Emerging Digital Technologies Impacting Global Trade

WITA Intensive Trade Seminar

Stephen Ezell
Vice President, Global Innovation Policy

September 5, 2018

ITIF | INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

@ITIFdc @sjezell

About ITIF

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

Increasingly Digitalized Global Economy

- Digital economy accounts for 25% of global GDP.
- Half of all value created in the global economy over the next decade will be created digitally.
- 75% of the value of data flows over the Internet accrue to traditional industries.

Sources: Accenture, “Digital Disruption: the Growth Multiplier”; McKinsey Global Institute, “Digital Globalization: The New Era of Global Flows”

Competition Was Once Confined to Vertical ICT Industry Sectors

Mainframe	Mini	PC	Mobile	Internet
IBM	Digital	IBM	Apple	Google
Sperry	IBM	Apple	Google	Amazon
Burroughs	Data General	Intel	RIM	Facebook
Honeywell	Wang	Microsoft	Arm	Twitter
NCR	Prime	Dell	Samsung	eBay
CDC	HP	HP	HTC	Wikipedia
ICL	Sun	Compaq	Motorola	Netflix
Amdahl	Tandem	Seagate	Nokia	Pandora
Siemens	Oracle	Sony	Ericsson	Kickstarter
Fujitsu	Honeywell	Toshiba	Huawei	Lending Club
Hitachi	Olivetti	Amstrad	Sony	Airbnb
Cray	NEC	Lenovo	LG	Uber

HQ in Silicon Valley

Source: David Moschella, CSC Leading Edge Forum

Now ICTs Make Virtually Every Industry "Disruptable"

Technology Disruptions

- Cloud, SaaS
- Mobility/Apps
- Social Media
- New Interfaces
- Big Data
- IoT, Wearables
- Open Source/DevOps

Industry Disruptions

- Mfg – 3DP, Robots, Food
- Health Care – Retailization
- Transport – Cars, Avionics
- Retail – Same Day Delivery
- Banks – Kickstarter, Bitcoin
- Education – MOOCs
- Insurance?

Dis-intermediation, Peer-to-Peer, Aggregation, Commoditization, Standardization, Re-invention …

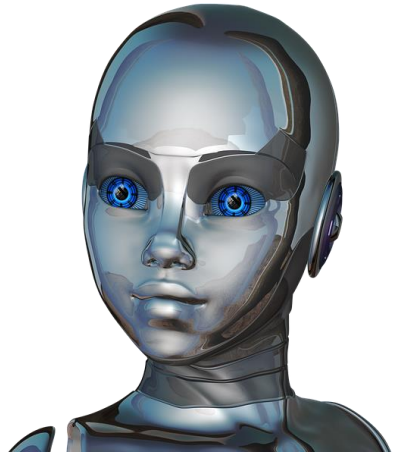
Source: David Moschella, CSC Leading Edge Forum

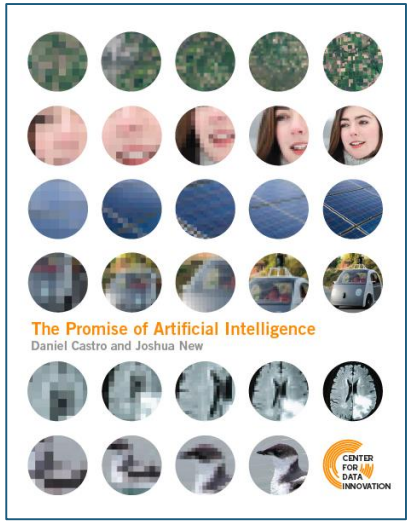
Emerging Platform Technologies Impacting Digital Trade

1. Artificial Intelligence/Big Data
2. Cloud Computing
3. The Internet of Things
4. New Production Systems (e.g., Industry 4.0)
    - Generative Design and 3-D Printing
5. Block Chain

What is Artificial Intelligence?

