ICTs for Emerging Technologies and Industry 4.0 Special Track: Critical Elements of Successful Industry 4.0 Policy

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ITIF | INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

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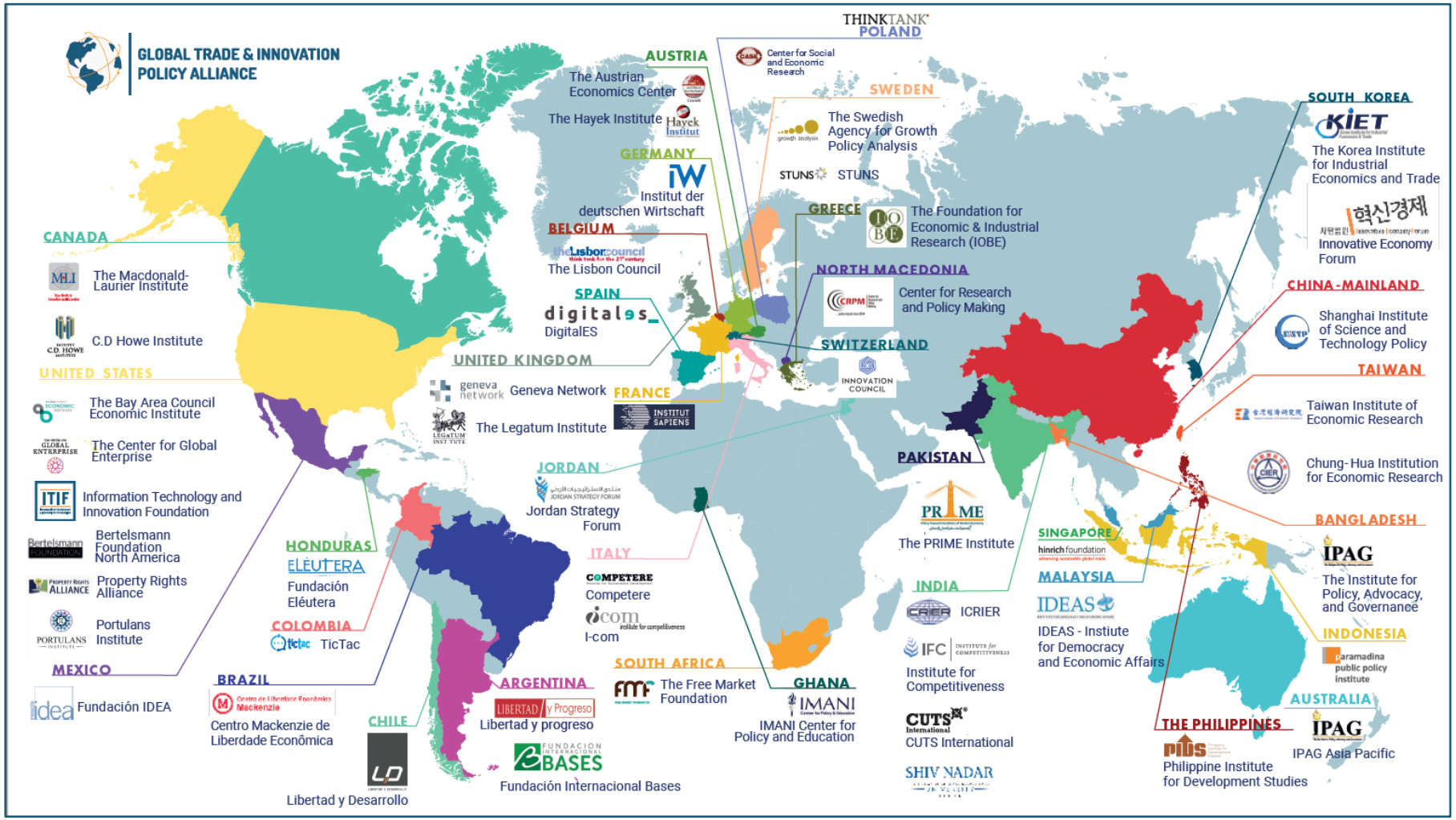
About ITIF

