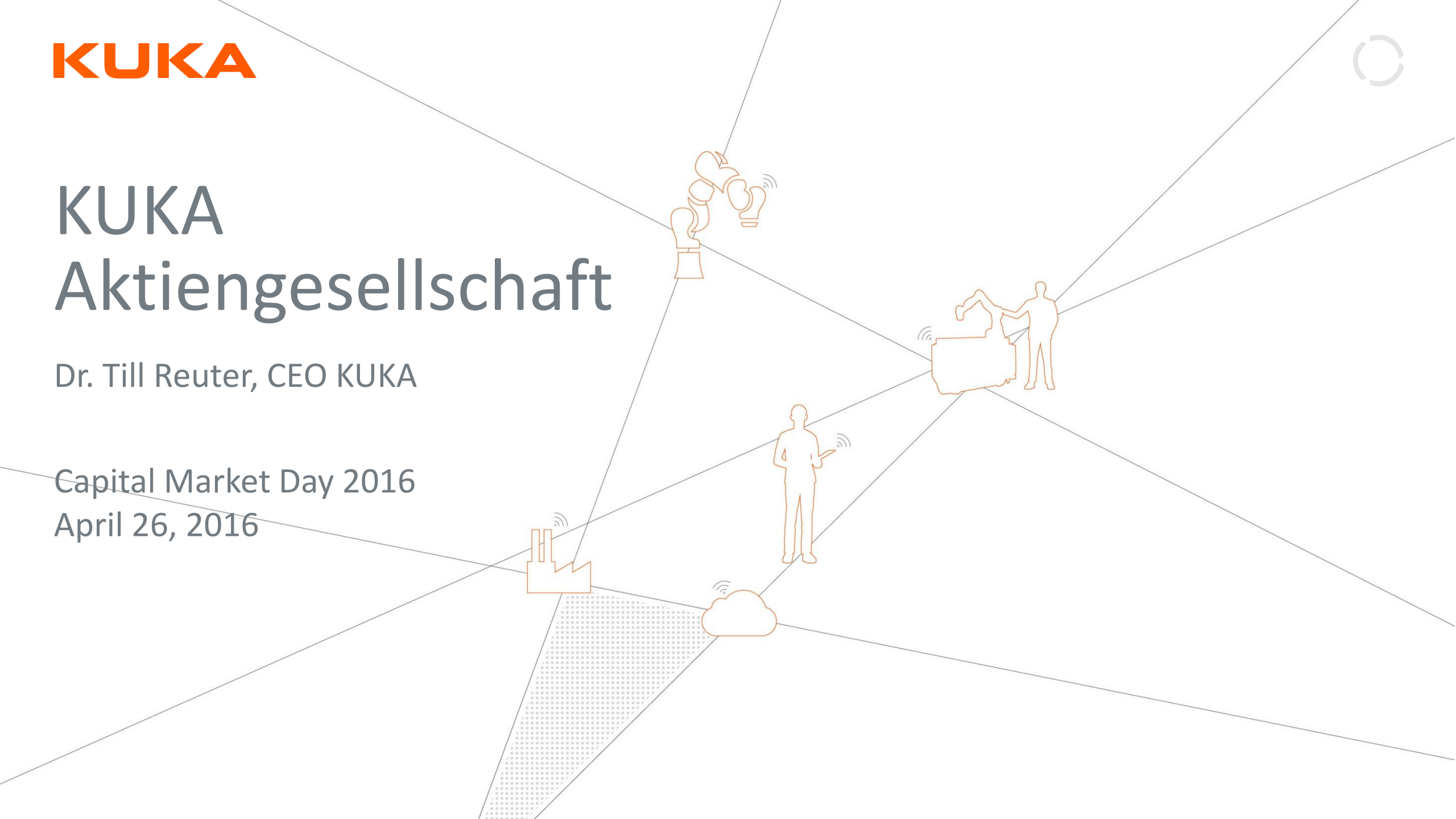
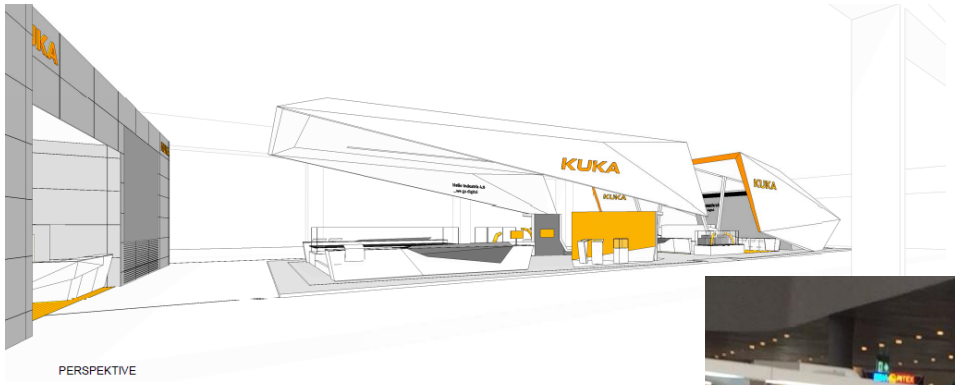
KUKA Aktiengesellschaft

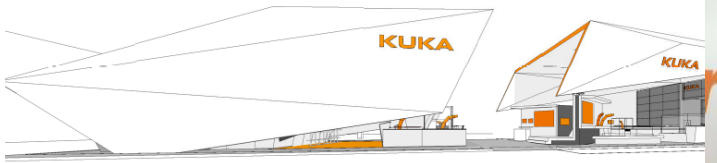
Dr. Till Reuter, CEO KUKA

Capital Market Day 2016
April 26, 2016



KUKA at the Hannover fair





Outlook – KUKA 2020

Development

Sales revenues
€3.0 billion
2015

Growth ~50%

China

General Industry

New products/ Industrie 4.0

REIS ROBOTICS
KUKA Industries

Swisslog/ E-commerce

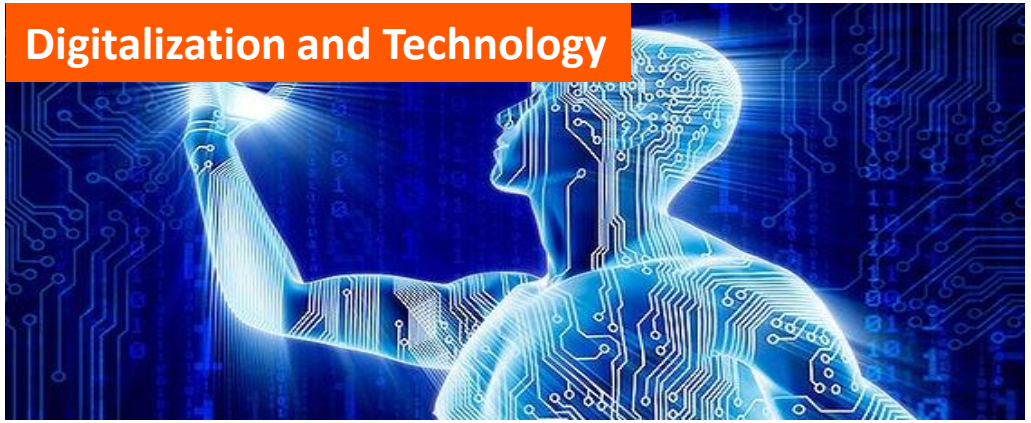
Sales revenues
€4 – 4.5 billion

EBIT margin
> 7.5%
2020

Global megatrends shaping KUKA’s present and future

Globalization

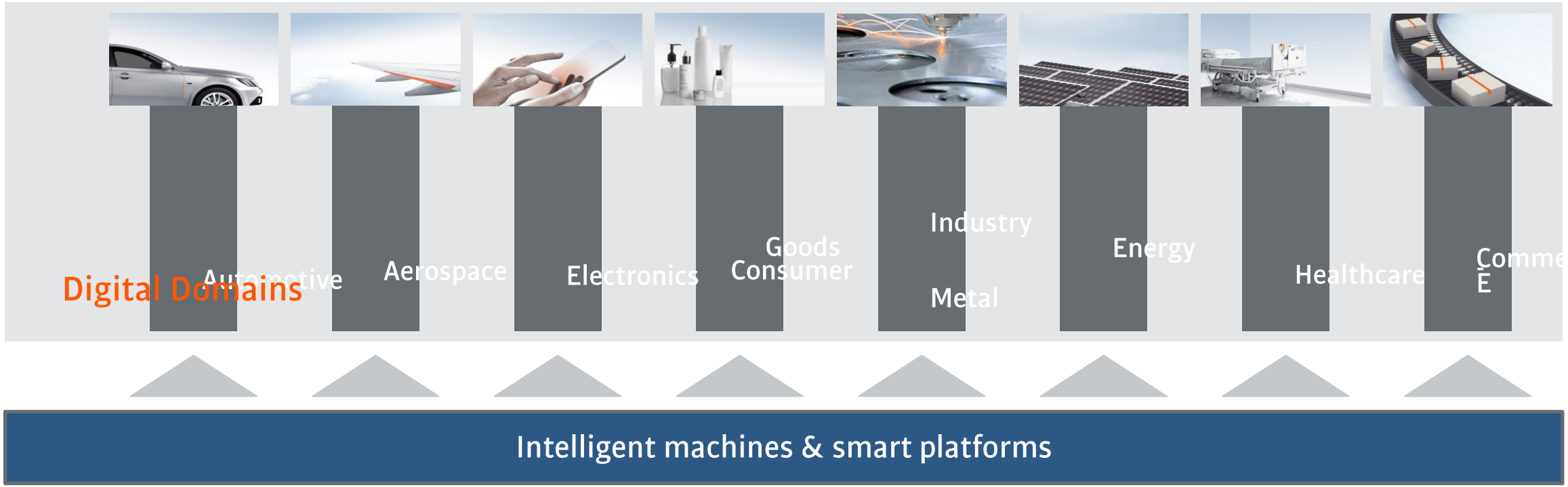
Digitalization and Technology



Demographics

Biosphere/Ecosystems

Intelligent machines and **digital domains** – key elements of Industry 4.0



The KUKA Group unites intelligent machines, digital domains and digitalization know-how under one roof. With innovative, robot-based automation solutions we make our customers all over the world more successful and simplify people's lives and work.