- "Artificial intelligence" is the use of software to imitate intelligent human behavior, such as learning, reasoning, and making decisions.
- "Machine intelligence" – The development of smart, adaptive algorithms that learn by being "trained" on data.
- May generate $13 trillion in global economic impact by 2025.





Sources: Daniel Castro and Josh New, "The Promise of Artificial Intelligence"; Accenture, "Why Artificial Intelligence is The Future of Growth"

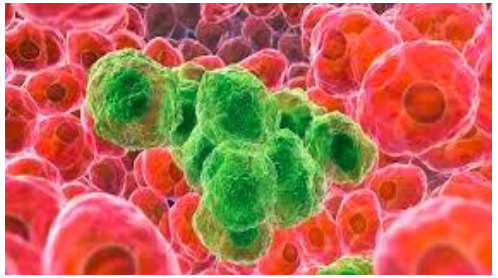
How Will A Be Used?

Monitoring Rapidly analyze large amounts of data and detect abnormalities and patterns.

Discovering Extract insights from large data sets and discover solutions through simulations.

Predicting Forecast or model trends likely to develop in future (e.g., Netflix/weather).

Interpreting Interpret unstructured data, images, text (e.g., diagnostic software identifies cancer cells or analyzes X-rays to detect aneurysms).



Source: Daniel Castro and Josh New, "The Promise of Artificial Intelligence"

Cloud Computing

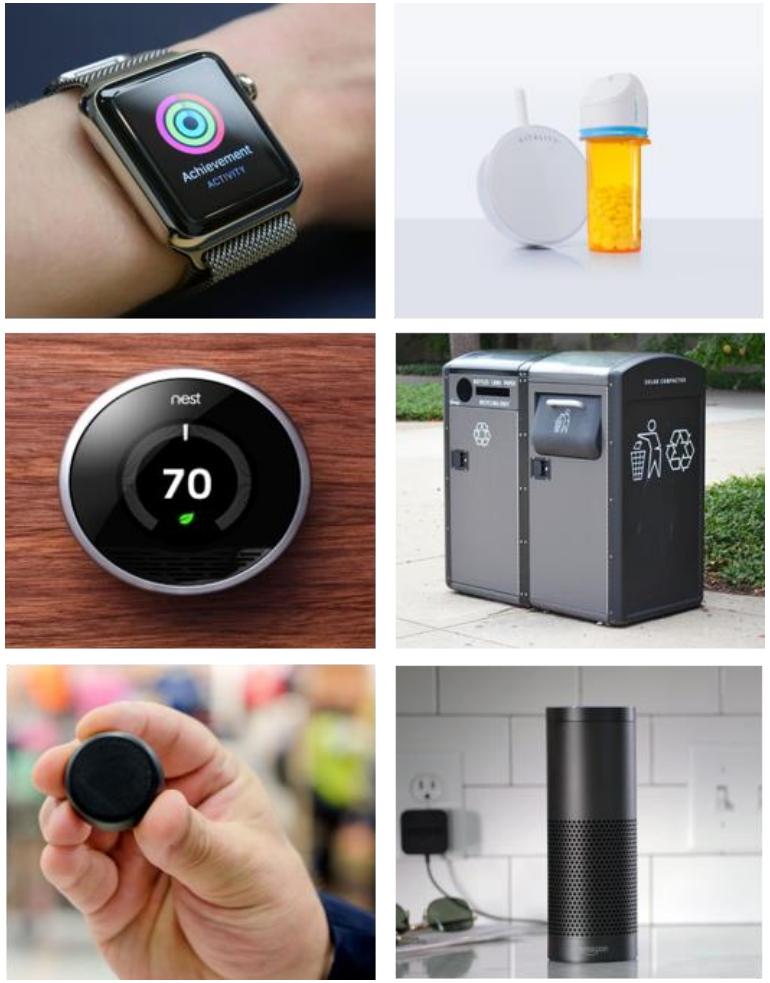
Delivery of scalable computing resources as an on-demand service.