- The world's leading science and technology policy think tank.
- Supports policies driving global, innovation-based economic growth.
- Focuses on issues at the intersection of technology innovation and public policy across several sectors:
  - Innovation and competitiveness
  - IT and data
  - Telecommunications
  - Trade and globalization
  - Clean energy, manufacturing, life sciences, and ag biotech



The Global Trade and Innovation Policy Alliance

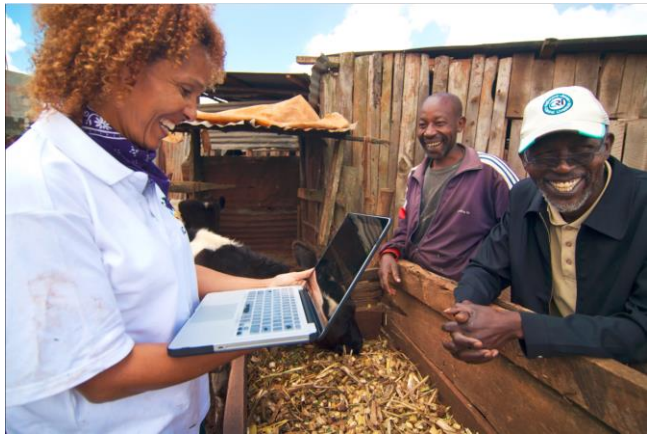


ICTs Have an Outsized Impact on Productivity

ICT is “super capital” that has a much larger impact on productivity than other forms of capital.

- ICT has 3 to 7 times more impact on firm productivity than non-IT capital.
- ICT workers contribute significantly more to productivity than non-IT workers.

Developing countries: ICT added ~25% of growth, 2000–2010.



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It's Better to "Consume" Than "Produce" the Tech

- Over 90% of the economic benefits from ICT are related to its use by organizations and consumers, rather than its production by tech firms.





