

# Transportation Research Board

## International Trade and Transportation (AT020)

## Intermodal Freight Transportation (AT045)

Mid-Year Meeting

Galveston, Texas

June 12, 2019

# Agenda

## **AT045/AT020 Joint Meeting Agenda 1:00 PM – 2:00 PM CST**

1) Welcome (Juan and Jolene - 5 min)

2) Presentations (40 mins)

a. Blockchain in International Trade

Juan C. Villa

b. Texas Border Master Plan

TBD

3) Freight Day 2019 update (15 mins)

4) NCHRP and other research ideas (10 min)

# Blockchain Technology: Potential Applications in International Trade and Transportation

Transportation Research Board  
Mid-Year Meeting - Texas A&M – Galveston  
AT020 and AT045 Joint Committee Meeting  
June 12, 2019

Juan Carlos Villa  
Texas A&M Transportation Institute

# Why a new technology?

- International trade and transportation transactions remain heavily dependent on paper documents
- An international shipment generate stacks of paper that are costly to manage --costs could be higher than moving a container.
- Efforts to digitize the process have been slow. -- security concerns, data flows, stakeholders

Blockchain technology has the potential to be a game-changer in international trade and transportation

# What is Blockchain?

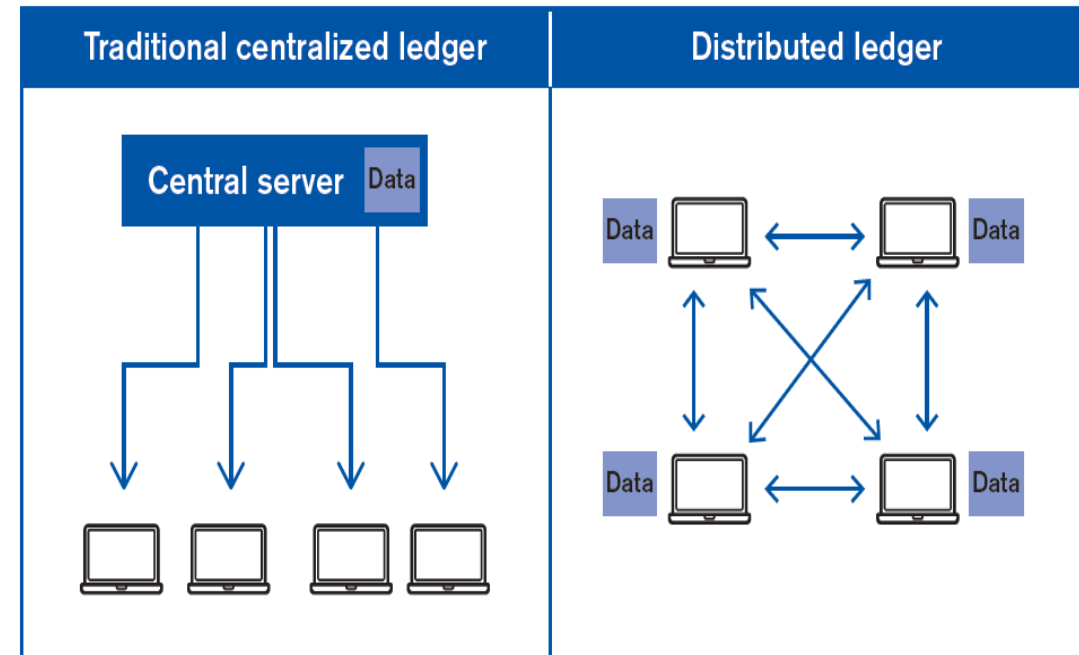
- A blockchain is a digital record of transactions – or ledger – that is decentralized
- Transactions are stored in a highly secure, verifiable and permanent way using cryptographic techniques.
- A continuously growing list of records, which are combined in “blocks” that are then “chained” to each other
- Blockchains can operate without the need for a central authority or trusted intermediaries
- Information, once added to a blockchain, is time-stamped and cannot easily be modified.