- 90% of global enterprises use cloud in some capacity.
- Will account for 60-70% of corporate IT spend by 2020.

SaaS – Software as a Service (e.g., Salesforce, Google Docs)

IaaS – Infrastructure as a Service (e.g., AWS, Barclays)

The Internet of Things (IoT)

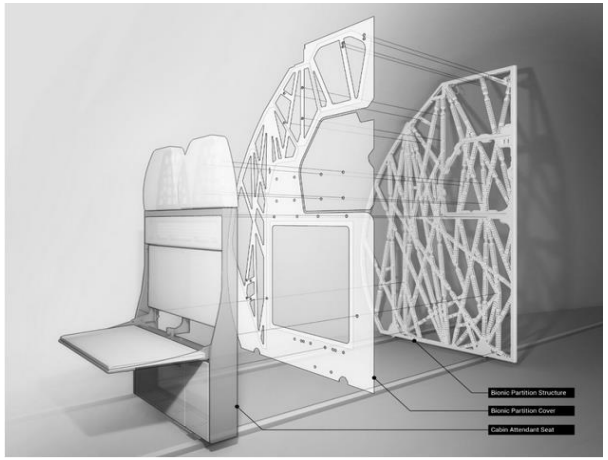


- The Internet of Things is the set of physical objects embedded with **sensors** or **actuators** that are enhanced with **network connectivity**.

- There are expected to be up to **50 billion** connected devices by 2020 generating as much as **$11 trillion** in annual economic value.

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.

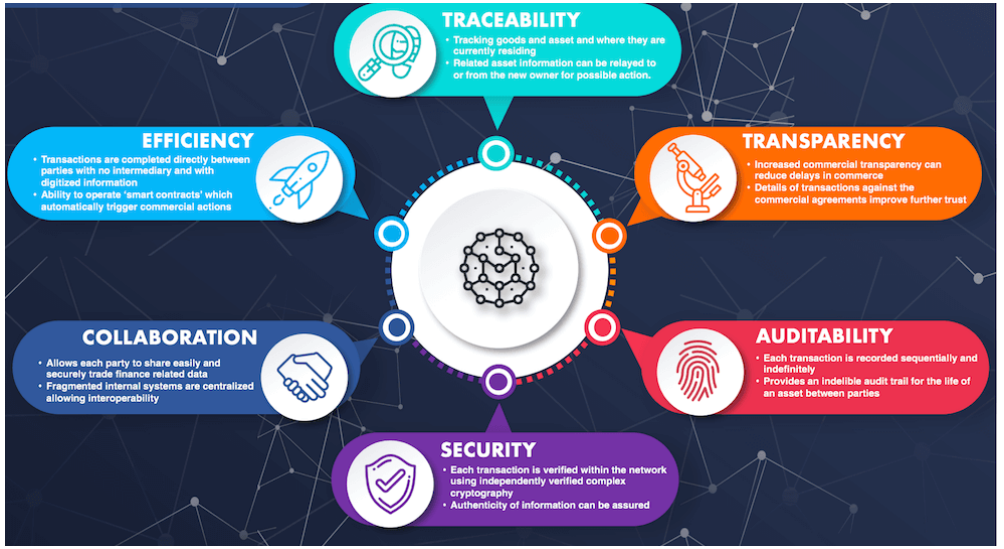


Source: ITIF, "A Policymaker's Guide to Smart Manufacturing"

Block Chain

- Blockchains are shared public ledgers cataloging transactions as they occur in chronological order, using cryptography and public recording to validate transactions.

- IBM leading a consortium of banks building a new global system for trade finance using blockchain technology.



Source: TradeEx, "Key Benefits of Blockchain Technology in Trade Finance"

Enable Entirely New Digitally Based Business Models

- *Product Servification: Selling Products as a Service*

  Rolls Royce: Sells “power by the hour”
  GE Medical: Sells “radiological services”
  Johnson Controls: Sells “chilled air at 72º”

- *Outsourcing Services: Task unbundling*

  Sending images of MRI scans abroad for remote interpretation and diagnosis and analysis.

