Chinese Government's Approach to Smart Manufacturing

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China's Policy on Smart Manufacturing

- I. Official Documents
  - ***Development Plan for Smart Manufacturing***
  - *Guidelines on Implementing Smart Manufacturing Projects*
  - *Guidelines on Establishing the System of Standards for Smart Manufacturing*
- II. *Development Plan for Smart Manufacturing*
  - The first national policy in general on SM
  - MIIT and MOF in 2016
  - An echo to the strategies of "Re-Industrialization" in developed economies

China's Policy on Smart Manufacturing

- III. Purpose of the *Plan*
  - To point a direction and draw a big picture of what SM look like and how to achieve it
  - To encourage industry to employ ICT tech and upgrade the manufacturing process
- IV. Tasks set out by the Plan
  - 1. Technology Innovation and Development
    - The industry must be able to develop techs and equipments necessary for employing SM
    - Have comprehension of essential techs and possess know-how

China's Policy on Smart Manufacturing

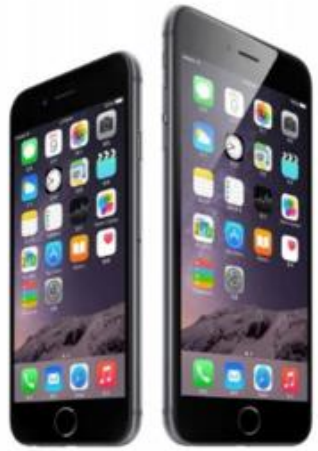
- IV. Tasks set out by the Plan
  - 2. Provide Foundational Enabling Capabilities
    - system of standards; industrial internet of things (IIOT); and cyber security
  - 3. Encourage Adoption of SM
    - Supply Side: call for system solution providers—an ecosystem
    - Demand Side: industries voluntarily adopt SM—particularly for SMEs
  - 4. Prepare Labor Force for SM
    - SM calls for cross-cutting knowledge and skills
    - More investments on education and training

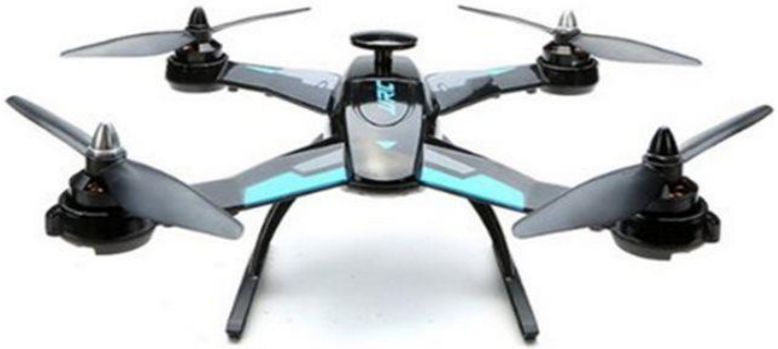
Principal Challenges in Promoting SM

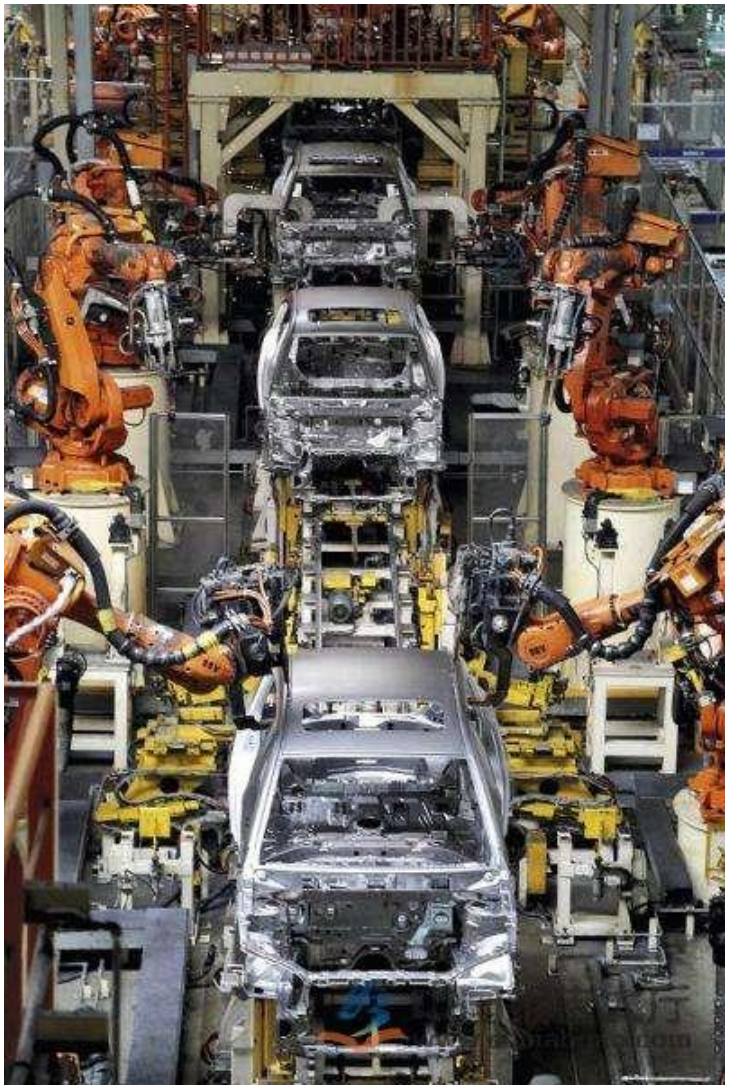
- A simple fact…
  - Industrialization not completed yet
  - Unbalanced development: coastal v. inland; labor-intensive manufacturing
  - The *Plan*: "the Chinese manufacturing industry remains in a phase, where mechanization, electrification, automation, and digitalization coexist, and different areas, industries, and enterprises have various level of development."
- Gives rise to several specific challenges