Intelligent machines – the evolution

Innovation

Industrial automation

Robot cells with safety fences

Sensitivity and safety

Human-Robot-Collaboration

Mobility

Standard Automated Guided Vehicles (AGV)

Intelligence and perception

Intelligent machines & smart platforms

Future

Intelligent Machines unleashing new customer benefits

Characteristics

- Identification - *Which kind of machine am I?*
- Connectivity - *With whom can I speak?*
- Storage - *Which information do I have?*
- Computing - *Which tasks can I do?*
- Autonomy - *Which decisions can I make on my own?*
- Location - *Where am I?*
- Integrated sensors - *What can I measure around me?*
- Internet connectivity - *Which information can I get?*

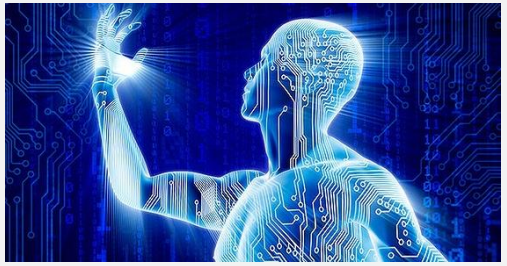
Customer benefits

- Higher uptime
- Better energy efficiency
- Higher flexibility
- Autonomous decisions
- Lower inventory
- Faster time2market
- Safe human-machine interaction
- Learning from data

Digital Domains – the essence of new customer value

Digital domains provide…

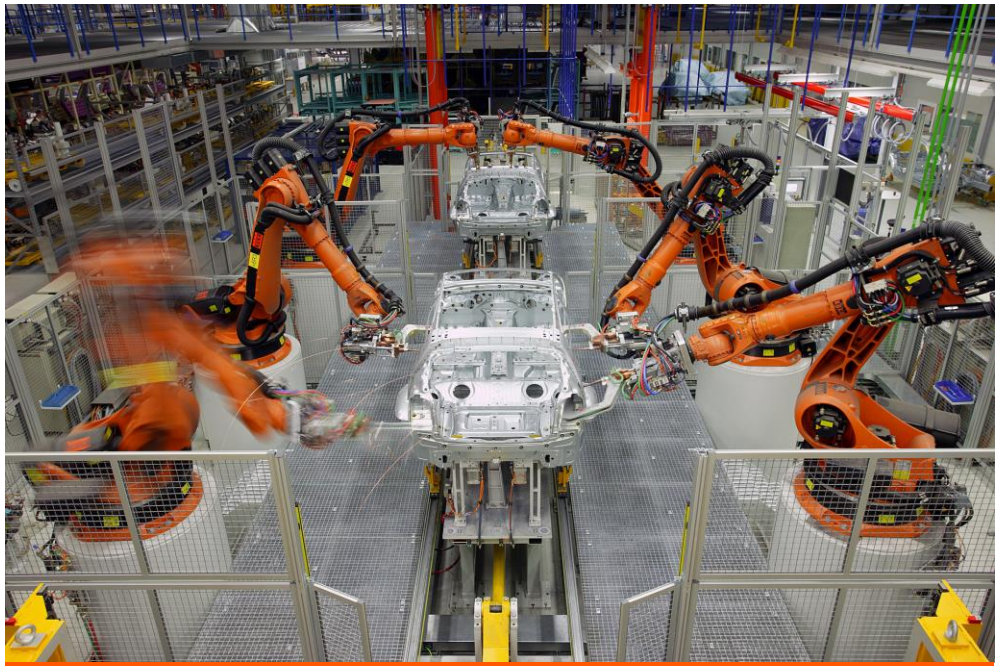
- Big data correlations
- Optimization of complex systems
- Holistic transparency
- Immediate alerting
- Predictive forecasts
- Information and services on demand
- Optimization across system boundaries
- Enabling new information sources merged with the status quo



…. opportunities for new customer value

- Enabling new business models
- Creating highly integrated value networks
- Optimization of complete value networks
- Fast reaction to new situations
- Immediate reconfiguration to increase flexibility
- Prediction of the future to initiate preventive actions
- Insight & Control anytime and anywhere

KUKA is a long term partner of automotive customers



#1 Automotive

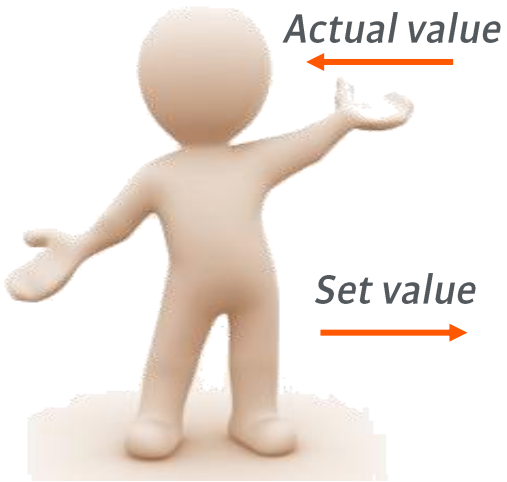
1. **Value as a Service**
   - Technology support – 2nd level support, optimization as a service
2. **Module as a Service**
   - Operating model – Digital manufacturability as a service
3. **Platform as a Service**
   - Supplier park – Productivity as a service, up to date technology as a service
4. **Infrastructure as a Service**
   - Eco-system supplier park – productivity, versatility, quality, logistics, availability as a Service

New customer values

- **Productivity** pay per piece
- **Flexibility** pay per module
- **Versatility** pay per feature
- **Availability** pay per achievement

KUKA offers a complete solution and creates eco-systems in a new way

Human



Human/machine interface

Apps for all layers

- Marketplace
- Cloud services
- Cloud platform
- Edge/Fog
- Standardized Communica
- Robot and process

Strategic partners

- salesforce — Marketplace
- KUKA — Asset efficiency & Big Data Mgmt.
- Infosys — IIP Big Data Platform
- Real-Time Fog Node
- HUAWEI — 5G Communication
- KUKA — Intelligent machines

Software and Industry 4.0 drive profitable growth of KUKA

market share

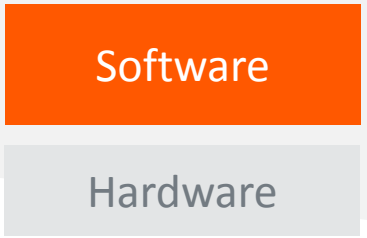
customer retention

growth

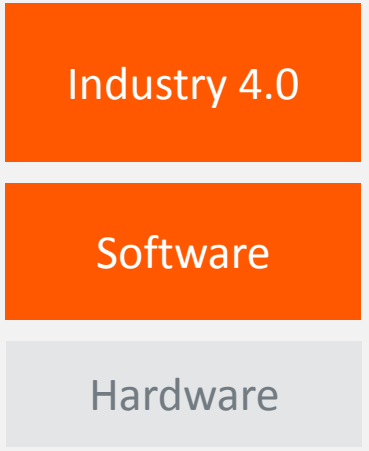
KUKA Cloud

profitability

2009



2015



2020

Industry 4.0 strategy

Investments

KBee

nebbiolotechnologies

R&D hubs Austin/ Texas and Budapest

roboception

New technology center in Augsburg

Cooperation

salesforce

Infosys®

HUAWEI

Focus

- Increase R&D workforce
- Setup a Industry 4.0 team
- Pilot projects started
- Industry 4.0 solutions used in own facilities

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Stefan Lampa, CEO KUKA Robotics

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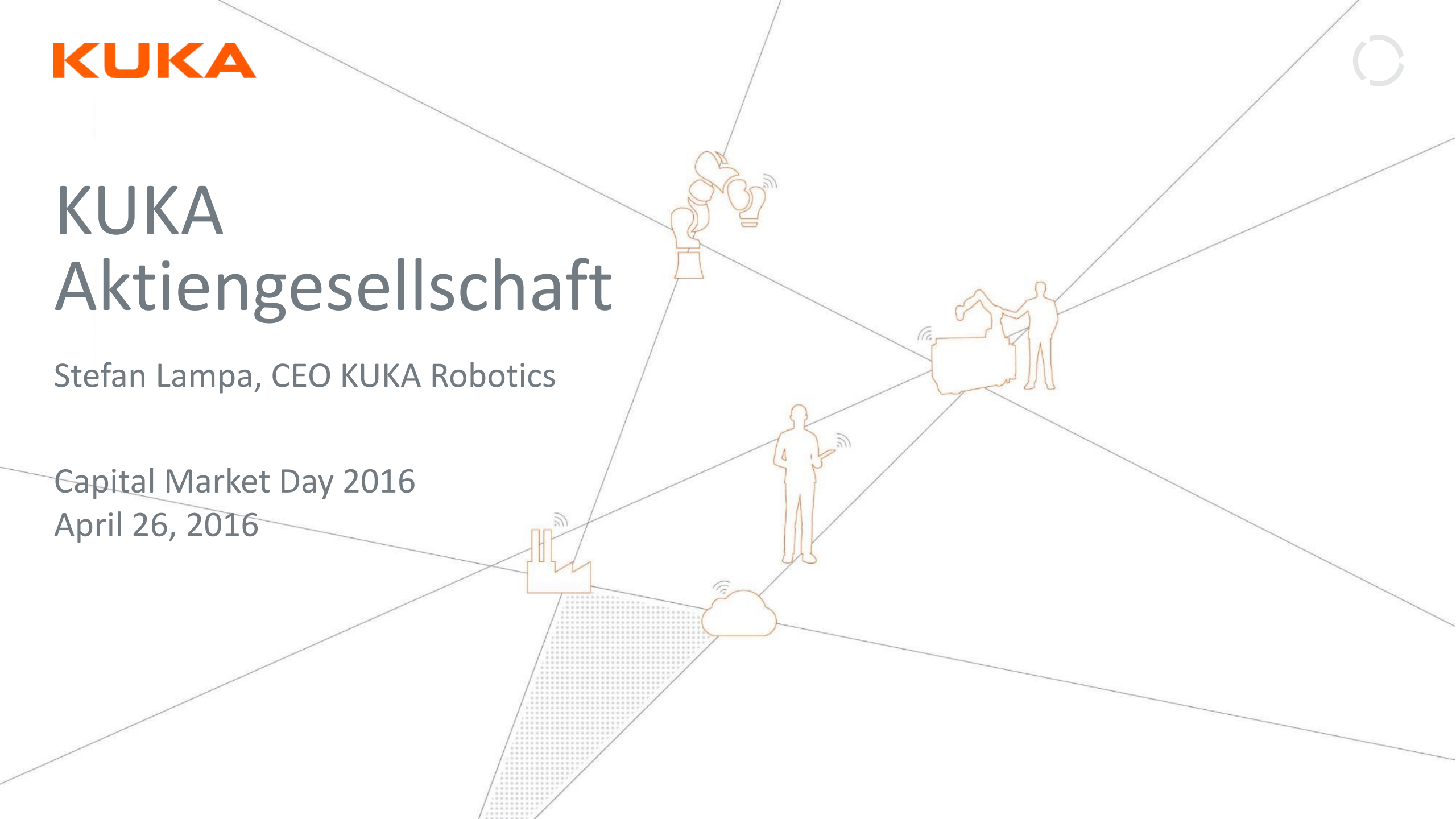
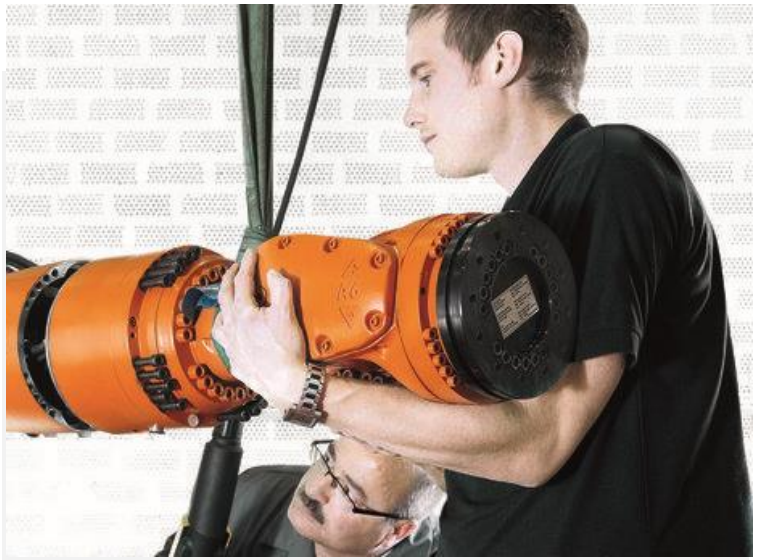
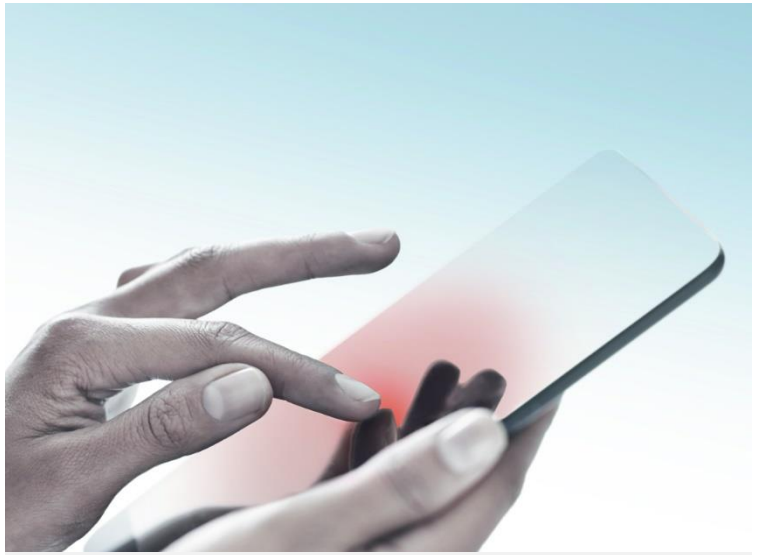


