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
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...
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...
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
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- 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
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
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
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 \approx 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