**Trust Machine = shared, trusted ledger that all participants can access and check at any time, but that no single party can control.**

# What is Blockchain?

**Blockchain: a tamper-proof, decentralized and distributed digital record of transactions that creates trust and is said to be highly resilient.**

- Blockchain ensures immediate, across-the-board transparency, and as transactions added to the blockchain are time-stamped and cannot easily be tampered with
- Blockchain technology allows products and transactions to be traced easily.
- Can be used to automate processes, further reducing costs.
- Smart contracts = computer programs that self-execute when certain conditions are met



Source: Can Blockchain revolutionize international trade?,  
Emmanuelle Ganne, World Trade Organization

# Smart Contracts

- A functionality of the blockchain technology.
- State obligations, benefits and penalties to either party under different circumstances.
- Take information as an input, process it through the rules set out in the contract, and take any agreed action as a result.
- Data feeds could come from third-party service providers, i.e. temperature, payment completion, price fluctuations, etc.

**Not really smart:** there is no cognitive or artificial intelligence component, only the automatic execution of a pre-defined task when certain conditions are met:

- If the goods are unloaded at the port, then funds are transferred

**IoT device in a container:**

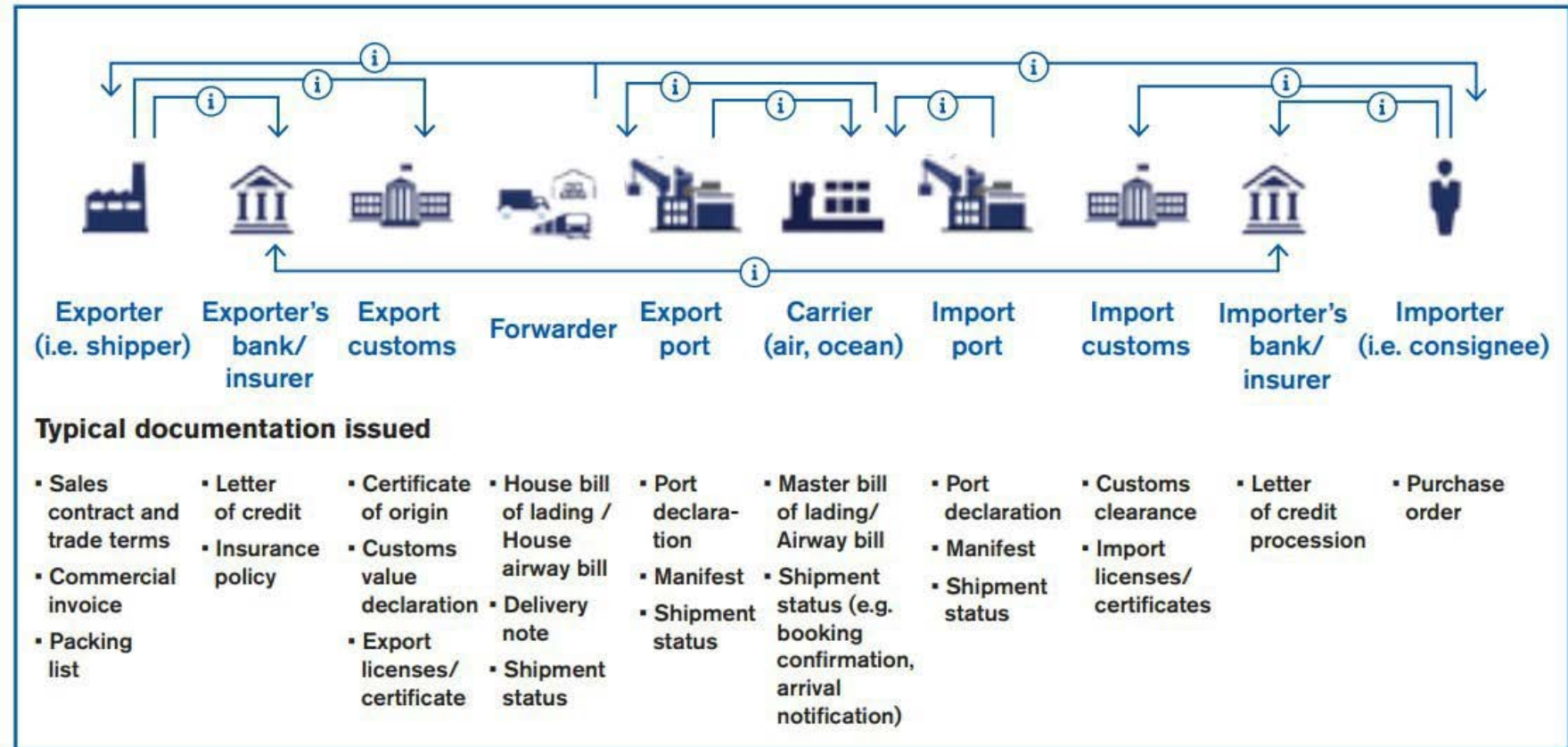
- If the temperature goes above a certain level, insurance payouts are automatically be triggered and a request for inspection sent.