3 Main Focuses



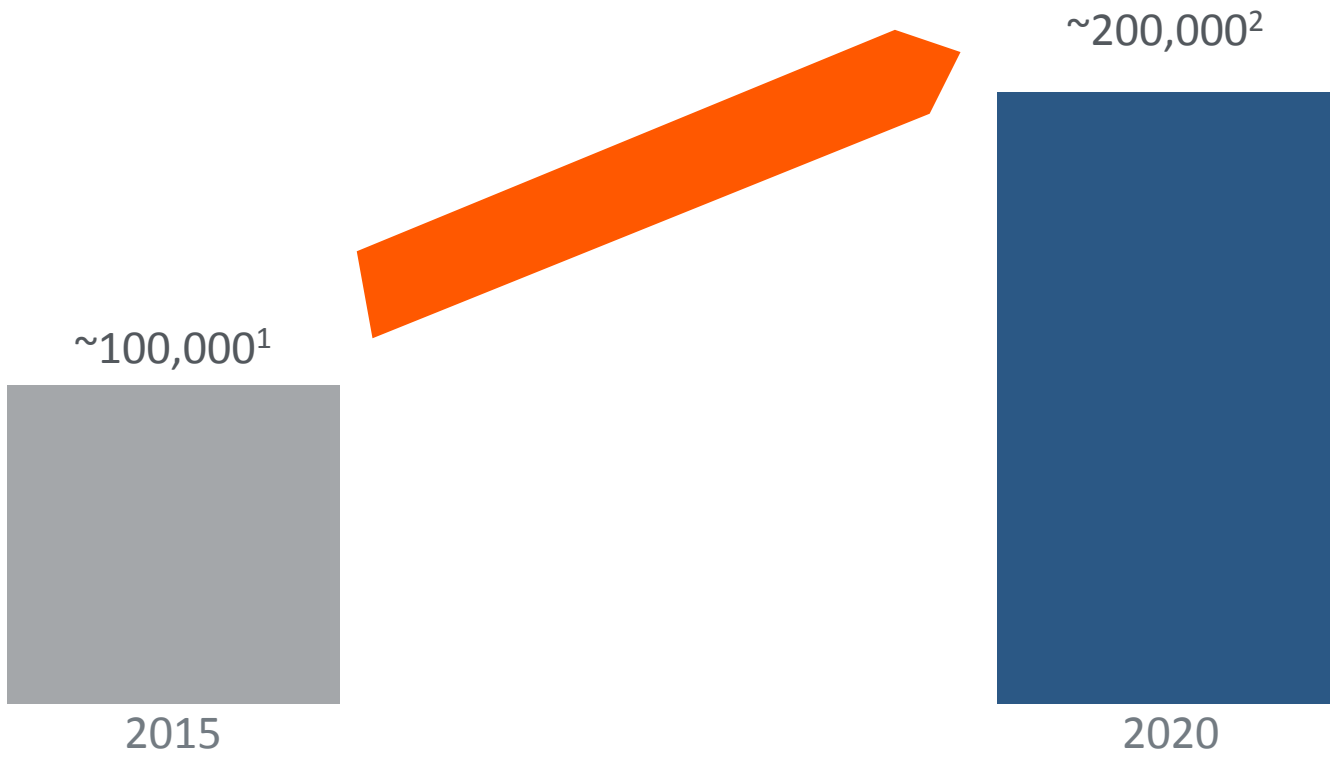
Service



General Industry

Automotive Industry

Strong growth of General Industry expected



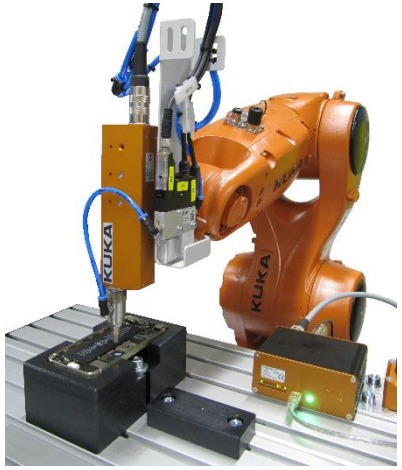
Number of articulated robots sold worldwide to General Industry p.a.

1) Preliminary figures (IFR)

2) Expectation (KUKA)

Key success factors

- Global organisation



- Application know-how

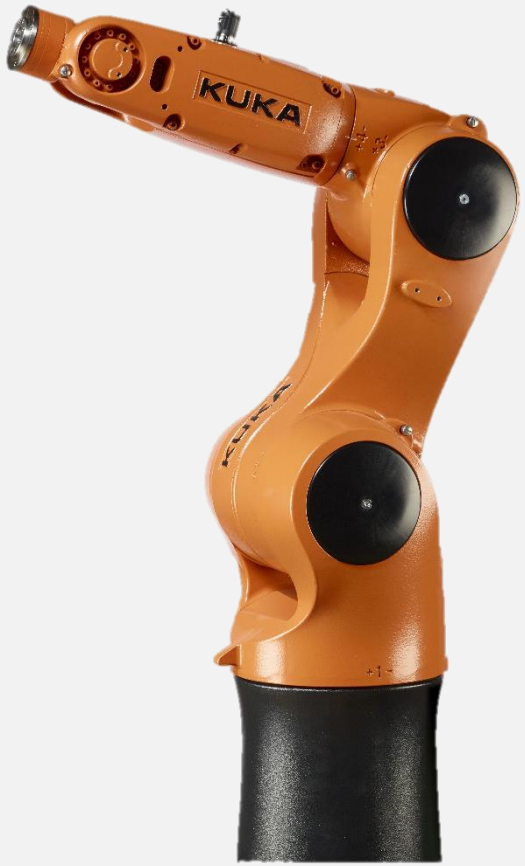
- Product portfolio

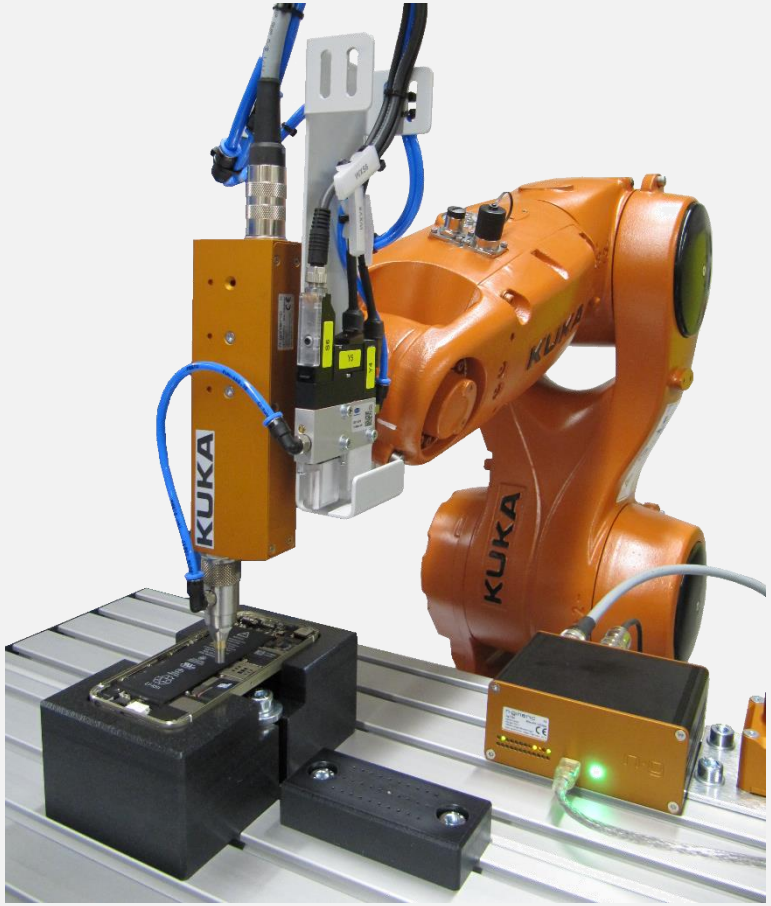
Key success factor #1 - Extend global organisation

Key success factor #1 - China is changing Robotics

- High number of people
- Changing working conditions
- Lack of professional skilled workers
- Increasing labor cost