Alliance Medical
Intelligent imaging

Source: ITIF, “Cross-Border Data Flows Enable Growth In All Industries”

Enabling Entirely New Digitally Based Business Models

- *Mass Customization: Tailored Services Offerings*

The health insurer **Humana** has partnered with **Apple** to provide customers tailored health insurance prices based on data from their wearable health sensors, such as number of steps taken daily.

Benefits:

- More accurate health insurance premiums
- Pricing model incentivizes healthy behavior
- Lower health care costs overall

Digitally Enabled Services Business Models

Fractional ownership	Uses the Web to enable fractional ownership of capital assets, with the Internet enabling scheduling in time increments not previously practical.
Marketing of excess capacity	Business models, often leveraging ICT, that identify and sell unused capacity.
Dynamic pricing	Adjusts prices online in real-time in response to fluctuating supply or demand variables.
Auction or matching markets leveraging the aggregation of supply and demand markets	Aggregates consumer demand and supply for products or services in one location, allocating supply and demand through auctions or matching.
Create a new, Web-based platform for commerce	Uses the Internet to create an entirely new platform for commerce, monetized by inviting third parties to participate through it.
Outsourcing and Cloud Computing	Company assumes complexity, capacity, or hosts services on behalf of client.
Software-as-a-service	Enterprise-application software that customers do not have to license, but can access online over the Internet.

Source: ITIF, "The Internet Economy 25 Years After .com"

Digitally Enabled Services Business Models

Pay-per-use plans	On-demand or per-pay-use services.
Information-based, targeted offers	Uses data mining to develop targeted offers or services.
Mass customization	Uses ICT systems to introduce "mass produced, yet customized," also known as "mass customized" services.
Anytime services	Internet enables always on availability of services.
Ad-supported search, content, and services	Free content or search services for Web users supported by paid business advertising.
Social media/social marketplaces	Create a meeting place for people, enabling transactions.
Referral-based models	Receive a fee each time a sale is made through the referring Web site.
Location-based services	Context-specific offers based on knowledge of customers' location, interests

Source: ITIF, "The Internet Economy 25 Years After .com"

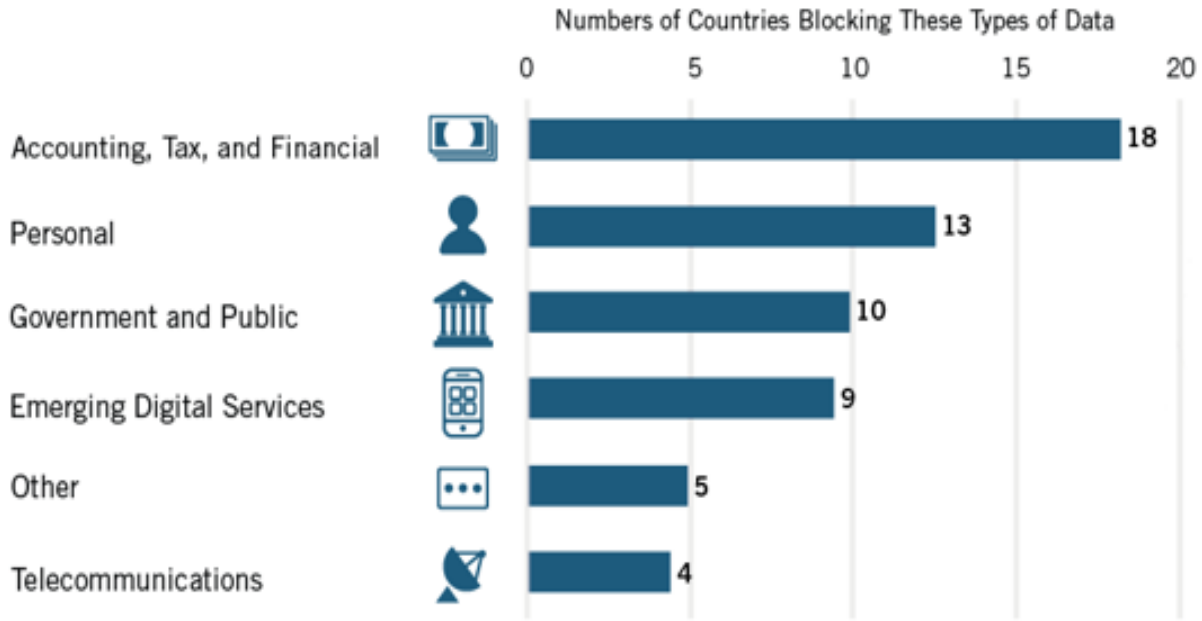
Trade Implications of Emerging Digital Technologies

