Driving and Moving Industries
THAI-GERMAN INDUSTRY 4.0 SYMPOSIUM
KUKA Group (Key Figures and Organization)

- KUKA has ca. 12,300 employees, 3 billion Euro revenue (2015)
- In 39 countries

KUKA Robotics

KUKA Systems

Swisslog

Component
- Industrial Robotics
- Service Robotics
- Medical Robotics

Cell
- Technical Solutions
- Reis

Solution
- Automotive
- Aerospace
- Warehouse Logistics
- Healthcare

Integrated software solutions and modular product platform

- Robotics expertise
- Application and industry expertise
- Systems and process expertise
- Systems and process expertise

Global market access

Industry 4.0 Symposium – Drives and Motion
KUKA Robotics Thailand | Wenzel | 05.10.2016 | Page 2
### Local presence on a global scale (Expansion in Asia)

#### Production
- [Image of world map with dots indicating production locations]

#### Sales & Service
- [Image of KUKA Robotics (Thailand) Co., Ltd.]
- New office in May 2016 (opening Sept/16)

### Americas
- Argentina
- Brazil
- Chile
- Canada
- Mexico
- USA

### Europe
- Austria
- Belgium
- Czech Republic
- France
- Germany
- Hungary
- Italy
- Norway
- Poland

### Asia/Rest of World
- Australia
- China
- Taiwan
- India
- Japan
- South Korea
- **Malaysia (2003)**
- New Zealand
- **Thailand (2016)**
- Vietnam (2017)
Why is Thailand important for KUKA?

- Key location between East – South-East Asia to supply goods to whole Asian continent.
- Dedication by Government to Automate (Incentives, Policies, Supercluster Policy)
- Thailand 4.0 Policy goes beyond automation, it is like the German Industry 4.0 about smart factories, an upgrade in workforce (by education), combining IT & communication infrastructure with automated manufacturing.
- Thailand has emerging & important players ready to serve regional and world markets (e.g. Food, Construction Material)?
- Once Thailand 4.0 policies are implemented, new business models requiring flexible/ smart factories can be expected to be here.
“Things” in the IoT
What is Industry 4.0? Trends in Automation

- Mass Production
  - Steam Power
    - First mechanical loom: 1784
    - First production line, Cincinnati slaughterhouses: 1870
  - Cyber Physical Systems
    - First programmable logic controller (PLC), Modicon 084: 1969
    - 3. Industrial revolution uses electronics and IT to achieve further automation of manufacturing
    - 4. Industrial revolution based on Cyber-Physical Systems

- Mechatronic
  - 1. Industrial revolution follows introduction of water- and steam-powered mechanical manufacturing facilities
    - End of 18th century
  - Start of 20th century
  - Start of 1970s
  - Today

Source: DFKI 2011
Industry 4.0 Cloud Computing & KUKA Connect

Examples of Applications:
- Monitor conditions & Predictive maintenance
- Centralized control over robots on a smart platform (allowing to optimize production)
  - Learning Robots
- Data Exchange with AGV (automatic guided vehicle) and robots, other production devices.
- Communication between IT and OT (Operations Technology)
- Capacity Management & pay per use
  - Robot Lifecycle management
  - Remote Service Management
  - Energy optimization

Condition:
- Standards (allowing a communication with devices)
KUKA is part of the Industry 4.0 standardization working group in Germany.
Change in communication paradigm

Human 2 Human

Human 2 Machine

Machine 2 Machine

x 2 x
KUKA products to support Industry 4.0 Strategy

1st Robotic Revolution
Industrial automation

2nd Robotic Revolution
Sensitive, safe robot-based automation (LBR iiwa)

3rd Robotic Revolution
Mobility, mobile manipulation (KMR iiwa)

4th Robotic Revolution
Intelligent & cognitive & perceptive robot systems

Future

Innovation
Collaboration boosts flexibility and productivity

High flexibility at limited productivity

High productivity at limited flexibility

High flexibility and high productivity by Human-Robot-Collaboration

Source: Daimler
World CO2 emissions will increase 16%.
The average global temperature will rise 0.5-1.5°C.
Declining biodiversity and extreme weather (Roland Berger).
The average age worldwide will rise from 27.2 years now to 37.3 years in 2050 (Oxford Institute).
Average age in Germany will rise to 88 years for women and 82.5 years for men in 2050 (Deutsche Bank).

The share of the world population living in urban areas will rise to 53.6% in 2030 (United Nations).
Large-scale migration from region to region and countryside to urban areas continues in both Asia and the Middle East (Copenhagen Institute).
How automation will be impacted

Megatrends

New Requirements (Market Pull)
- Individualized Products
- Employee’s Health & Satisfaction
- Flexible & optimal Production

New Possibilities (Technology Push)
- Low Cost & powerful IT, Moore’s Law
- Internet Technology, Nielsen’s Law
- Smart Software
Example Smart Factory / Matrix Production

- Examples for opportunities in a Smartfactory
  - Flexibility in production to the extent of batch size ONE.
  - Less Lead-time for new products
  - Integration with suppliers and customers (exchange of data)
  - Production Logistics integrating Warehousing and Tool Storage by AGV
  - Efficiency maintained by flexible capacity utilisation
Megatrend: Use instead of own = Everything as a Service

Objective / Goal / Target / Solution

Ownership
Zero

Desire / Requirements / (Customer)Wishes

Something is directly owned

Megatrend

„Everything as a Service“

Something is provided as a Service

Investment
CAPEX

OPEX
The Prosumer Model

Producer und Consumer partnership together

- Brand loyalty
- Quality
- Social Media
- Support
- Perception

Collaboration

XaaS (Full Service)
Technology push will enable new business models

- New business models are the real revolution!

- Trends
  - Prosumer: Consumer want to collaborate with producers in an Eco System
  - Concentrate on core competences, outsource everything else
  - Use instead of own
  - Pay only for what you really consume
  - Software Defines Everything
  - Everything as a Service

- Opportunity and Threat:
  - New business models can (and often will) disrupt your existing business models
  - New technologies can enable disruptive innovations
Focus on our markets – Clear market position

Megatrends change the world

- World CO2 emissions will increase by 5%
- The average global temperature will rise by 2.5-3.8°C
- Declining biodiversity and extreme weather conditions

KUKA
Holistic Business Model
Cross-company approach serving solutions:
Component – Cell – Solution – Services

Your strategic automation partner from production to distribution
KUKA 2020 – Creating the conditions for implementing Industry 4.0

Smart factory

Human-Robot Collaboration

Market and customer proximity

Connection to the world of IT using intelligent control concepts – “Smart Platforms”

Mobility

“Generation R”