

# The Internet of Things: Improving Productivity & Sustainability

Margarethe Wiersema

Dean's Professor of Strategic Management  
University of California, Irvine

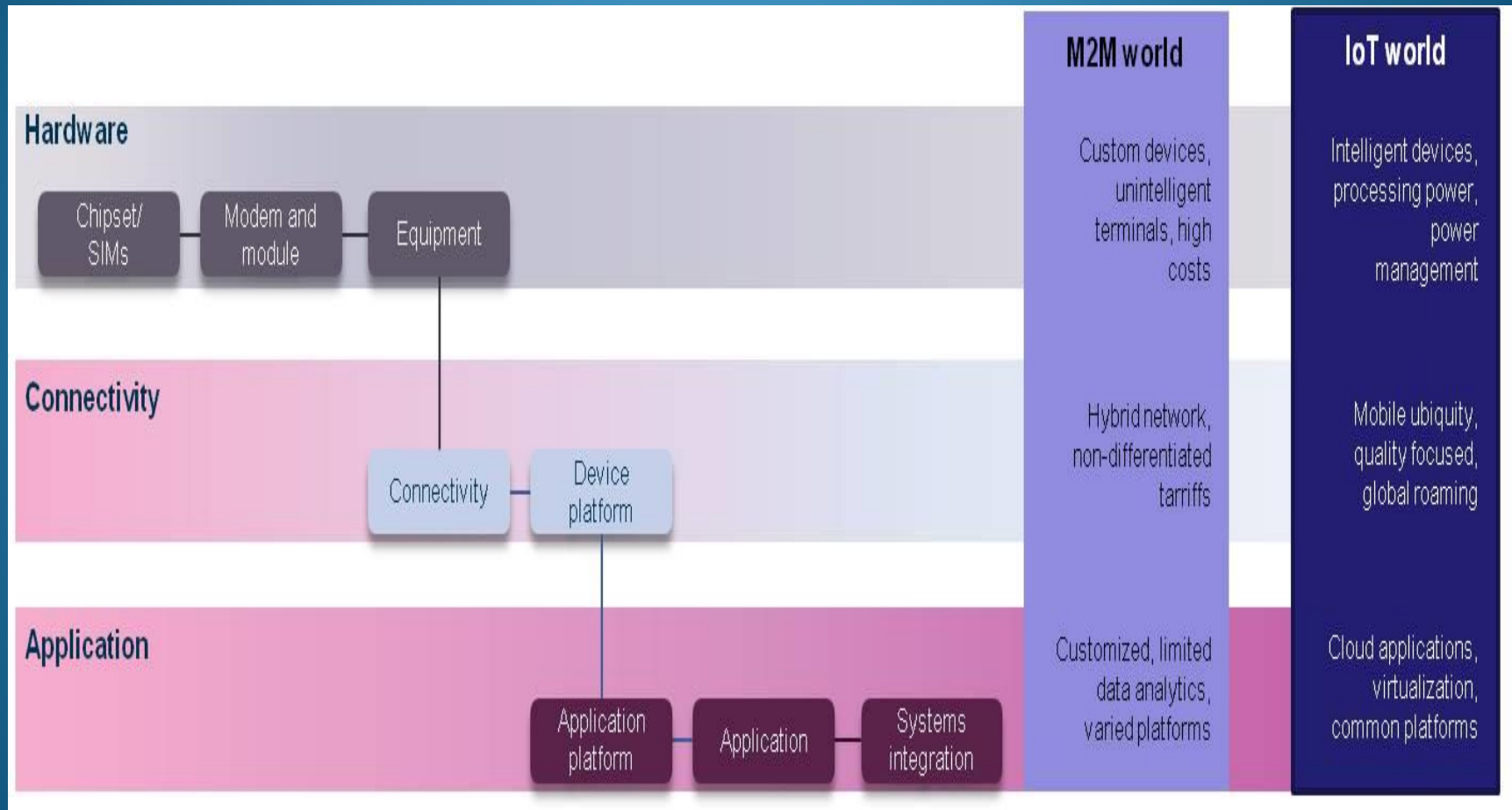


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# Internet of Things



# Managing the Wind Farm



- KPM - Increases energy output by 20%



# Turning Down the Lights



- KPM – 20 million kilowatts hours savings/year (\$3 million)



# Sharing the Ride



- KPM – Top 10 platforms produce 19.2 million units (2014) – will be 27.8 million units (2020)
  - 1 million units/platform results in a \$700 per vehicle cost reduction
  - > 1 million units/ platform results in an additional \$100 per vehicle cost reduction



