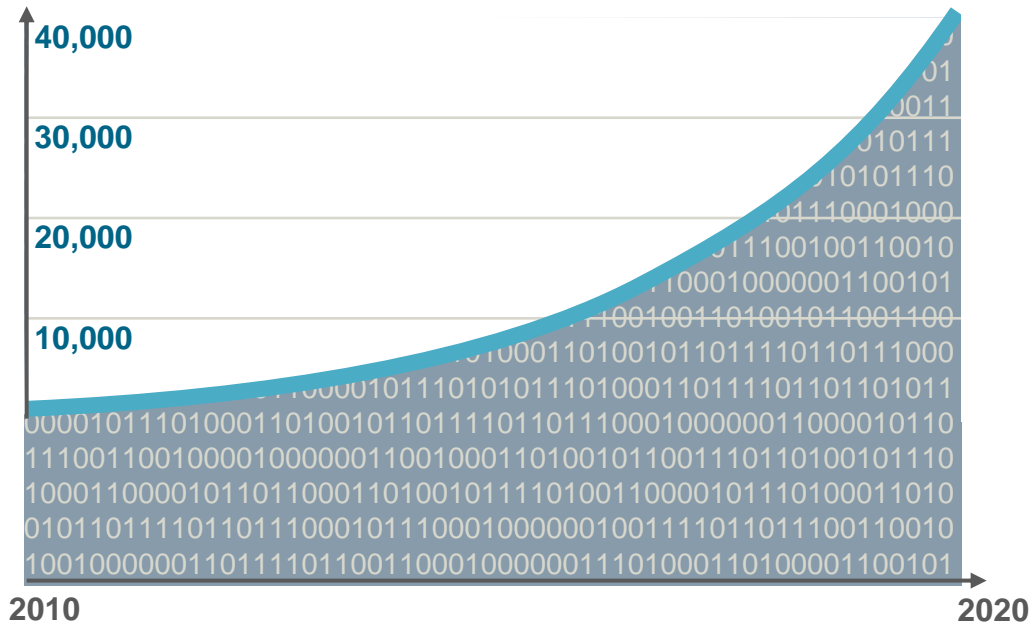
- *Learning from other robots and humans*
- *Multi programmable*
- *Great capabilities*
- *H2M, M2H, New:M2M,*
- *Self –testing and repairing*





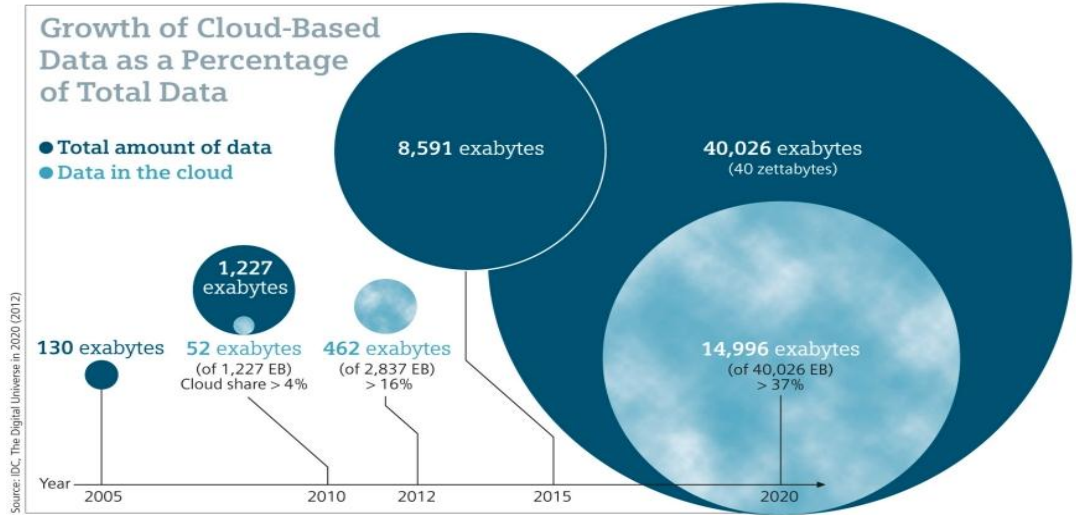


- ***By 2020 the digital universe will reach 40,000 exabyte p.a.***
- ***Many different sources (robots, automation software, even unfinished product)***
- ***Must for real-time decision making***