Key success factor #2 - Build up application know-how

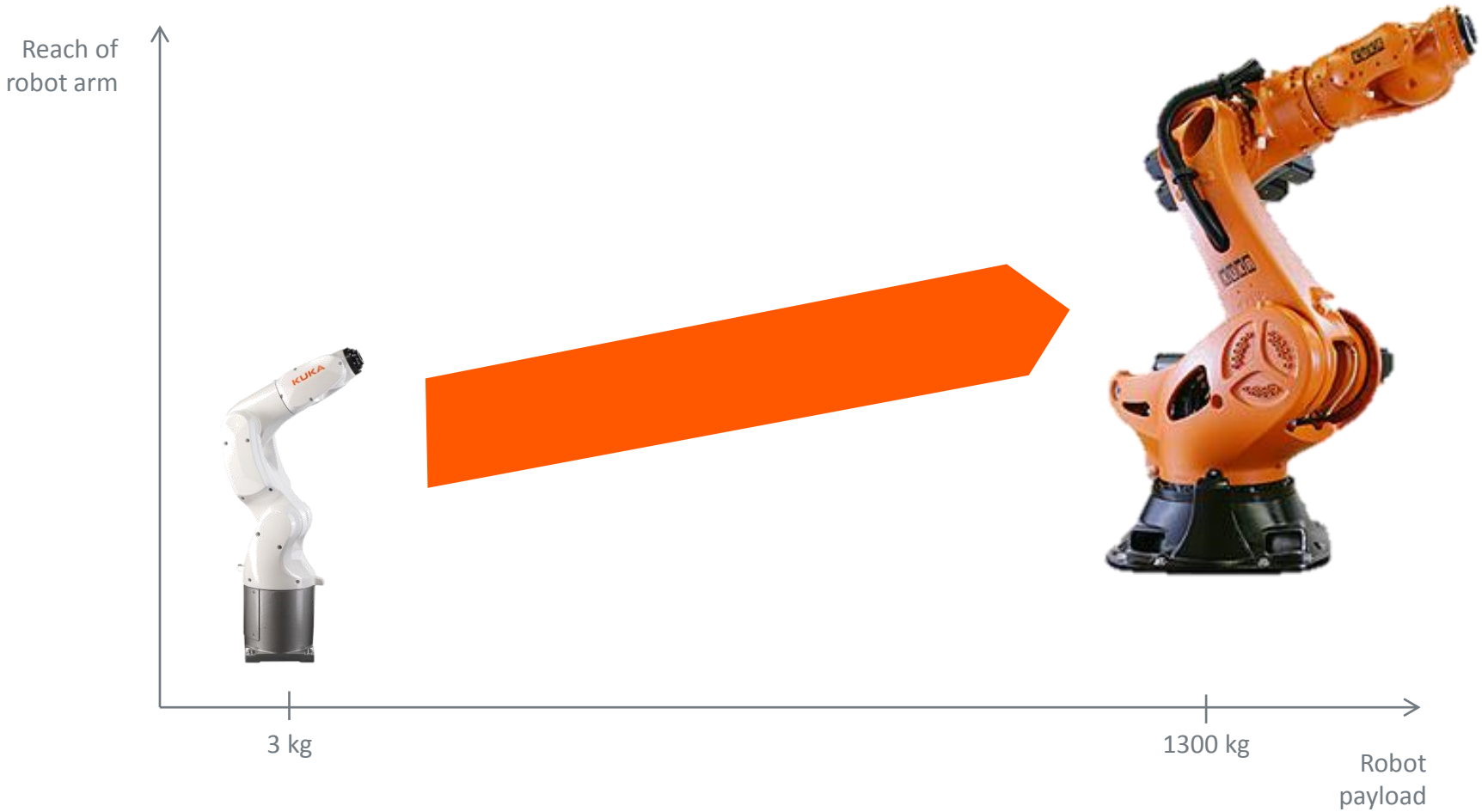




Key success factor #2 - Electronics is changing Robotics

- Shorter product cycles
- Higher volumes
- Mass customization
- Global standards

Key success factor #3 - Offer complete product portfolio from 3 kg to 1,300 kg



Key success factor #3 - KR 3 AGILUS

★ KUKA QUALITY
on a small footprint

★ ALL-ROUNDER
for small parts
assembly & handling

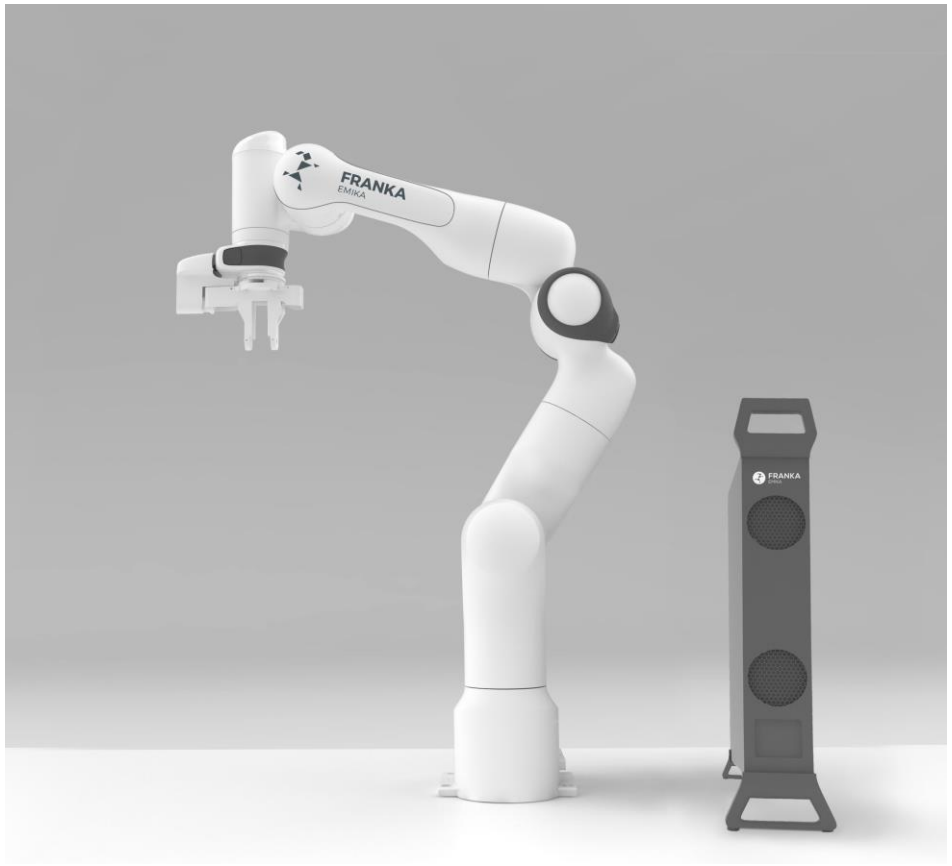
★ AGILE
& DYNAMIC

★ LOWEST TOTAL COST
of ownership in its class

★ Ideal for SMALL AUTOMATION CELLS on electronics assembly line

★ Developed for the DEMANDS OF ELECTRONICS INDUSTRY

Investing in innovation



★ Engagement in the highly innovative robotic technologies of the technology company KBee

Summary

- Three main focus areas for KUKA Robotics: Service, Automotive Industry and General Industry
- Next steps to improve further growth in General Industry
- KR 3 AGILUS offers best in class 3 kg robot

KUKA

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David Fuller, Chief Strategy and R&D officer Service Robotics

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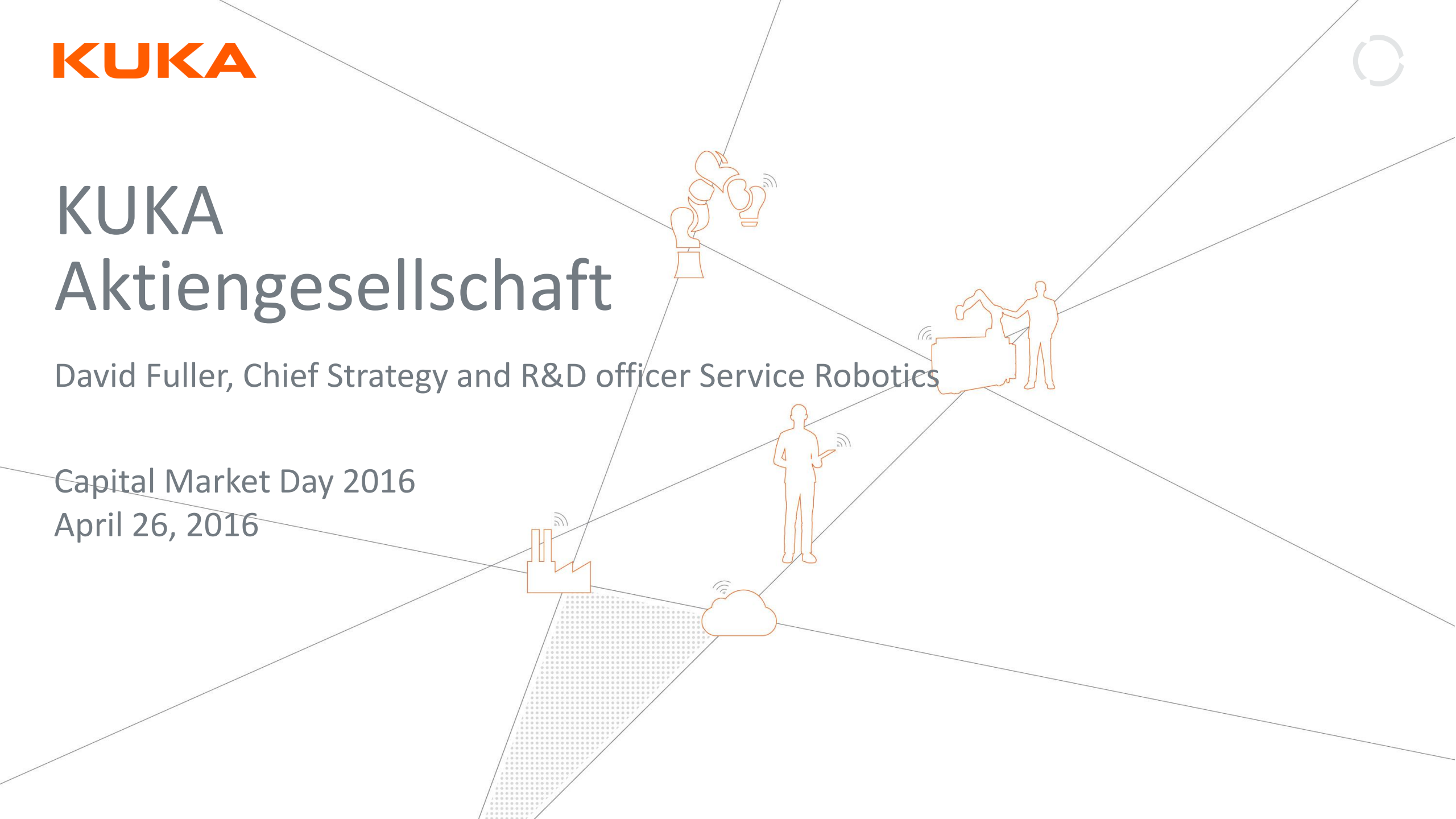
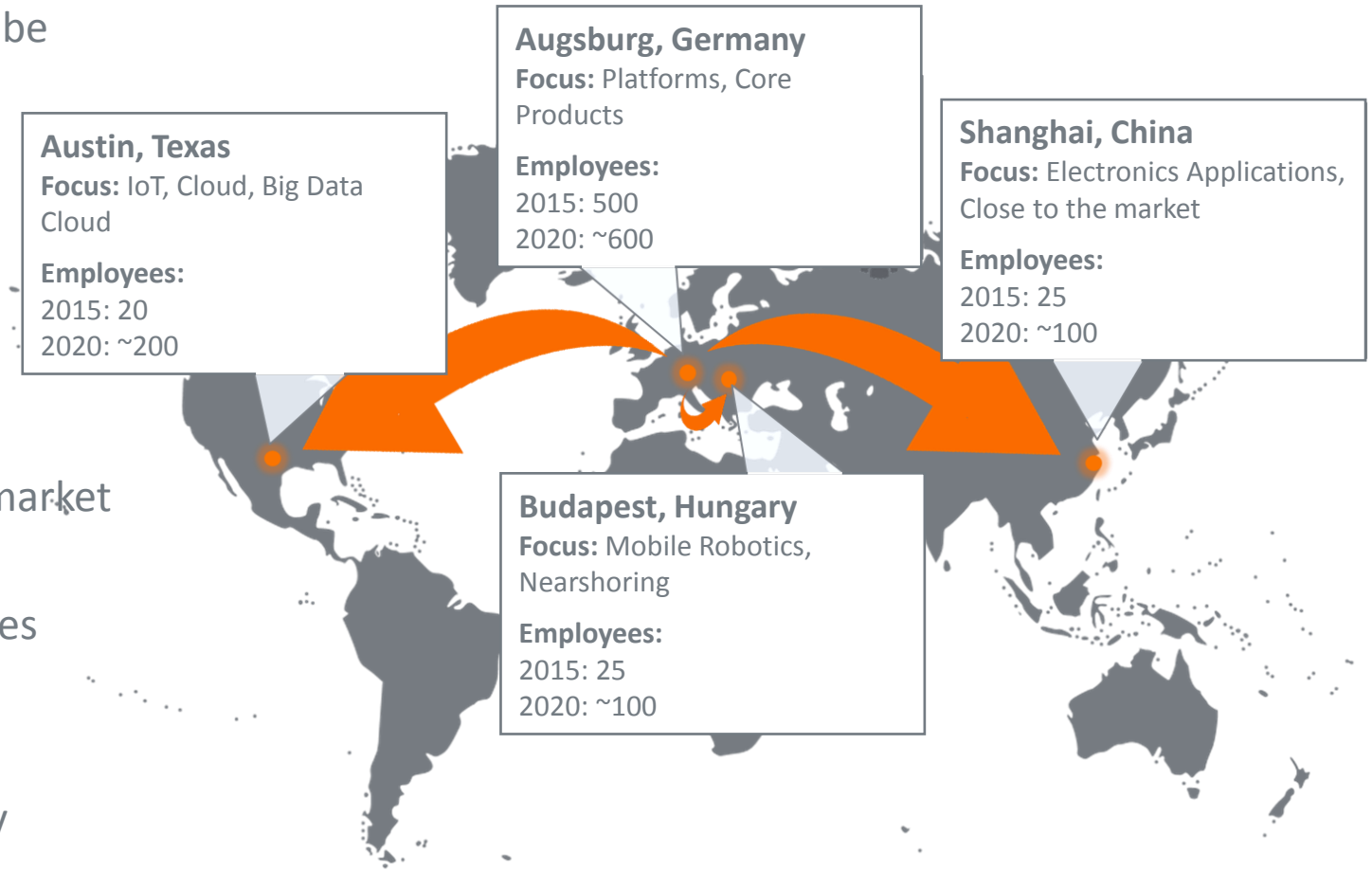