# Can we use blockchain to move towards paperless trade?

## Typical international trade documentation issued

Documents:

- Commercial
- Trade finance
- Transport
- Border procedures



Source: Accenture.

# Can we use blockchain to move towards paperless trade?

International trade transactions require multitude documents

1. Commercial transaction: sales contract, commercial invoices, packing list
2. Trade financing, such as letters of credit
3. Transport documents, including bills of lading
4. Border procedures:
  - certificates of origin
  - sanitary and phytosanitary certificates (food, plant and agricultural products)
  - certificates of conformity with particular standard
  - export or import licenses
  - customs declarations;
  - customs inspection documents.

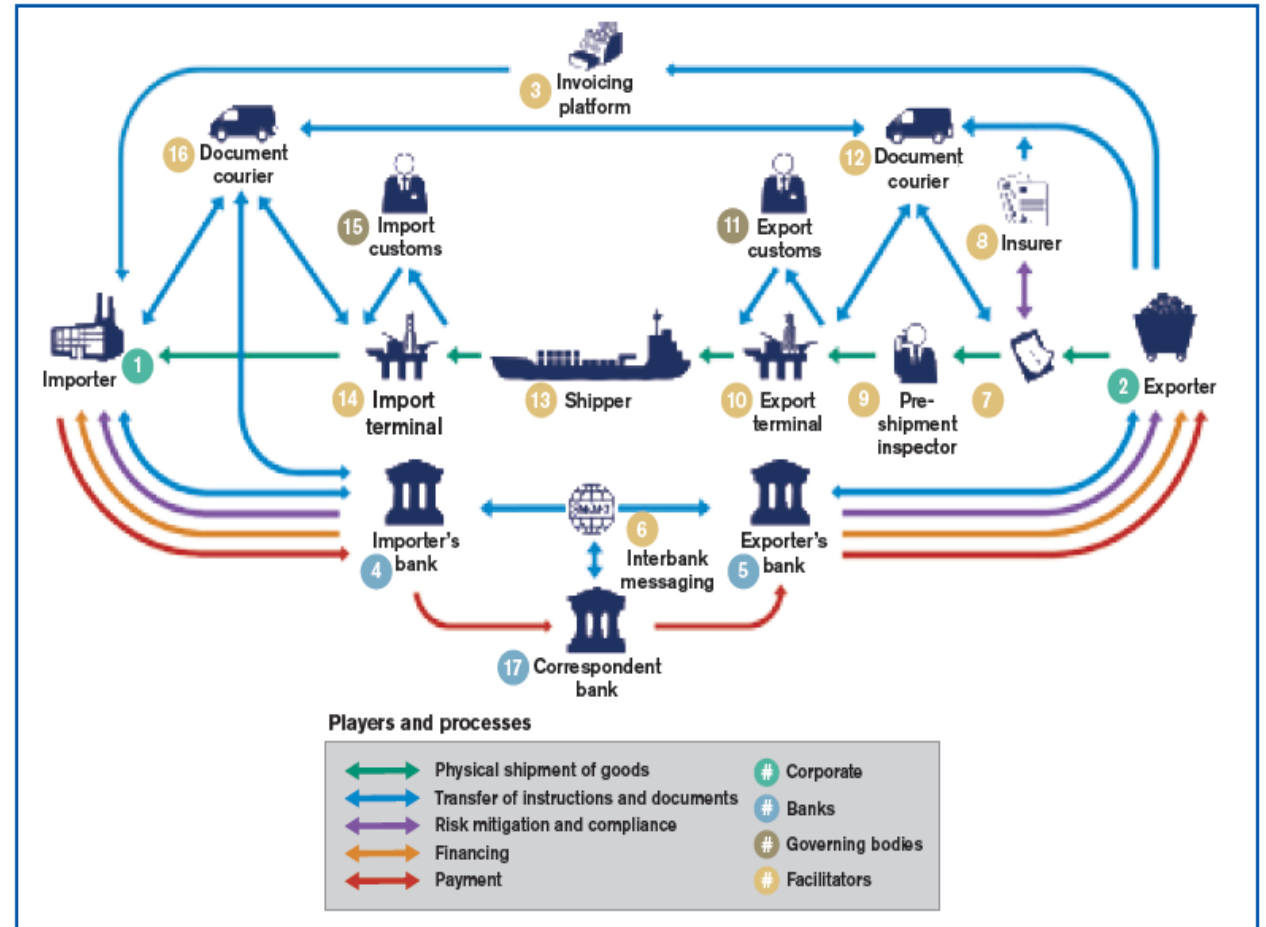
# Trade Finance- Area of Opportunity

- The availability of trade finance is crucial for trading activities.
- Only a small part of international trade transactions are paid cash in advance, as buyers usually want to pay only once the goods have been properly delivered.

The traditional finance process is highly fragmented across multiple entities and processes



Streamline and automate letters of credit processes.

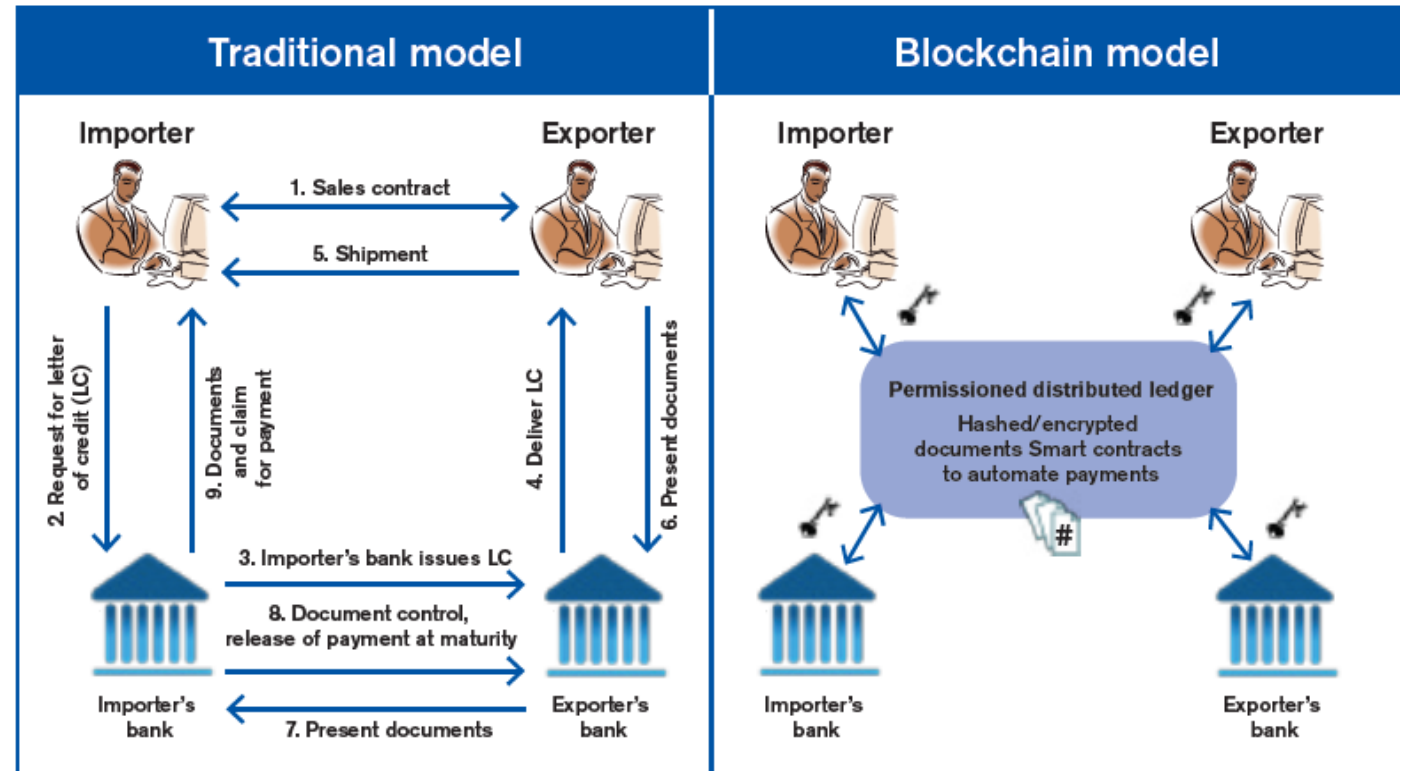


Source: Boston Consulting Group (2017).