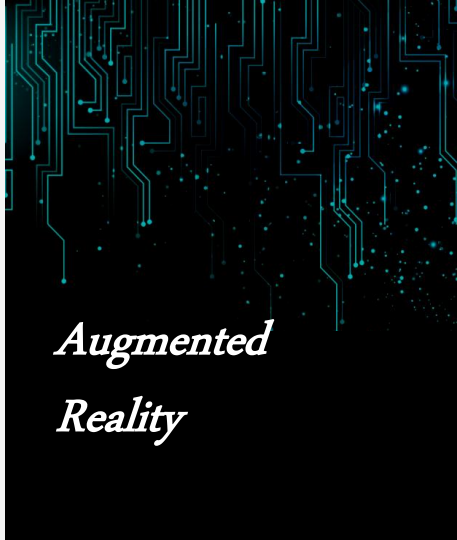
50fold

**Increase of data
from 2010 to 2020**



- **35 % in Cloud by 2020**
- **Cloud based solution**
- **Smart applications**





Augmented Reality

- ***Manufacturing instructions***
- ***Real-time reports, messages***
- ***Quality checks with camera***
- ***Emergency directives***





- *More comprehensive security framework*
- *Increased communication can cause access problems*
- *Vulnerable to cyberattacks, data privacy is critical*





What @SIEMENS?

*Siemens
Amberg
Facility*

- *1000+ product variants*
- *1 Million products monthly*
- *Only 25% performed by humans*
- *Quality 99.9988 %*





INDUSTRY

What@Turkey

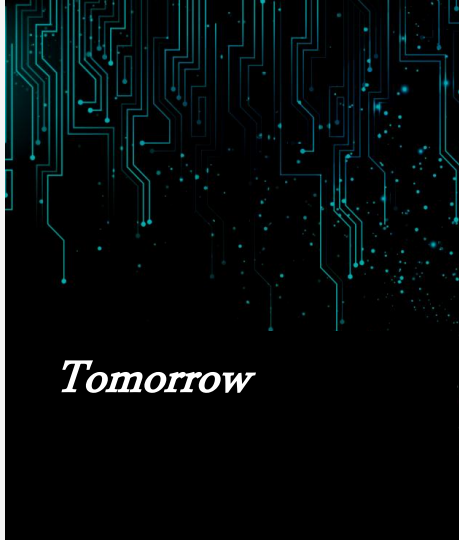


Today

- *Between 2.0-3.0*
- *Ministry of Science, Industry and Technology – 15%*
- *Industry Collaboration Program*
- *Support Programs*
- *Biliřim Vadisi*
- *İřbirlięi-Güçbirlięi Destek Programı*



Photograph Source : <http://fotogaleri.egebirlik.org.tr>



Tomorrow

- ***Industry 4.0 Turkey Platform***
- ***Industry 4.0 Country Strategy***
- ***Eurasia Hub of Manufacturing***
- ***From “technology user” to “innovator”***
- ***Middle Income Trap***





What@Next



Investment

- ***Germany invests € 40 B,
Europe € 140 B p.a till 2020***
- ***3.3 % of revenues in avg***





Revenue Growth

- ***New complex products***
- ***New customized products***
- ***Growth of 2-3% in ind. sales***
- ***Plus € 30 B for Germany and
€ 110 B for Europe***





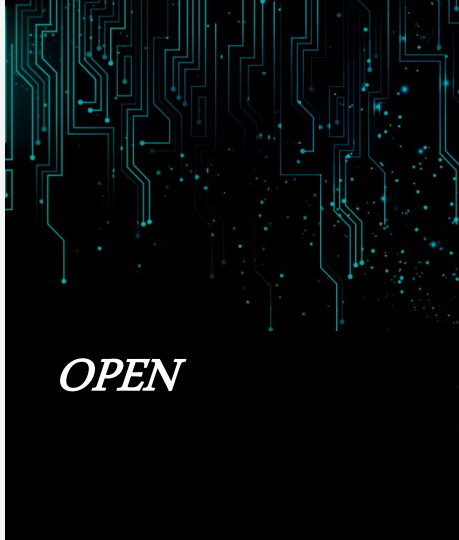
Employment

- *6% increase*
- *Highly skilled people needed*
- *IT and Mechatronics experts replacing low skilled laborers*