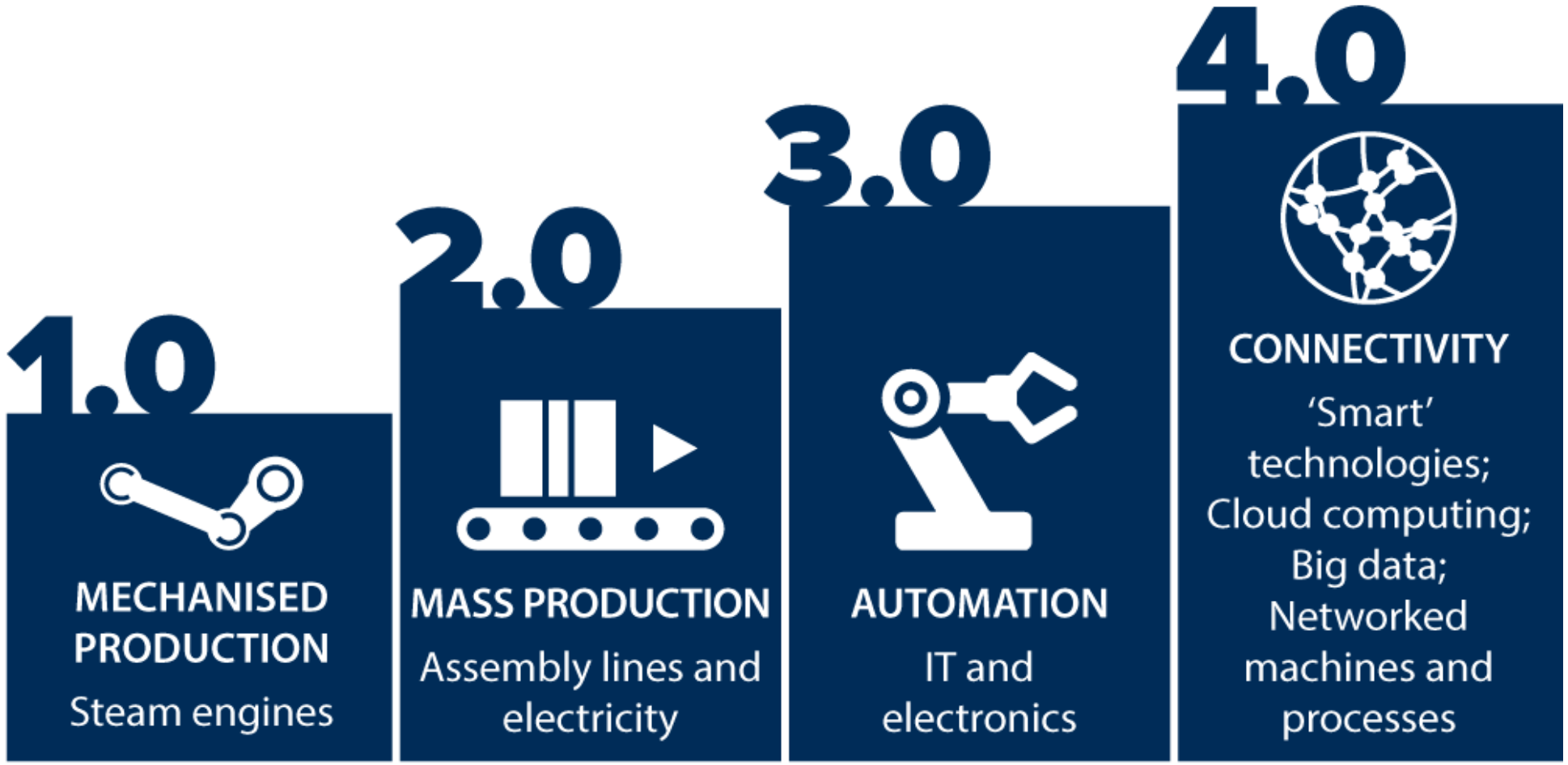
Increasingly Digitalized Global Economy

- "Half of all value created in the global economy over the next decade will be created digitally." – Tekes
- Digital economy now accounts for 25% of global GDP.
- 75% of the value added by data flows over the Internet accrues to traditional industries.



Sources: Accenture, "Digital Disruption: The Growth Multiplier"; McKinsey Global Institute, "Digital Globalization: The New Era of Global Flows"; IDC, "IDC FutureScape: Latin America IT Industry 2019 Predictions"

Digital Driving the Fourth Industrial Revolution



Source: Oxford Analytica

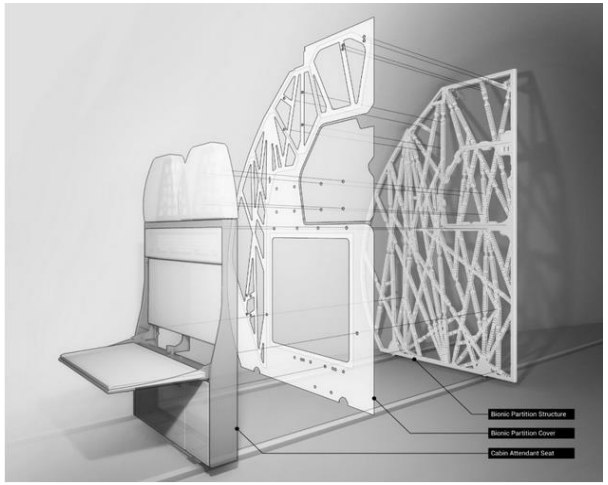
“Digitally Enabled” at Each Step of Manufacturing

1. Product Design
2. Fabrication and Assembly
3. Factory Integration
4. Supply Chain Integration
5. Product Use and Consumption



Generative Design & 3-D Printing

- Software designs products based by specified input constraints.
- Synthesizing successive layers of material into a three-dimensional solid object composed from a digital file.