Greater services tradability; economics of manufacturing transformed.

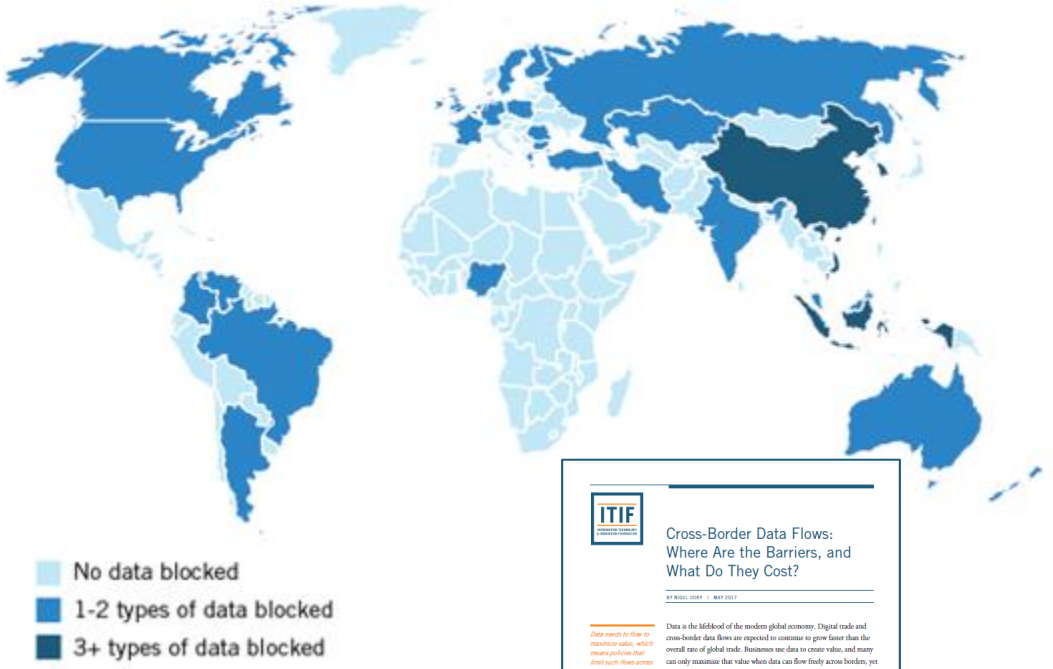
- **Reduce distance:** Enabling more services sectors to become traded. (Healthcare; Finance; Transportation; Education; Business Services)
- **Reduce cost:** Enabling high-cost nations to regain competitive advantage. (Smart manufacturing; Robots)
- **Democratize and localize production:** Enabling mass-customization, bringing work closer to the final customer.