What@Beyond



- *Open Innovation*
- *Open Design*
- *Open Software*
- *Open Hardware*
- *Open Organization*
- *Open Production*
- 49 *Open Capital*



Makers

Movement

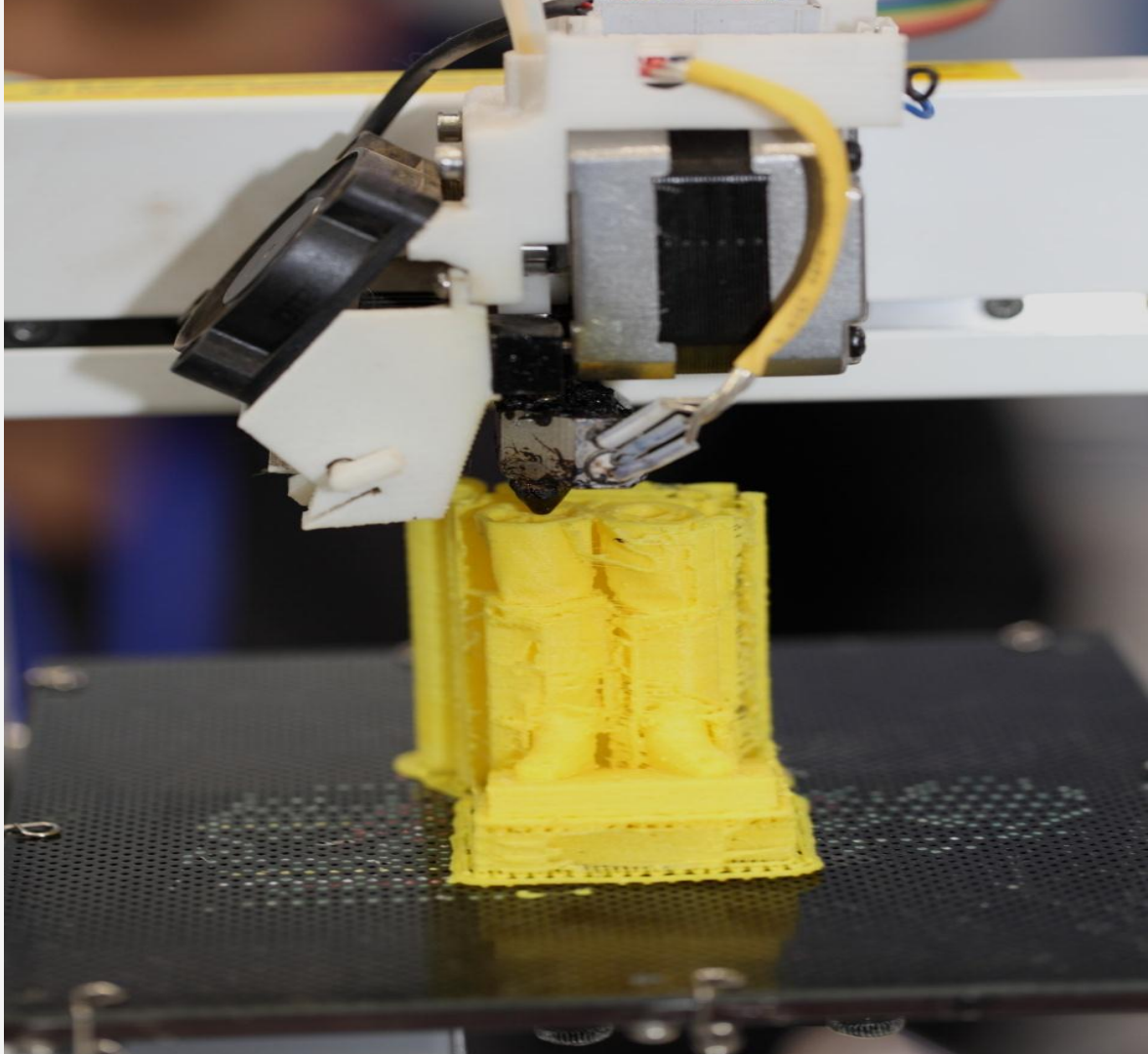
- ***Do it yourself!***
- ***Concept of makerspace***
- ***Ingenuity, Sharing, Self Learning***
- ***Self proto-typing***