Principal Challenges in Promoting SM

- I. How to have enterprises accept or adopt smart manufacturing
  - 1. Necessity to adopt SM not apparent
    - Have been used to and doing well with human labor-intensive manufacturing
    - Overhaul of manufacturing system entails heavy investment
    - No quick return or near-term benefit
  - 2. Limited understanding of what SM truly is
    - Some typical misunderstandings...







Principal Challenges in Promoting SM

- II. Foundational enabling capabilities for SM is insufficient: Standard System
  - “standardization must go ahead of industrialization”
  - standardization is a first priority for Industry 4.0
  - SM: widespread connections; data flow across steps and across sectors
  - Need a synthesized system of protocols and standards
- Despite the challenges, the community has a consent that SM is the right direction, we must work together to make it happen

Chinese Government's Approach to SM

- The *Plan* is the most important policy approach to meet the challenges of SM
  - Under its guidance, the Chinese Government has taken a couple of actions to address the specific challenges
- 1. To Meet the first challenge: SM Experiment and Illustration Program"
  - Launched by MIIT in 2015
  - How it functions...

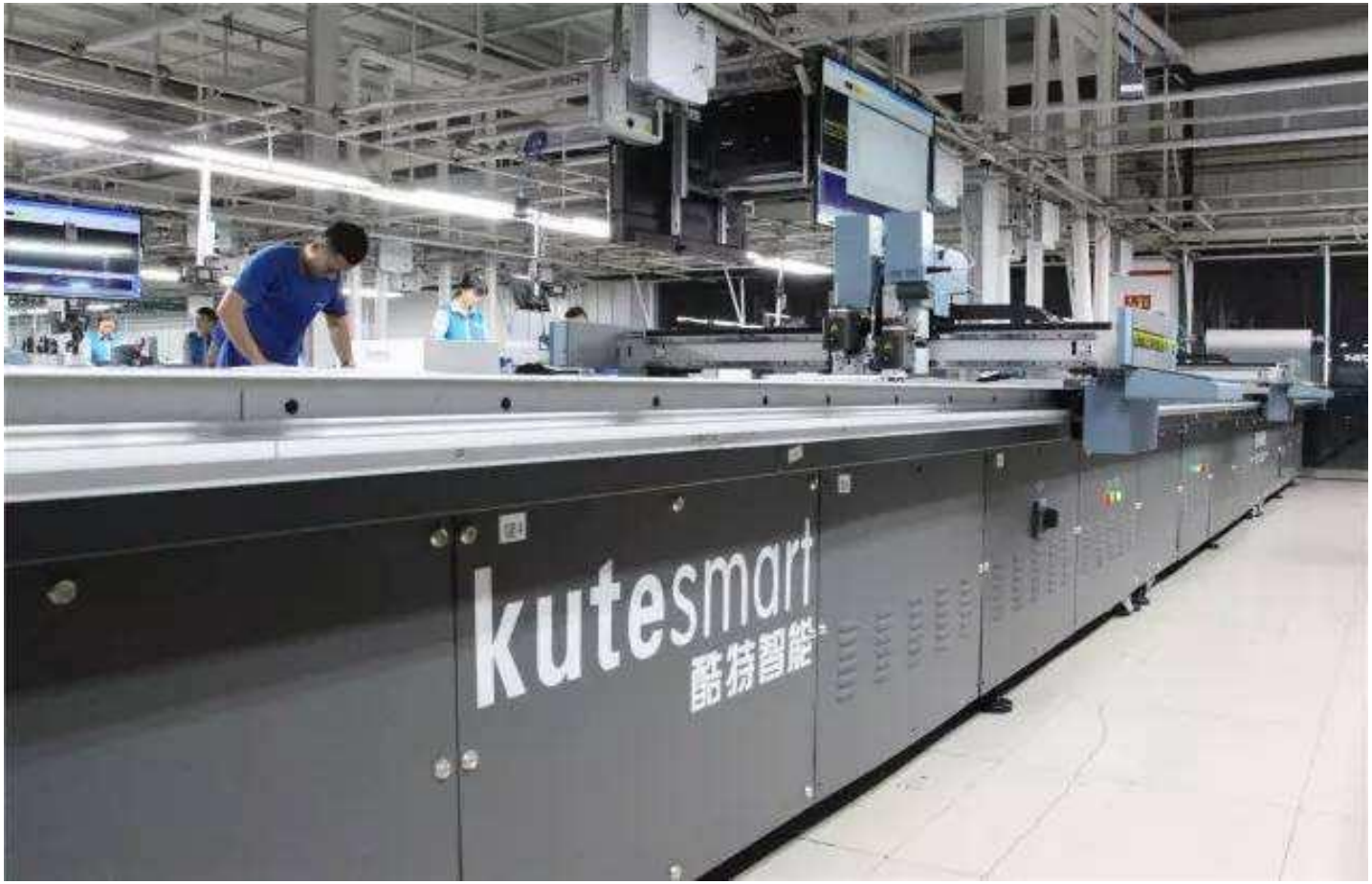
Chinese Government's Approach to SM

- 1. To Meet the first challenge: SM Experiment and Illustration Program"
  - How it functions:
    - Once a year, firms submit application to become EI Point
    - Demonstrate it has achieved an advanced status in particular aspect of SM: digital 3D software for product design, and deployed PDM
    - MIIT considers: cyber security; manufacturing efficiency; defective product rate; cost-effective
    - ★ : provide replicable experience - Experiment&Illustration
    - In essence, a Good Practice

Chinese Government's Approach to SM

- Example of Illustration Point: Redcollar Group
  - Custom clothing (traditional industry) v. one of the first to transform into SM
  - KuteSmart C2M system