Global Digital Economy Susceptible to Data Flow Barriers

What Types of Data Are Blocked?*



Which Countries Block Data Flows?*

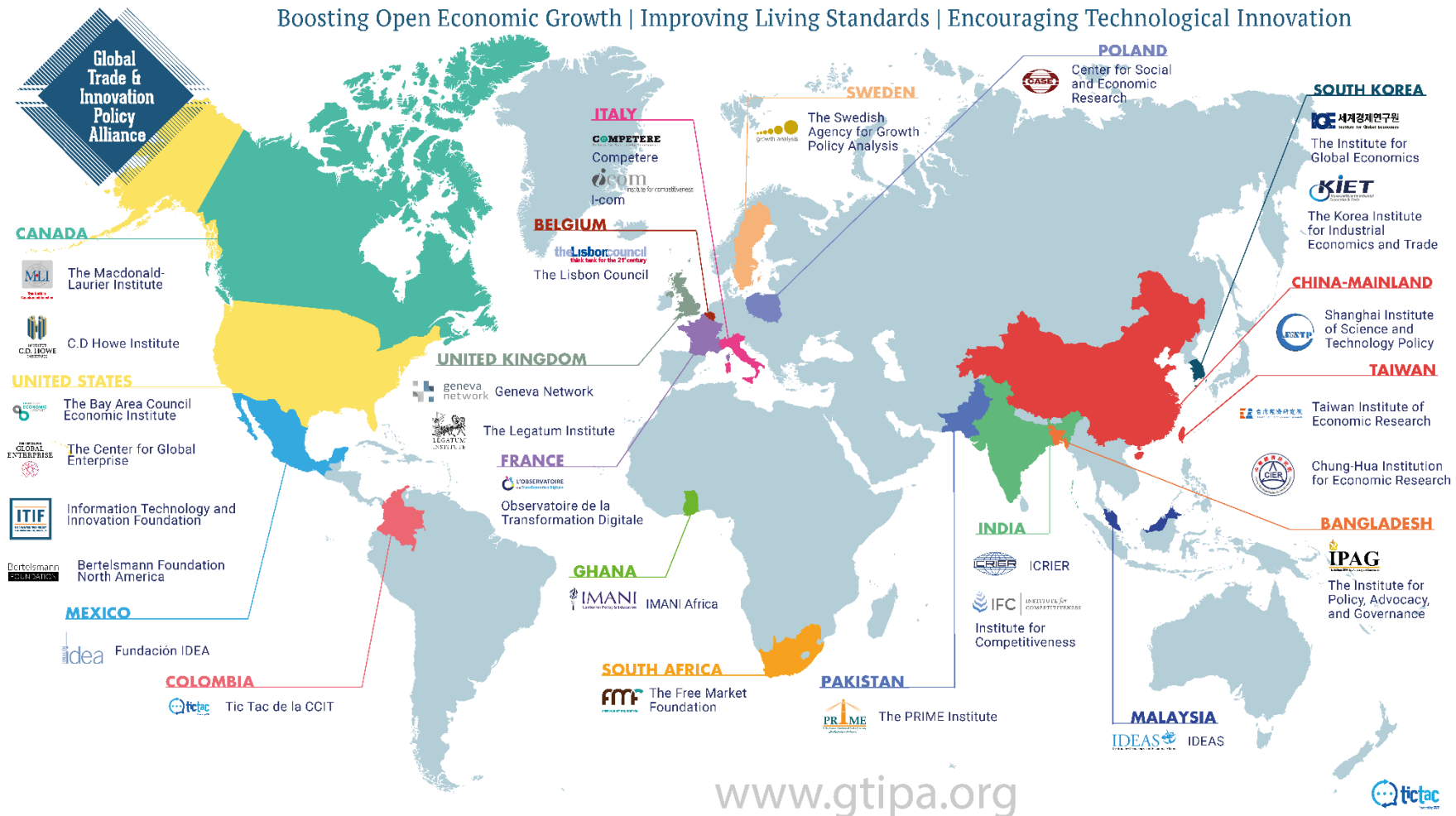



ITIF

Cross-Border Data Flows: Where Are the Barriers, and What Do They Cost?

Source: ITIF, "Cross-Border Data Flows: Where Are the Barriers, and What Do They Cost?"

Join The Global Trade and Innovation Policy Alliance



Thank You!

Stephen Ezell | sezell@itif.org | 202.465.2984

ITIF | INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

@ITIFdc

@sjezell