Additive Manufacturing

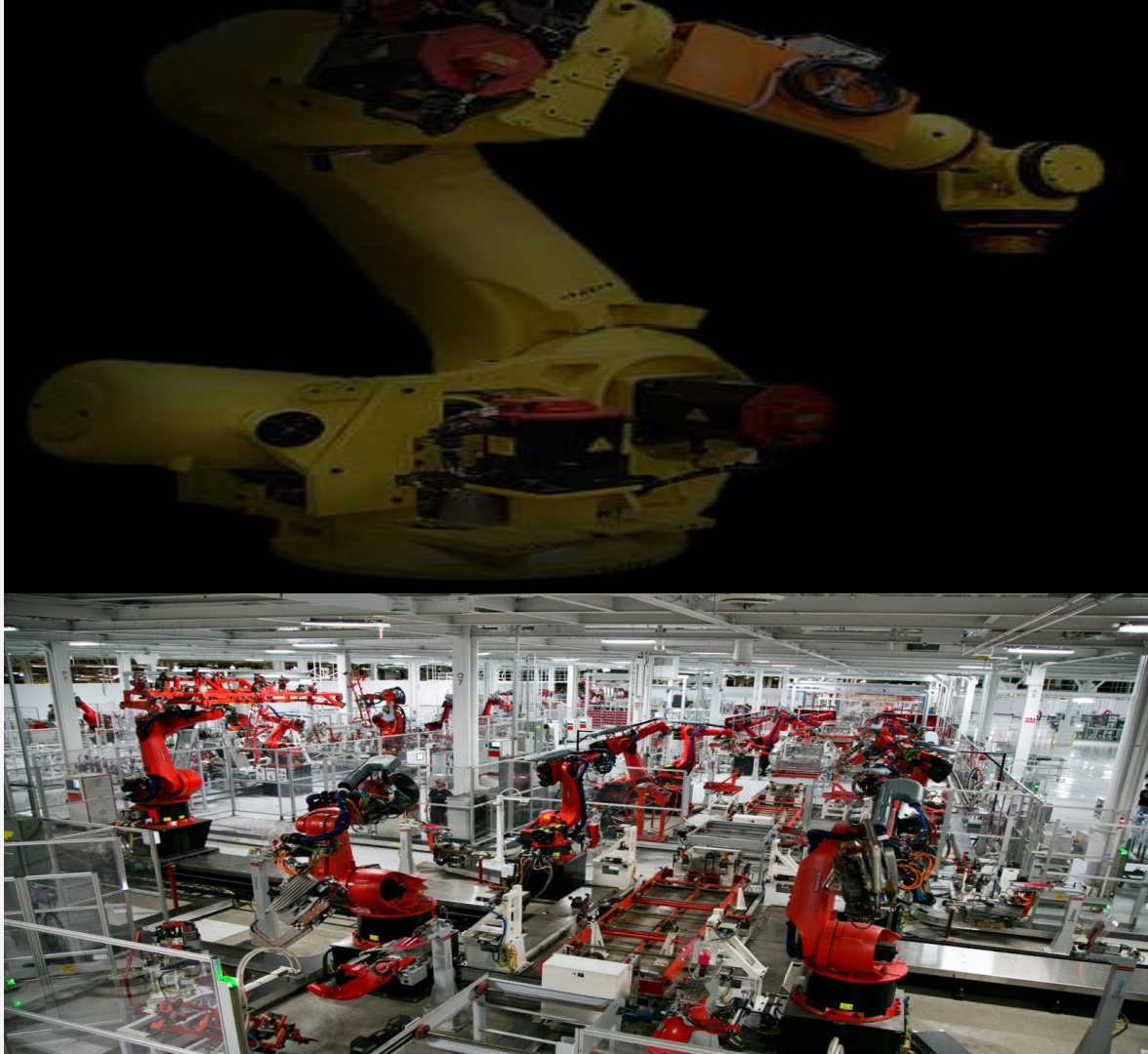
- *More customization of goods*
- *Household-level production will be possible*
- *Production of goods close to their points of consumption*
- *China can lose being manufacturing power of the world.*





*Light Out
Factories*

- *Highly automated robots are producing with no lights, ventilation or supervision*





*Disruptive
Innovation*

- *Today cars 5 % at work,
Google car 95 %*
- *Robots are producing
robots.*



*Let's get
ready
For them*

NOW!



Thank you...