KUKA R&D footprint – Get the best talent around the globe

- Global R&D – better R&D talent across the globe
  - Different geographies have tailored and deep specialties
    - Germany – excellent mechatronics
    - USA – excellent Cloud and IT software
    - China – excellent mass production in electronics

- Global R&D – products tailored to each local market
  - With the right local costs
  - With a dedicated competence of technologies
  - With greater speed of local market delivery

- Global R&D investment is a multi-year journey

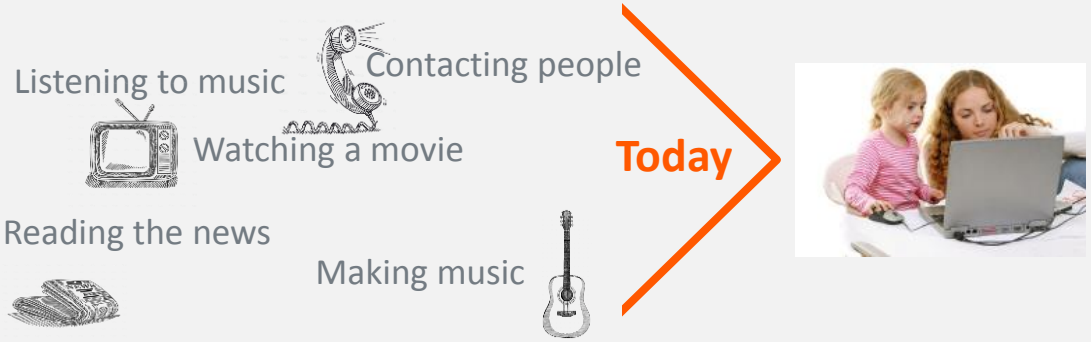


Digitalization has disrupted many areas. Manufacturing disruption is underway!

> A fundamental new rule for business is that the Internet changes everything.
>
> Bill Gates, 1999

- …but in 1999, we had the Internet of people only!
- The Internet of Things (IoT) is changing much more!