Factory Integration

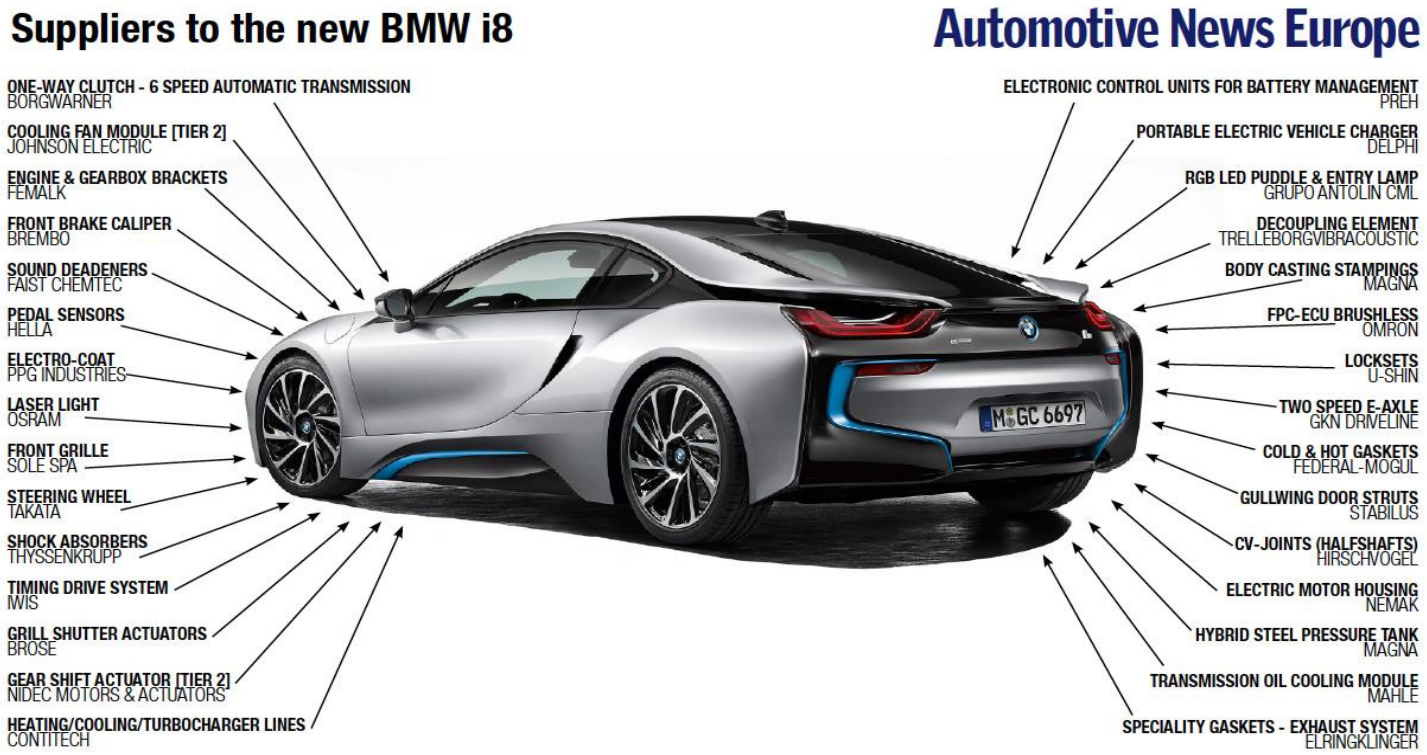
Sensor-enabling equipment generates a comprehensive, real-time view of the status of machines, work cells, and systems.





Supply Chain Management

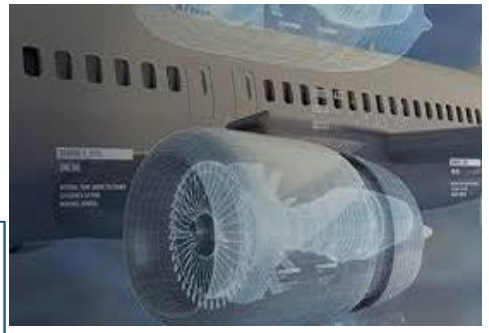
Real-time visibility into every machine making every component across entire industrial supply chains.