# Trade Finance- Area of Opportunity

- The application shares information between exporters, importers, and banks on a distributed ledger
- Proofs of concepts have been developed to streamline and automate letters of credit processes, and blockchain applications.
- Moving towards commercial application

## Letter of credit process using blockchain



# Facilitate G2G and B2G Trade Processes

Information could be exchanged and processed with all authorized parties in real time in a highly secure manner

Breaking silos

Automated process  
through smart contracts



- minimizing coordination costs and delays
- enhancing inter-agency cooperation at the national level
- help to administer single windows

## *Certification and licensing*

- Streamline the approval workflow of certificates
- Sanitary and phytosanitary, origin and conformity

## *Release and customs clearance of goods*

Reduce the need for manual verification

- Submit requests for advance rulings
- Facilitate pre-arrival processing
- Optimize risk assessment.

Korea's customs authority MOU with e-commerce companies

- accelerate e-commerce customs clearance,
- share information in real time,
- generate automated import customs clearance report,
- prevent fraud and smuggling.

# Facilitate G2G and B2G Trade Processes

## *Temporary admission of goods*

Use Blockchain to track goods movements and share information

## *Revenue collection and accuracy of trade data*

Smart contracts to allow automatic payment of customs duties (“if... then...” formula”)

## *Post-clearance audit*

Smart contracts could be used to screen documents on the basis of pre-defined criteria

## *Compliance management*

Blockchain could make it easier to determine the provenance of products

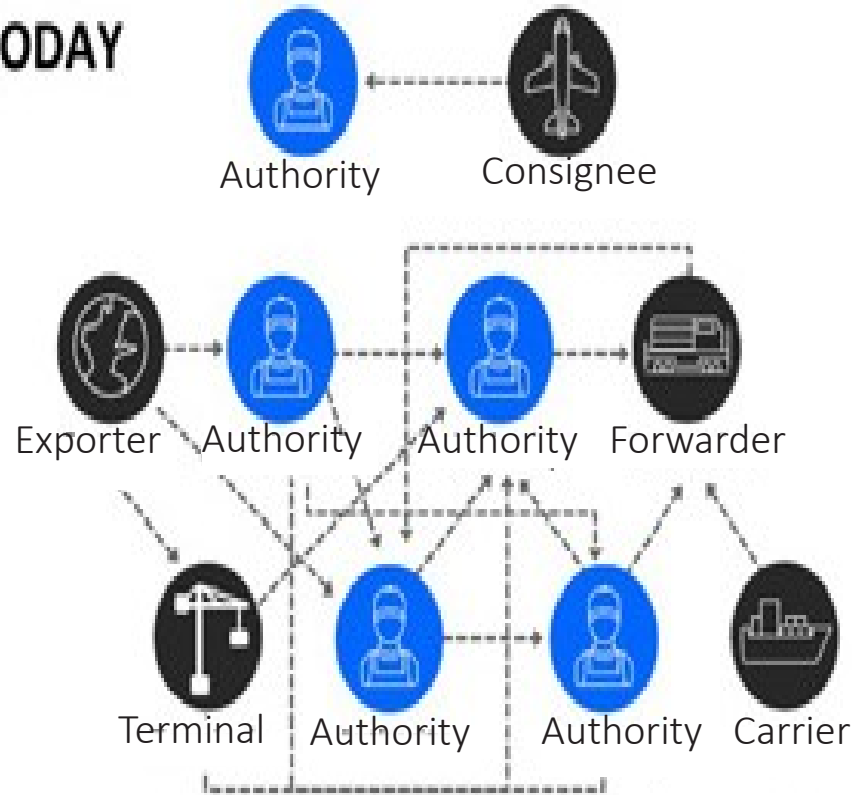
## *Identity management*

Blockchain could facilitate the verification of identities, i.e. authorized economic operators (AEOs) and implementation of AEO mutual recognition agreements (MRAs).