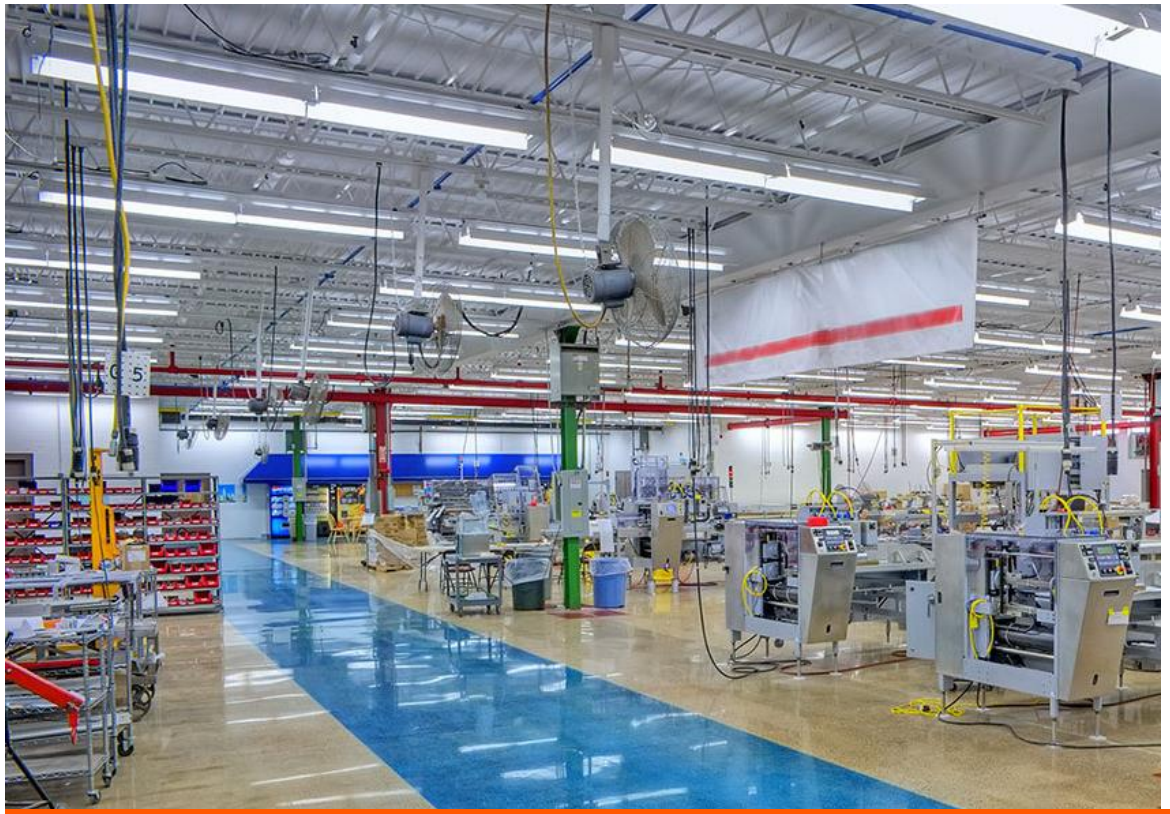
15 Years ago

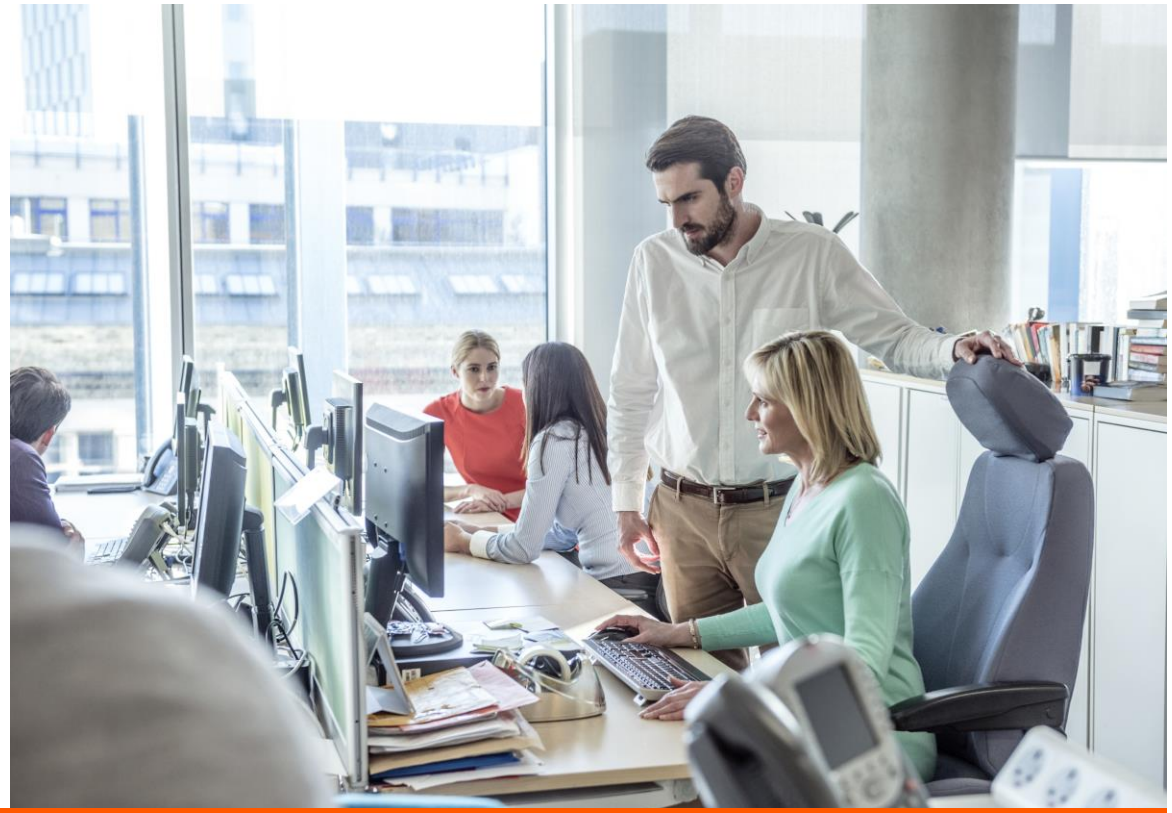


Today – manufacturing

Source: based on IIC

IT & OT are growing together





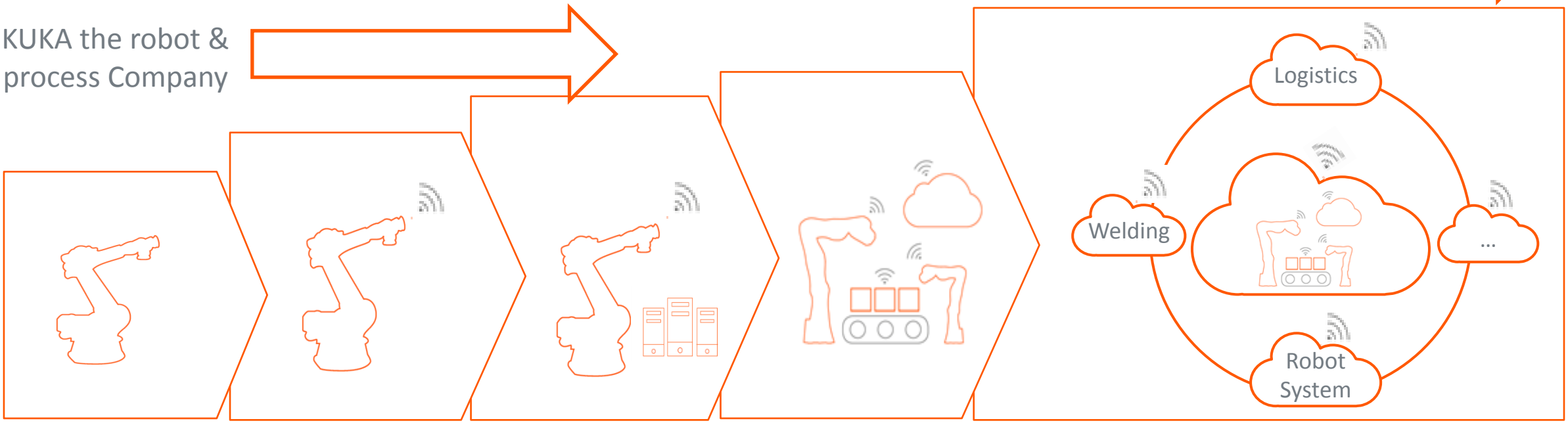
Connecting the Concrete to the Carpet Floor – IT and OT Convergence is a global R&D trend

Pictures by

Evolution of KUKA's product portfolio

KUKA the robot, process and cloud/ software company

KUKA the robot & process Company



- Robot & Process
- Robot & Process
- Connected
- Robot & Process
- Connected
- Intelligent
- Systems
- Connected
- Intelligent
- Optimized
- Digital Domain
- System of systems
- Connected
- Intelligent
- Optimized
- Digital Domain

Ecosystem of KUKA‘s cloud

People

Processes & Intelligent Machines

KUKA‘s cloud and Big Data

Connecting people, services and things

Digital Domains & Services

Intelligent Machines – Human Robot Collaboration

- **Sensitive and safe robots** for Human Robot Cooperation (HRC)
  - **Assistant systems** for humans
  - **No fences** needed
  - **Smart safe sensors**
  - New **safe human approach recognition** technologies for bigger industrial robots

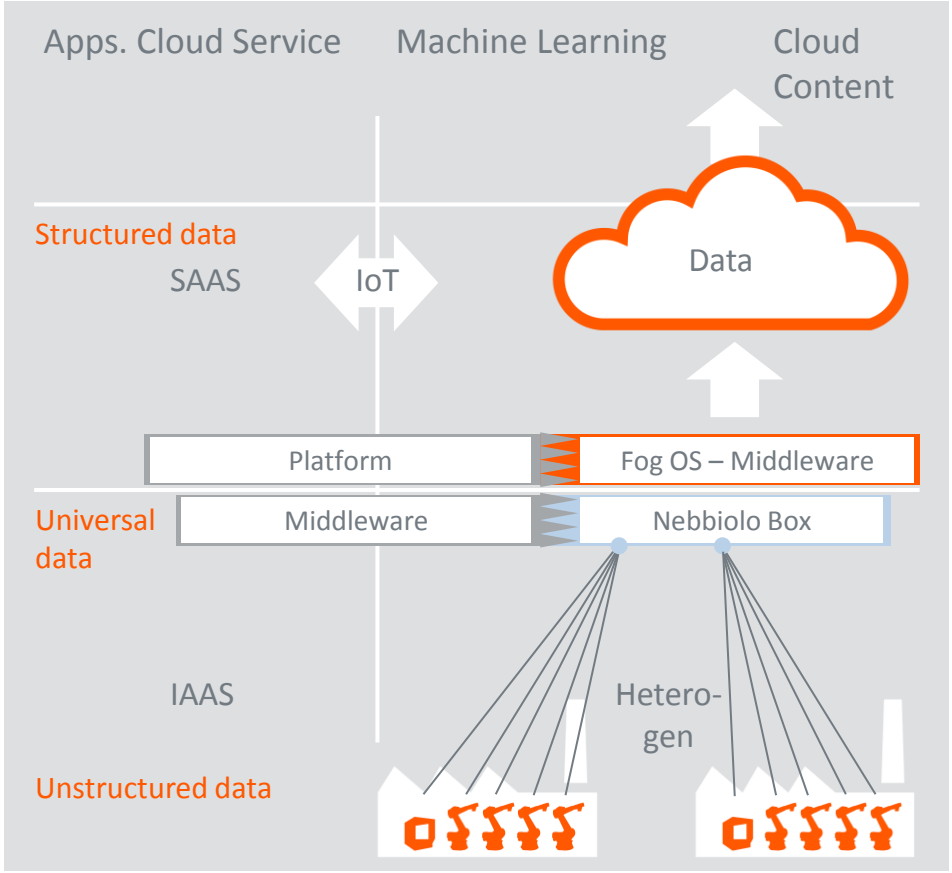
- Reducing the cost of automation; Easy to use Robots
  - Programming with **graphical languages**
  - **Teaching by doing** no programming required

Intelligent Machines – mobile robots & mobile platforms

- Mobile products, machines and tools are one **cornerstone of Industry 4.0**
- Mobility increases **flexibility**
- **Optimize material flow** reducing assembly time
- **Autonomous navigation** simplifies automation and reduces cost
  - **Swarm-based navigation** opens new fields within mobility

Digital Domains – Connectivity, mobile, cloud & big data

- **Connecting people, services, and things**
  - Industry standard communication protocols
  - Industry standard real-time edge cloud
  - Industry standard zero-touch deployment
- **Mobile |** Access live insights on any device at any time
- **Cloud & Big Data Services**
  - Asset management with full digital twins
  - Digitalized expert knowledge at your fingertips
  - Integrated service management
  - Cloud-2-Cloud connectivity with full federated clouds
- **Marketplace** for KUKA, partner, and customer ecosystem



KUKA **enterprise** software offers Industry 4.0 solutions

Partner Site

Real-time component information and usage of data for **remote optimization and remote management**

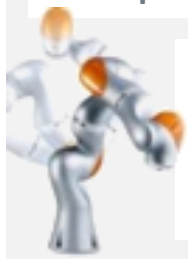
Real-time inventory control for automated supply of goods for **shorter time2market**

Production Site

Real-time data for **better and faster decisions**

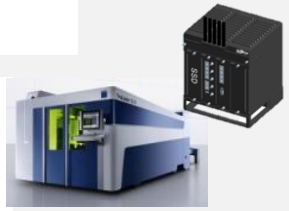
Flexible line concept and scheduling for **handling more product variants**

Flexible production logistics for **faster supply and lower inventories**



Condition based monitoring and predictive maintenance for **higher uptimes**

Energy efficiency by real-time data and planning forecasts



Automated software distribution and recon-figuration for **more flexibility**

Data to information and **investment protection** by using fog computing

Operations

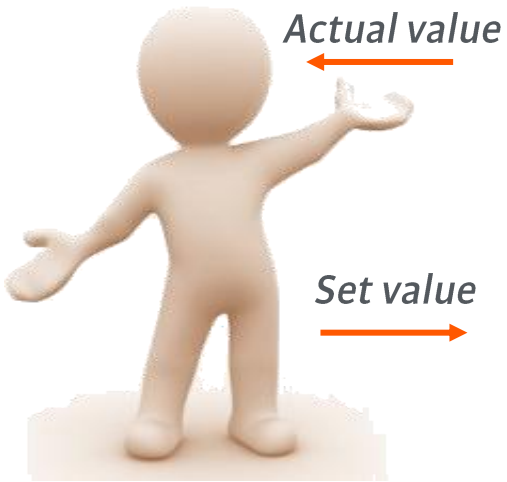
Remote monitoring of production status

Remote transparency of availability of production lines

Optimized service management by using predictive data

KUKA offers a complete solution and open ecosystem

Human



Human/machine interface

Apps for all layers

- Marketplace
- Cloud services
- Cloud platform
- Edge/Fog
- Robot and process

Standardized Communica

Strategic partners

- salesforce — Marketplace
- KUKA — Asset efficiency & Big Data Mgmt.
- Infosys — IIP Big Data Platform
- Real-Time Fog Node
- HUAWEI — 5G Communication
- KUKA — Intelligent machines

Why this is all a sweet spot for KUKA's customers and partners?