Digitally Enabled Product Use and Consumption

- Digitalization enables new business models such as product servification, mass customization, low-cost variability, and evergreen design.
  - E.g., Rolls Royce's "Power by the Hour" model.
  - John Deere tractors with variable engine horsepower.
- Value-added services increasingly driving revenue growth for manufacturers.









Source: Harvard Business Review, "How Smart, Connected Products Are Transforming Companies"

Economic/Productivity Impacts From Manufacturing Digitalization

- Industrial Internet of Things applications expected to add $10 trillion to the global economy over the next decade.
- Digitalization expected to boost factory productivity up to 25%.
- Could add 1-1.5% to annual productivity growth.



Sources: McKinsey Global Instiute, "The Internet of Things: Mapping the Value Beyond the Hype"
GE, "Industrial Internet: Pushing the Boundaries of Minds and Machines"

Trade Impact of New Production Systems



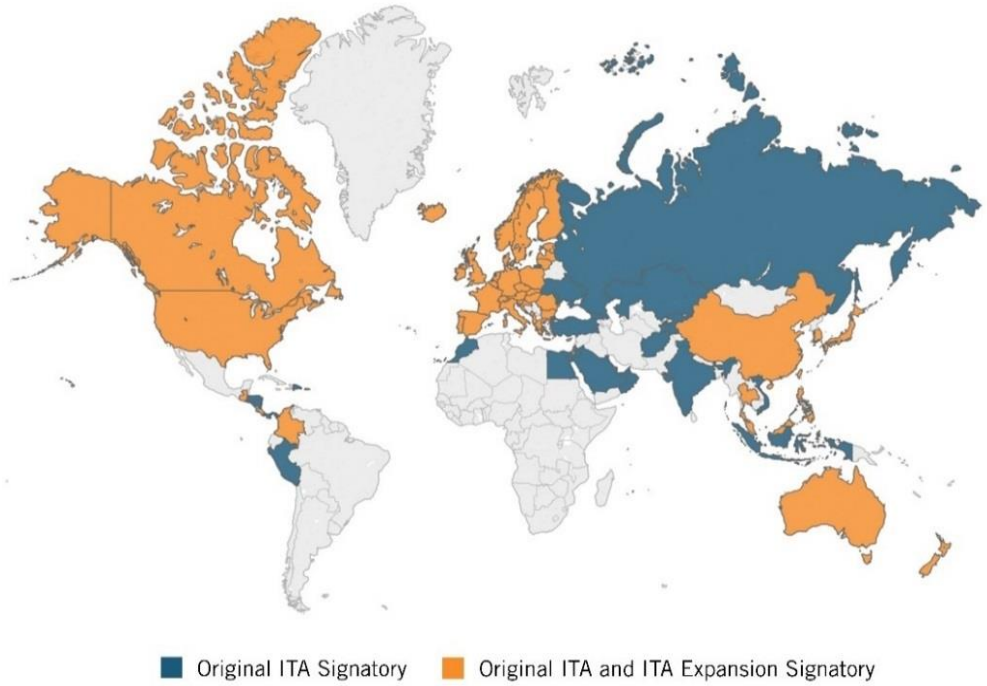
Note: 3DP allows for the breaking up of the manufacturing principle of one product/one manufacturing plant. Instead printing of products can take place in smaller units closer to customers.
Source and Graphics: National Board of Trade Sweden

Source: Courtesy Magnus Rentzhog, Swedish National Board of Trade, "Trade, digitalization, and the future of trade policy"

How Policymakers Can Spur Greater Digitalization

1. Join the Information Technology Agreement (ITA)

- Eliminates tariffs on 330+ categories of ICT goods/components.
- ITA trade totals $1.7 trillion annually.
- 82 signatories to ITA1; 54 to ITA2.



How Joining the ITA Spurs Growth in Developing Nations





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How Joining the Information Technology Agreement Spurs Growth in Developing Nations

BY STEPHEN J. EZELL AND J. JOHN WU | MAY 2017

By reducing costs, the ITA leads to increased use of ICT goods, which spurs productivity and economic growth in signatory nations, while deepening their enterprises' participation in global value chains.