# Connected Manufacturing



- KPM - \$173 million savings (5 years)
  - 44% due to reduced plant downtime
  - 11,000 minutes/plant/year to 2,500 minutes/plant/year



# Using Data for Yield Optimization

- Arcelormittal Gent
  - 0.5% gains in BOF Fe yield by broadening the data set going into the BOF process model



# Example – Blast Furnace Remote Monitoring and Diagnostic System (BFRMDS)

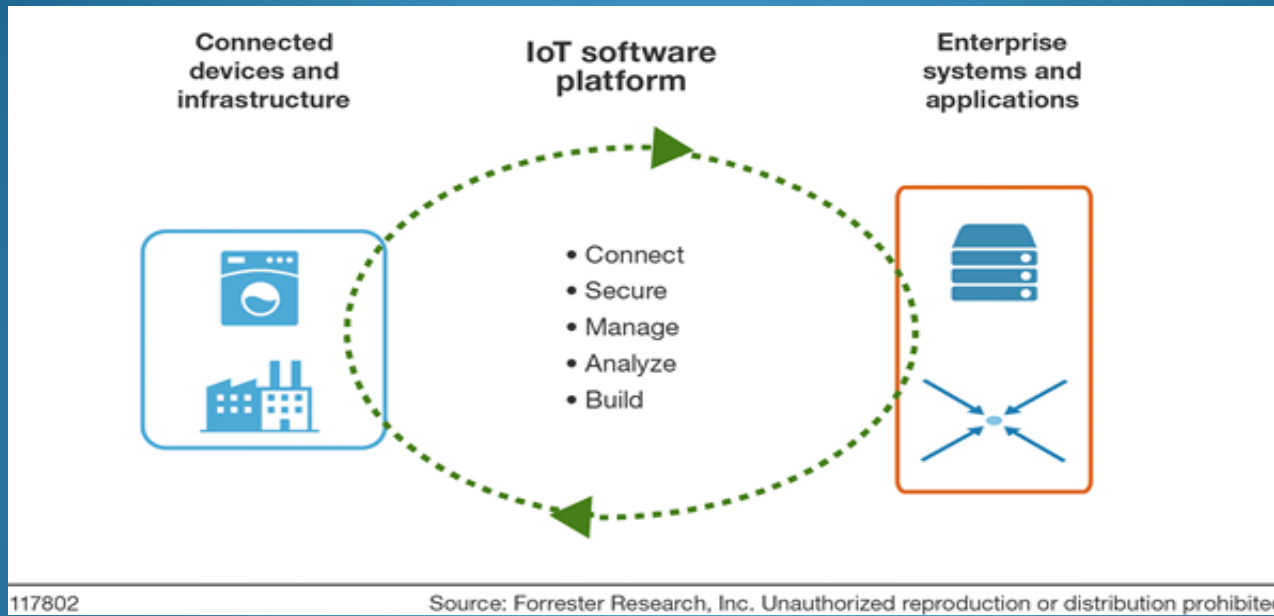


- Real-time remote monitoring of blast-furnace parameters
- Piloted in 2010 and now operational at 10 furnaces (6 planned for 2012)
- Tracks 500+ performance data points and 30+ KPIs per furnace
- Facilitates early detection of process problems
- Enables global process experts to collaborate in real time
- Identifies the most appropriate action at the right time
- Facilitates sharing of best practices
- Supports development of a universal knowledge-base
- Estimated \$20 million annual savings (plus avoidance of catastrophic events)
- Approach now being developed for electric-furnace operations





# Internet of Things



- Physical World becomes an Information System
  - Connectivity of sensors, actuators, video cameras and RFID readers to the Internet
  - Intelligent Connected Networks



# Industrial Internet

- Big Data Analytics with the Internet of Things
- Enables Optimization of Production Systems
  - Track and manage machines and systems
  - Identifies bottlenecks and weaknesses in production
  - Preventative and condition-based monitoring
  - Minimizes equipment failure/ Increases machine uptime
  - Addresses quality control problems
  - Reduces waste and energy use



# Initiatives

- Industrie 4.0
  - German gov't initiative to advance the application of digital technologies to the industrial sector
- Made in China 2025
  - Chinese gov't initiative to promote integration of digital technologies and industrialization
- IoT World Forum
- Industrial Internet Consortium
  - Founding members: AT&T, Cisco, GE, IBM, Intel