  - Customer input body size and need with app – data transferred back to factory – big data v. hand prototyping – each clothes assigned unique e-label – tasks sent to corresponding sectors – workers receive tasks from computer screen – progress monitored by sensors
  - Inventory to zero; profit to 20% v. 5% for average

kutesmart
酷特智能



Chinese Government's Approach to SM

- Example of Illustration Point: Redcollar Group
  - KuteSmart also transform Redcollar from a manufacturer into a service and solution provider
  - Help firms in clothing, apparel, shoemaking industry to reinvent their management and production system
  - A pioneer's experience replicated by others

Chinese Government's Approach to SM

- 2. To Meet the second challenge: standardization
  - Issued the *Guidelines on Establishing the System of Standards for Smart Manufacturing*
  - Set up a working group: coordinate; advisory opinions
    - Co-chaired by MIIT & Standardization Administration of China
  - China-Germany cooperation on standardization
    - May 2015, two government established the "SM/I 4.0 Standardization Working Group"
    - Representatives from government, industrial associations, academia, business
    - The most important cooperation and communication platform on SM between China and Germany

Chinese Government's Approach to SM

- 2. To Meet the second challenge: standardization
  - China-Germany cooperation on standardization
    - Working principally on mutual recognition of standards about SM
    - The Guidelines identified 220 critical and foundational tech standards ≈ corresponding counterparts in I 4.0
    - Since 2015, the working group made mutual recognition of standards a first priority: mutually recognized standards amount to 36
    - Jointly making new standards in progress

Conclusion

- Government needs to play a role in promoting the development of SM
- What shall government do? – China's experience
  - **An educator**: draw a blueprint and let the industry know what SM is, by issuing document or designating illustrative examples
  - **An organizer**: build up a platform, bring together stakeholders, create a good environment for interested parties to communicate and cooperate