

APEC Seminar on Understanding the Impact of Smart Manufacturing in Policy and Regulatory Approaches. 25<sup>th</sup> – 26<sup>th</sup> September 2018. Penang, Malaysia.



# SMART MANUFACTURING VIA SMART POLICIES

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# Outline

Item	Page
Defining Smart Manufacturing	1
Trends in Smart Manufacturing	2
The Benefits of Smart Manufacturing	3
The Challenges of Smart Manufacturing	4
The Role of Government	5
Policy Approaches on Smart Manufacturing by Leading Economies	6
Smart Manufacturing in Malaysia: Landscape & Policy Recommendations	8
APEC/ABAC and Smart Manufacturing Initiatives	10
Conclusion and Moving Forward	11

# Defining Smart Manufacturing



Smart manufacturing is a technology-driven approach that utilises **Internet-connected machinery**, **accumulating more data** as it makes its way through production processes, improving business, physical, and digital processes within factories and across the entire value chain

- Computer/Automation, while part of IR4.0, is actually a hallmark of IR3.0
- IR4.0 moves beyond just automation and machine-to-machine connectivity to cyber-physical systems. Smart manufacturing needs holistic connectivity of the entire operation, from the factory to the office
- One difference from past IRs is that machines are taking over **cognitive** tasks



# Trends in Smart Manufacturing



**Big data and cloud computing**

**Distributed manufacturing**

**3D printing/additive manufacturing**

**Modelling and simulation**

**Virtual manufacturing**

**The emergence of 'next shoring'**

# The Benefits of Smart Manufacturing



**Improved  
productivity**



**Innovation  
and higher  
quality  
products**



**More  
manufacturing  
jobs**



**Energy  
efficiency**

# 3 Main Challenges of Smart Manufacturing



1

## Revamping business models

- Manufacturers face threats from digital disruptors driving the need to look into new business models rapidly

2

## Data and Security

- Smart manufacturing is heavily reliant on technology and data which brings with it the challenges of data security and protection
- Failure to adhere to data protection legislation will risk financial penalties and reputational damage

3

## Agile and Interoperable Operations

- Operating smart manufacturing will be dependent on manufacturers being agile and responding more quickly to update their technology
- The systems and networks used must be interoperable to successfully connect systems together

# What Can Governments Do for Smart Manufacturing?

## 1. **Enabling Infrastructure is Crucial**

Smart manufacturing will necessitate high-quality digital and data infrastructure (5G)

## 2. **Public Incentives for Capital Investment & Technology Adoption**

Public incentives and funding makes it easier for private firms to take the initial step to invest

## 3. **Public Efforts to Upgrade Workforce Skills & Increase Industry Linkages**

The low cost labour-intensive model no longer cuts it, a focus on upgrading workforce skills is needed, including efforts to increase public-private-academia linkages

## 4. **Policy & Regulation**

Regulation needs to keep pace with technological change, yet not stifle innovation and at the same time protect the interests of the people

## 5. **Government To Actively Leverage Technology to Improve Public Service Delivery**

Governments should themselves be quick to adopt new technologies to realise efficiency gains and lead by example

# Policy Approaches in Leading Economies

Looking at EU Member States, South Korea, China, and the US's strategies to accelerate smart manufacturing and technology...

## EU States

Platform Industrie 4.0  
Industrie du Futur  
Produktion 2030

## South Korea

Manufacturing  
Industry Innovation  
3.0 strategy

## China

Made in China 2025

## United States

Manufacturing USA

## Some Common Threads...

- **Public-private cooperation:** Amongst all the strategies, even in China, there is a substantial role for private sector consultation, often involving establishment of public-private councils
- **A focus on technology first:** initiatives usually focus on R&D and technology upgrading, workforce skill upgrading mostly a secondary goal—maybe this shouldn't be the case



# Policy Approaches in Leading Economies



There are some differences between the **East Asia** approach (China, South Korea) and the **Western** approach (EU Member States, the US)

The **Western** approach emphasises the government playing a mostly **enabling role**, with limited active interventions

- Emphasises establishment of strong institutions, IP protection, support for R&D through tax credits only
- Emphasises bottom-up approach led by private sector and markets

The **East Asia** approach involves the government having a sizeable **active role** in addition to an enabling role

- Active market intervention: Higher amounts of state funding and direct subsidies
- The Chinese government directly subsidises manufacturing plants, even covering a percentage of their production costs
- The Korean government plays an active role in helping companies upgrade their operations to smart factories

# The Smart Manufacturing Landscape in Malaysia

- In 2016, the ifactory 4.0 Innovation Centre became the first learning factory in South East Asia to feature the latest production concepts, connecting all machines via a Smart Data platform according to German Industry 4.0 standards
- The Malaysian Investment Development Authority (MIDA) supports local companies through:
  1. Automation Capital Allowance (adoption of automation)
  2. Technology Transfer by partnering with international players
- However, the transition to smart manufacturing in Malaysia remains slow, due to 3 main challenges faced by industry players:

①

- **Funding**

②

- **Mindset Change & Drive**

③

- **Skills & Expertise**

- Most local SMEs still operate in Industry 2.0 level (automation at infancy stage)
- It is critical for Malaysia to increase scale and intensity in terms of IR4.0 strategy, up-skilling of labour force & upgrading of technology over the next 3-5 years

# Considerations for Malaysia's Smart Manufacturing Strategy



There is a need for national strategy, but strategy needs to be flexible - not too prescriptive and set-in-stone

- Jack Ma: “seven- to twelve-year regulatory policy timelines do not reflect the speed of the internet”
- National strategy need **clear** goals with measurable targets as well as rigorous monitoring and evaluation mechanisms
- Lessons from international smart manufacturing strategies tell us that public funding is crucial, but successful programs also leverage private sector financing through both voluntary and mandatory policies

Another Important Consideration: What role should the government play in this strategy?

- Emphasise **active** or **enabling** role?
- Emphasise industry-driven (bottom-up) or top-down governance approach?
- Perhaps an optimal mix of both?

# APEC/ABAC and Smart Manufacturing Initiatives



Does APEC/ABAC look into technological changes impacting the manufacturing landscape?



To date, there is no dedicated initiative or project that directly looks into Smart Manufacturing



Projects and initiatives mostly focusing on

- GVC development & cooperation
- Growth of Digital and Internet economy (Cross-border e-commerce)



Discussions on “Smart” – mostly on Smart Cities



Discussions on Industrial Revolution mostly related to human resource and skills needed

# Conclusion and Moving Forward

- Technological growth is transforming the world's manufacturing landscape
- Robust policy approaches on Smart Manufacturing play a key role in creating states of higher competitive play in the field
- APEC economies should understand the benefits of Smart Manufacturing and seize the opportunities, or risk being left out of the GVC
- Moving forward, government, academics and private sector in APEC economies need to strengthen education and skills, innovation, technological creation and adoption as well as mindset change in responding to the industrial revolution in the manufacturing industry

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# THANK YOU

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