Implemented in 1996, the Information Technology Agreement (ITA) has played a pivotal role in facilitating global trade in information and communications technology (ICT) products. Under the ITA, 82 signatory countries have agreed to fully eliminate tariffs on hundreds of ICT products. By reducing their costs, the ITA leads to increased use of ICT goods, which spurs productivity and economic growth in signatory nations, while deepening their enterprises' participation in global value chains (GVCs) for the production of ICT goods and services. Recognizing these benefits, 53 nations agreed in December 2015 to reduce tariffs on an additional 201 ICT tariff lines (including hundreds of products, parts, and components) as part of an expanded list of goods covered by the ITA. Yet, despite its proven benefits, some developing countries have remained on the sidelines of the initial ITA and its recent expansion. In this report, ITIF analyzes the effects of six developing nations—Argentina, Cambodia, Chile, Kenya, Pakistan, and South Africa—joining the original ITA as well as its recent expansion. It finds that doing so will boost economic growth for each of these countries, while generating tax revenues from new economic growth in the 10th year following accession that more than offset tariff losses for two of the six nations, while recovering most tariff losses for another three.

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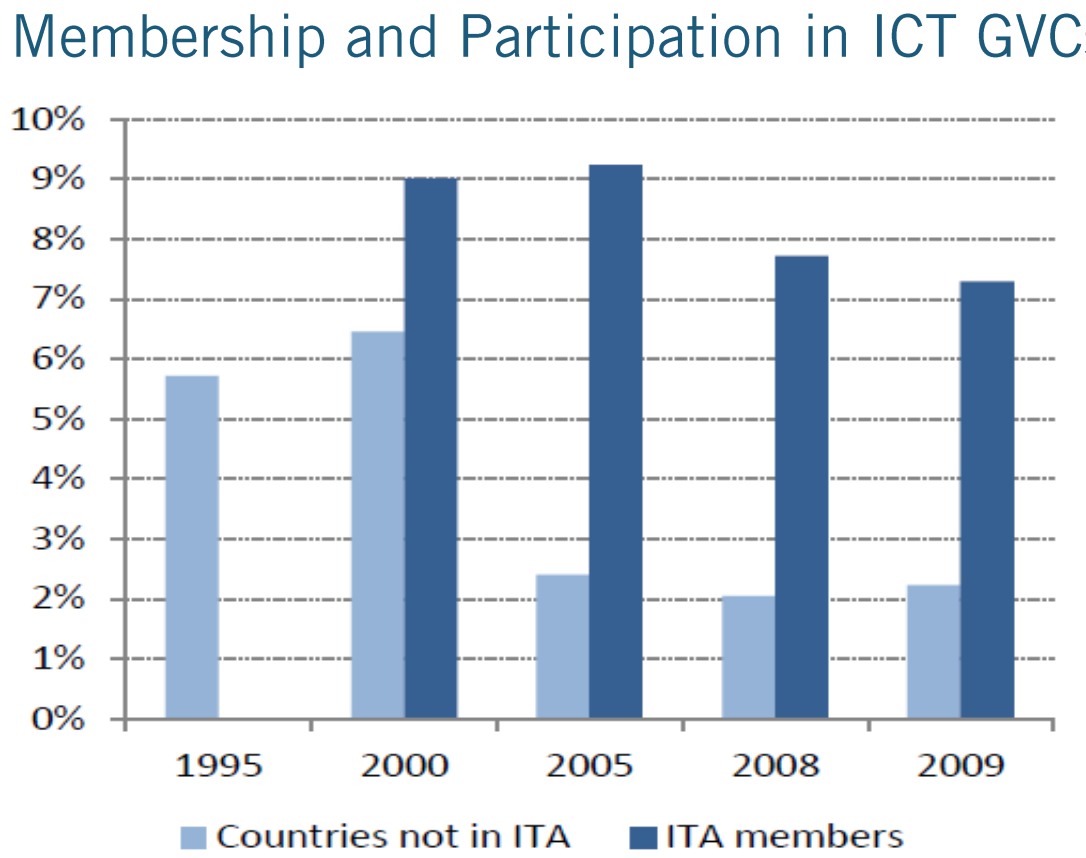
ITA Facilitates Participation in ICT Global Value Chains



Source: OECD, *Implications of Global Value Chains for Trade, Investment, Development, and Jobs*, 2013

How the ITA Stimulates Economic Growth/Tax Revenues

Eliminating tariffs lowers ICT prices.