KUKA

Holistic Industry 4.0 offering

Eco-System Partners	• Apps & Cloud-Services Eco System • Technology Components • Industry 4.0 Middleware
KUKA Central Industry 4.0 team	• KUKA Industry 4.0 Platform • Enabling New Business Models • Apps & Cloud Services
KUKA swisslog	• Industry 4.0 ready Intelligent Machines • Domain Process Content

We are able to offer a complete stack combined with domain knowledge & machines

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Larry Drake, President & CEO KUKA Systems Global

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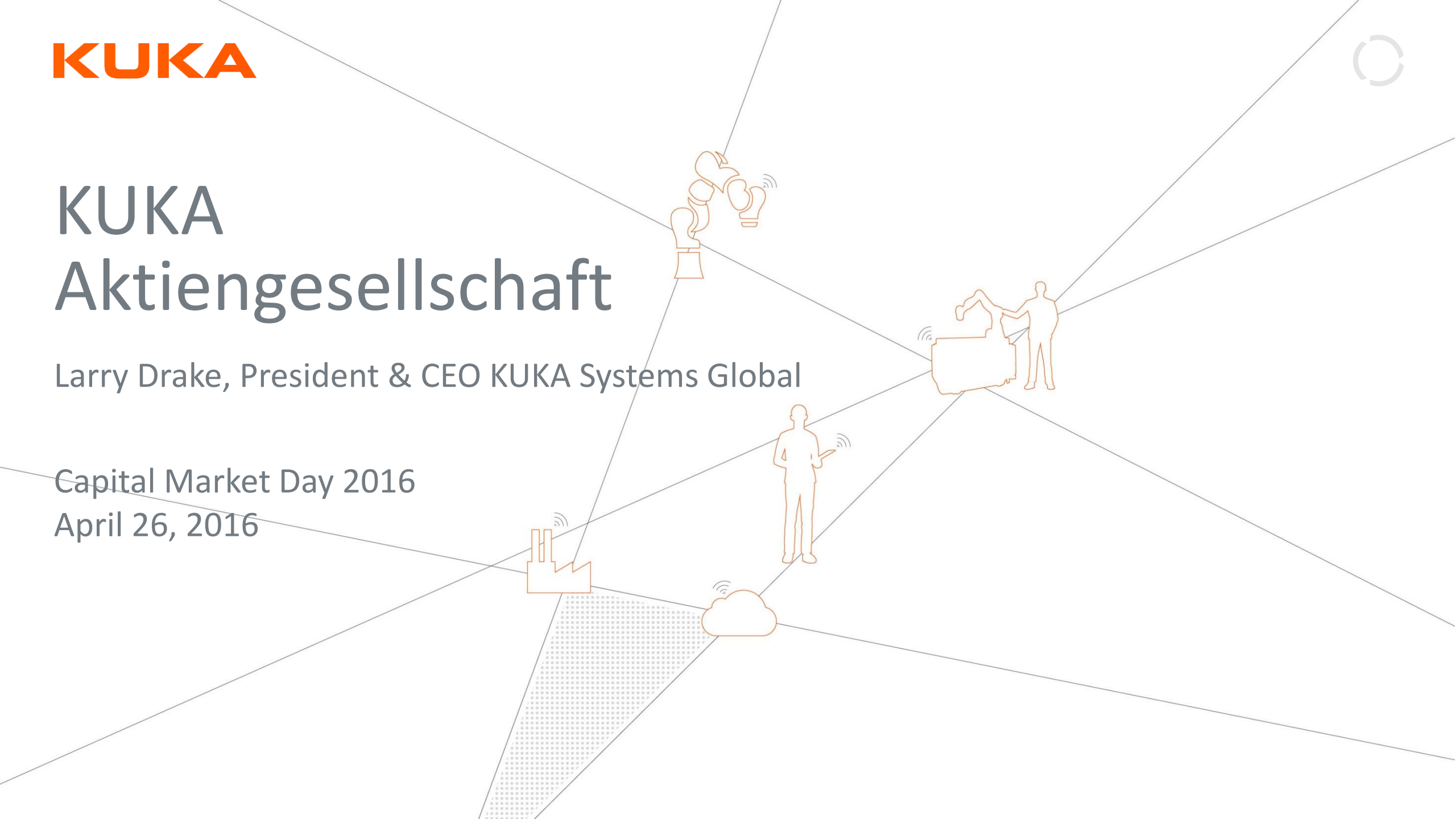
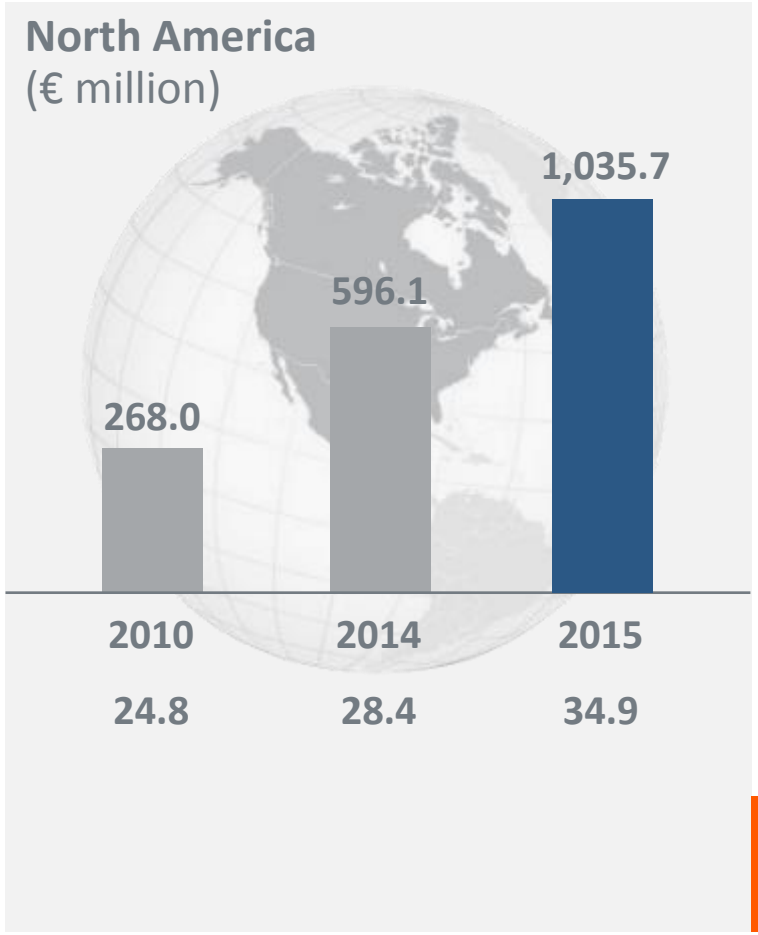


Strong growth in the U.S.



Share in % of KUKA's total sales

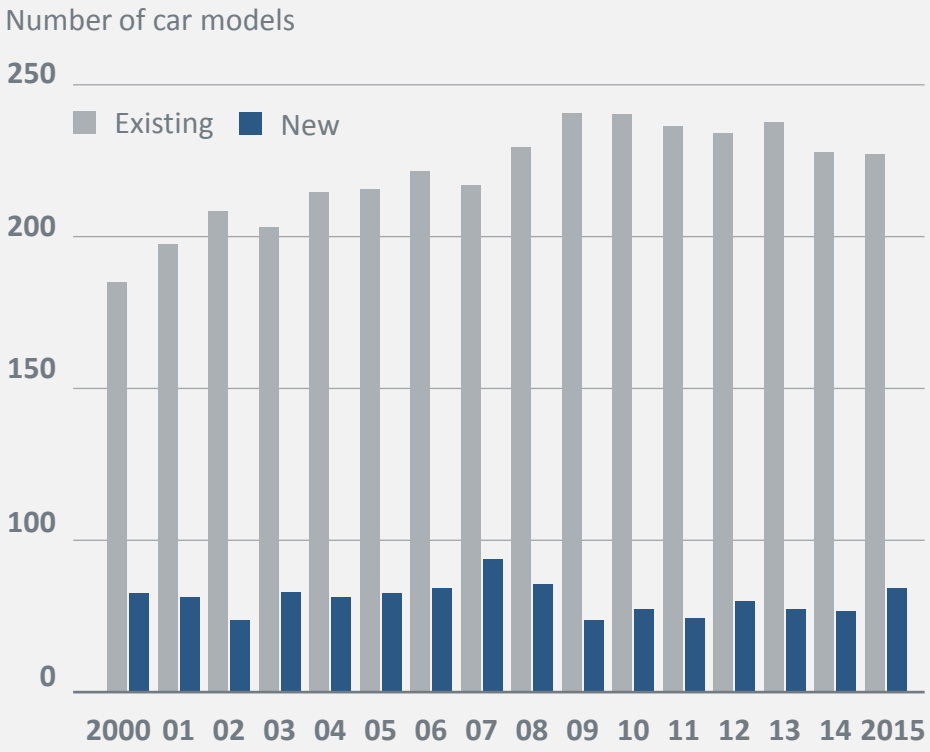
Number of car models and combinations support Systems‘ business model

Combinations available when buying a Ford F150 pickup

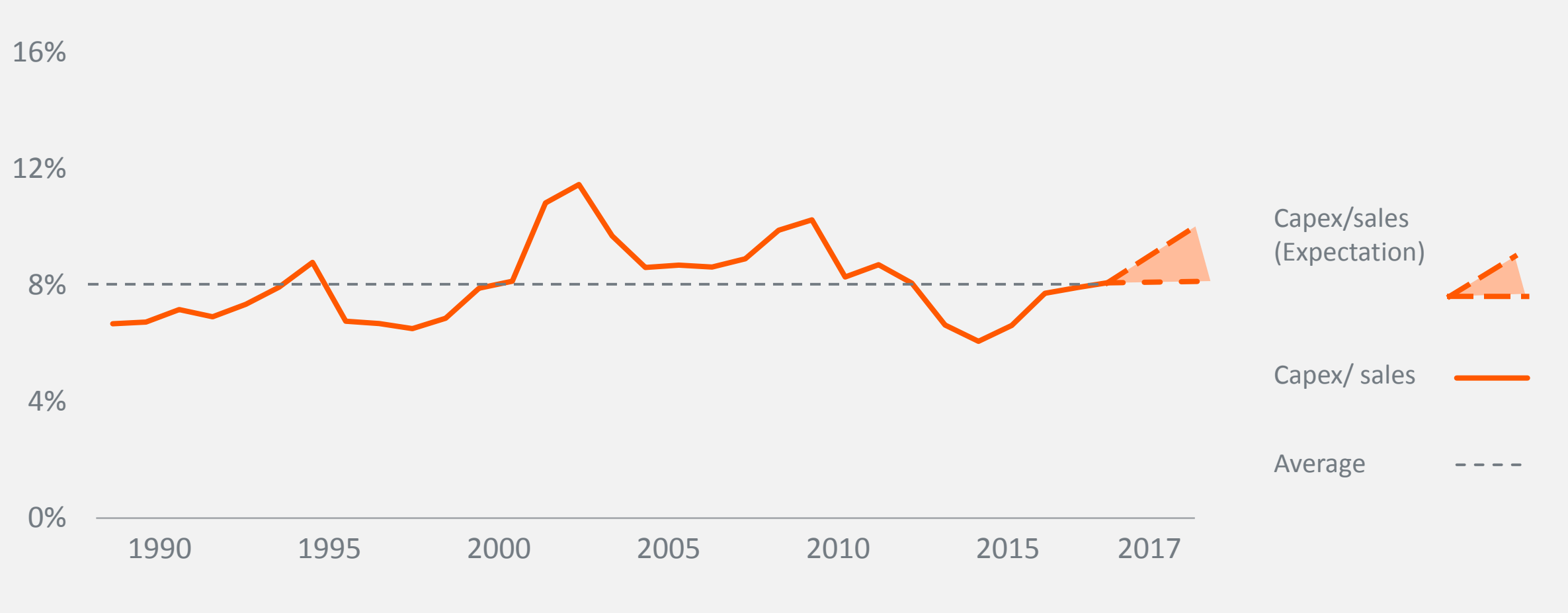
Equipment options	Variants	Theoretical combinations
Trim	6	6
Passenger compartment	3	18
Power train	2	36
Cargo space	4	144
Engine	3	432
Transmission	3	1,296
Rear axle ratio	7	9,072
Wheels	9	81,648
Tires	8	653,184
Seats	18	11,757,312
Power seats	2	23,514,624
Radio	5	117,573,120
Running boards	4	470,292,480
Rear windows	3	1,410,877,440
Colors	12	16,930,529,280
Interior trim colors	3	50,791,587,840
16 individual options	**12,870**	**653,687,735,500,800**

Source: Siemens

Total number of existing and new car models in the U.S.

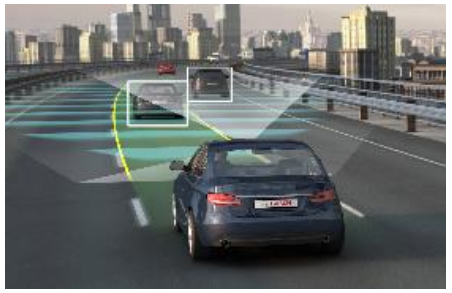


Global automotive OEMs - development of capex/ sales ratio



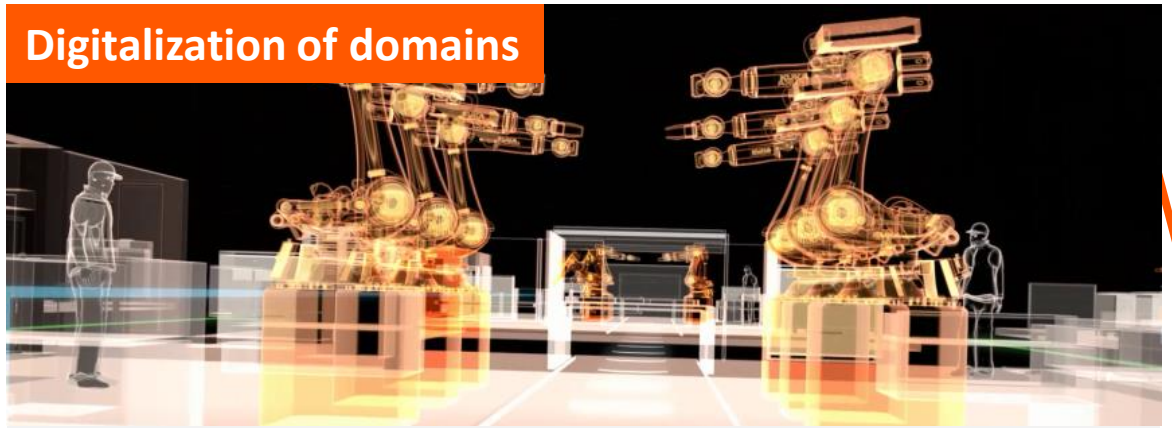
Requirements of future production lines

- Megatrends driving automation
- Alternative fuel – electric vehicles
- Connectivity – connected vehicles
- Autonomous navigation
- Fleet/car sharing
- New mobility ecosystem



New business models offer margin potential for KUKA

Digitalization of domains

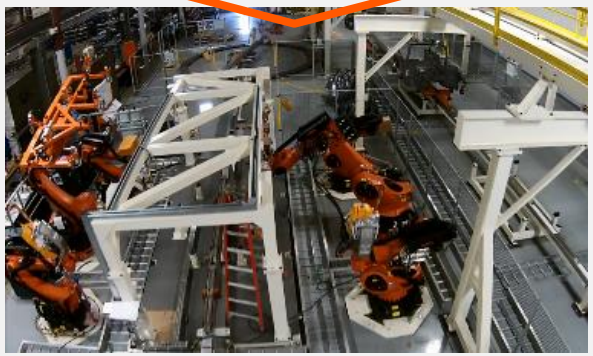
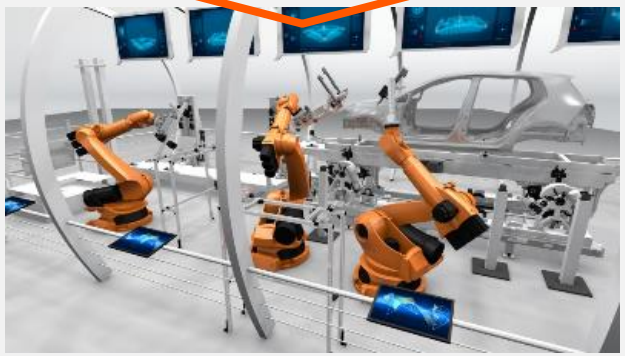


- Digitalization of homogeneous processes and physical objects
- Real-time modelling of data in the “Digital Shadow”
- Digital control and optimization of complex systems
- Prediction of future performance and conditions by efficient use of Big Data (“correlation instead of causation“)

New industrial business models

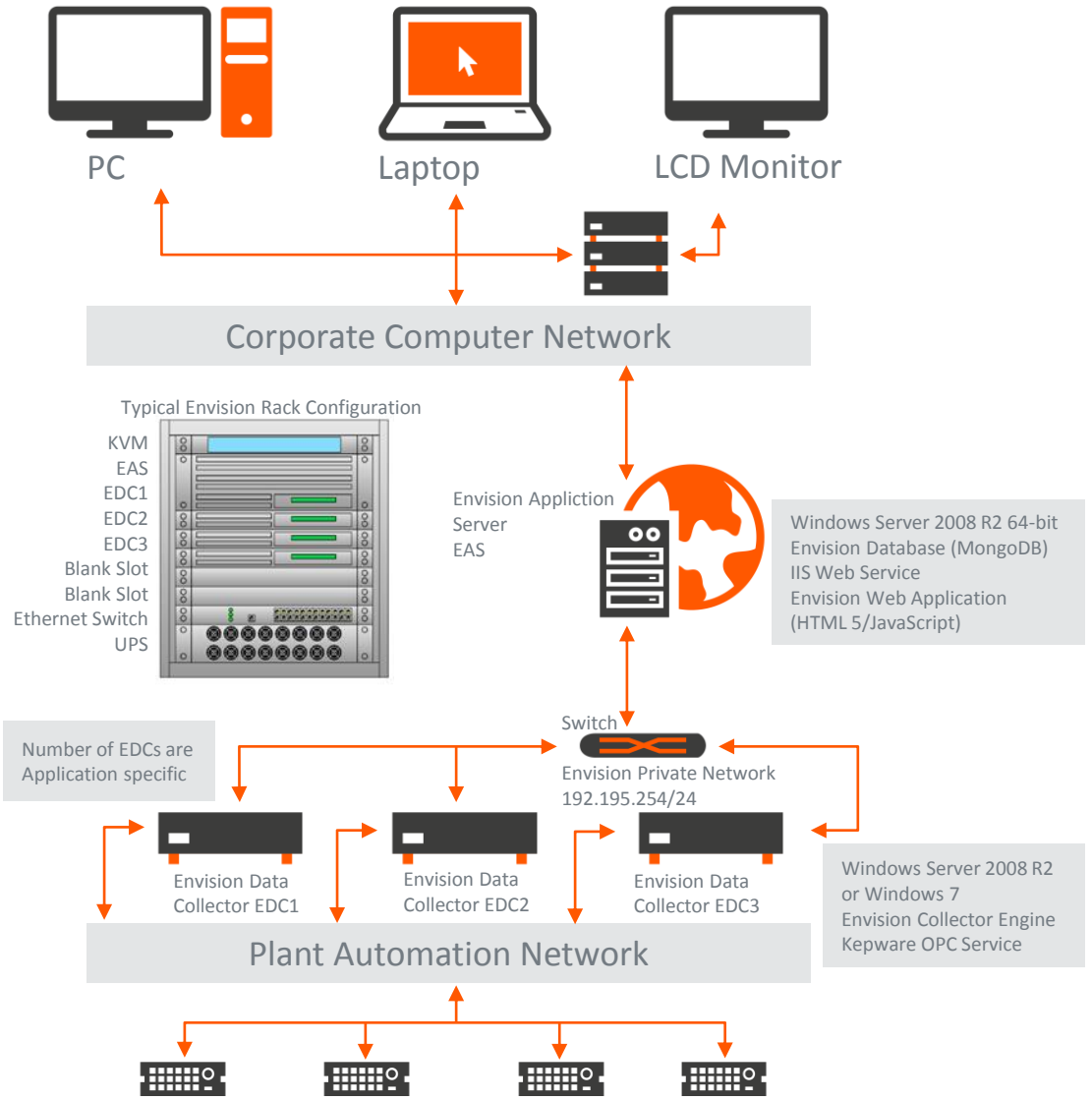
- **Value as a service**
  Personalized services to satisfy customer needs,
  e.g. Productivity as a Service (pay-per-welding spot, pay-per-rivet)
- **Module as a service**
  Open hard- and software modules for personalized service, e.g. KUKA Connect
- **Platform as a service**
  Lifecycle environment and communication to supply soft- and hardware modules,
  (e.g. KUKA App Store, KUKA Asset Management)
- **Infrastructure as a service**
  Holistic infrastructure as a basis for platforms and module supply, e.g. Supplier park with mainstream IT and standardized interfaces

Development of production lines (1)

	High volume/ low number of models	Low volume/ high number of models
Today		
Tomorrow		

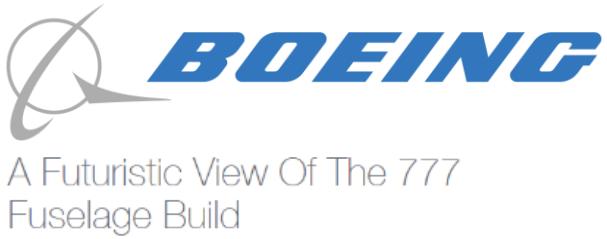
Picture: Siemens

Development of production lines (2)



Development of future Aircraft plant production

- Media -



- Fuselage Automated Upright Build, or FAUB
- Advanced Manufacturing technology
- Customer benefits
  - Improves workplace safety
  - Increases product quality
  - Increases production rates
  - Reduces rework
  - Improves efficiency and productivity.

- With FAUB, fuselage sections will be built using automated, guided robots that will fasten the panels of the fuselage together, drilling and filling the more than approximately 60,000 fasteners that are today installed by hand.
- The traditional hand-installation method has proven challenging over the years, with employees positioned inside and outside of the fuselage, drilling and filling in sync.

KUKA is in the perfect position to deliver 4.O/IoT, Hardware & Software fully Integrated

- Media -

Morgan Stanley
GLOBAL INSIGHT

Robotics Case Study – Laying the Basis ol IIoT with Kuka KTPO

What is KTPO? KTPO stands for **K**uka **T**oledo **P**roduction **O**perations (Ohio, US) and is an exclusive cooperation with Fiat Chrysler Automobiles (FCA). In that set up, Kuka manufactures the complete body shells for Jeep Wrangler, including all closure panels. This collaboration, also involving Magna and OMMC, started in 2006 and has since manufactured the body of all Jeep Wranglers sold in the world with close to 1.5 mn units completed so far. Kuka, Magna and OMMC have invested jointly close to USD 1 bn for the manufacturing set up of the Wrangler.

Source: Morgan Stanley – Global Capital Goods; Insight: Cloud Control – The Future of Industrial Automation, March 15, 2016

Disclaimer

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