Lower ICT prices stimulate increased ICT consumption.



Greater ICT consumption increases ICT capital stock, leading to increased productivity, and thus, economic growth.

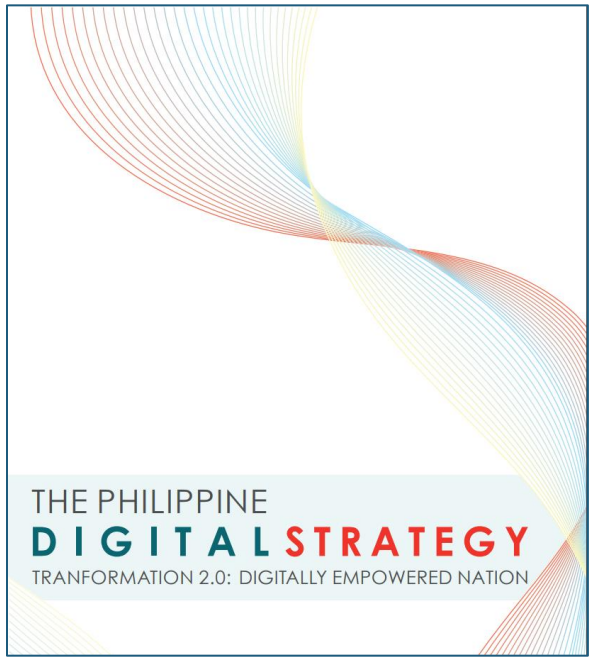


Increased economic growth produces tax revenues replacing tariff income forgone.

How Policymakers Can Spur Greater Digitalization

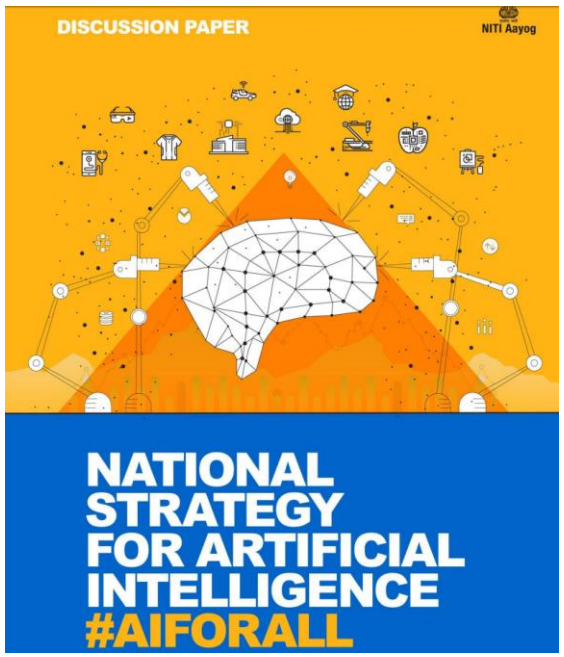
2. Develop both formal, national digitalization strategies…

   – And strategies for the deployment of AI, IoT, Industry 4.0, etc.









Make Manufacturing Digitalization a National Priority



Courtesy: Dave Vasko, Rockwell Automation

How Policymakers Can Spur Greater Digitalization

- Eschew data localization policies and barriers to cross-border data flows.
- Maintain the WTO E-commerce Customs Duty Moratorium.
- Deploy next-generation digital infrastructure (e.g., 5G).
- Make digital literacy a central objective of public education and adult workforce retraining systems.
- Support firms' investments in more-efficient production systems.
- Adopt an "innovation principle" not "precautionary principle."

Thank You!

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