# Facilitate G2G and B2G Trade Processes

Maersk-IBM TradeLens -- that aims to connect public and private sector stakeholder and to digitalize the supply chain from end to end, with a view to streamlining and facilitating procedures

**TODAY**



**FUTURE**



# Challenges for implementation

## Technological challenges

### *Scalability*

- Limited scalability of blockchains due to the predetermined size of blocks and energy consumption issues. (public blockchains)

### *Energy consumption*

- Greater use of distributed ledger technology could pose a serious challenge to the goal of reducing carbon emissions.
- Technology can help to increase energy efficiency, i.e. more efficient utility companies

### *Security*

- Blockchains are not completely immune from traditional security challenges.
- Easier disaster recovery (information in various nodes)
- A 51 percent attack remains possible in theory,

# Challenges for implementation

## Interoperability challenges

### *No interconnection-interconnectivity*

- Many platforms are being built that “do not talk to each other”.

**Important issue for international trade, as a single international trade consignment can touch various ledgers-- finance to logistics, customs, and provenance.**

**Recent developments-- Enterprise Ethereum Alliance is an open-source cross-platform standards-based framework**

### *Data standardization*

Aligning the semantics. Data dictionary: “port of unloading” vs. “place of discharge”?

# Challenges for implementation

## Legal Challenges

A frameworks to ensure networks interoperability, clarify the legal status of blockchain transactions, and regulate responsibilities and the way data can be accessed and used.

### *Legal validity of blockchain transactions*

- The legal status of blockchain transactions and smart contracts remains uncertain, not to mention that of financial instruments issued on a blockchain

### *Applicable law and liability framework*

- Blockchains can span several jurisdictions-- which national law applies in the event of a dispute or fraud?
- Liability framework -- resolution mechanism in case of conflict, technical problems unintentional action.

### *Data localization and data privacy issues*

- 34 countries had enacted or proposed data localization requirements
- Incompatibility between the European General Data Protection Regulation (GDPR) and Blockchain – Block Blockchain

**Question:**

**What type of research is needed to move from proofs of concepts to real world applications?**

**Ideas for Research Statements are welcome**

# Thanks You!

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# Agenda

## **AT020 Meeting (2:00 PM – 3:00 PM CST)**

- |                                              |                 |
|----------------------------------------------|-----------------|
| 1) Committee membership (2 min)              | Juan C. Villa   |
| 2) Annual meeting minutes (5 min)            | Steve Beningo   |
| 3) Triennial Strategic Plan Update (10 min)  | Steve Beningo   |
| 4) Economics and Trade Subcommittee (15 min) | Michael Bomba   |
| 5) Annual Meeting Session Planning (15 min)  | Isabel Victoria |
| 6) Other Business (15 min)                   | Juan C. Villa   |

# ATO20 Committee Members

☐ Committee Chair

***Juan Carlos Villa***, Texas A&M Transportation Institute (TTI)

☐ Vice Chair

***Maria Boile***, Hellenic Institute of Transport (HIT)

☐ Secretary

***Steven Beningo***, Office of the Secretary of Transportation (OST)

☐ Research Coordinator

***Daniel Hackett***, Hackett Associates, LLC

☐ Paper Review Coordinator

***Isabel Victoria Jaramillo***, Cambridge Systematics, Inc.

☐ Communications Coordinator

***Irina V. Bedyk***, Buffalo University

# ATO20 Committee Members

- ❑ **David Amble**, The Northwest Seaport Alliance
- ❑ **Elisa Arias**, San Diego Association of Governments (SANDAG)
- ❑ **Chris Bachman**, University of Waterloo, Canada
- ❑ **Travis Black**, Maritime Administration
- ❑ **Mary Brooks**, Dalhousie University
- ❑ **Maxim A. Dulebenets**, Florida A&M University-Florida State University
- ❑ **Verena Ehrler**, DLR – Institute of Transport Research, Germany
- ❑ **Tiffany Julien**, Federal Highway Administration
- ❑ **Emily Hashimoto**, Goldman Sachs and Company
- ❑ **Marc Levinson**, Congressional Research Service
- ❑ **Ghim Ong**, National University of Singapore
- ❑ **Mathew Rooney**, George W. Bush Institute in Dallas, Texas.
- ❑ **Gisela Rua**, Federal Reserve Board
- ❑ **James Sassin**, Fugro Roadware, Inc.
- ❑ **Eleftherios Sdoukopoulos**, University of Piraeus
- ❑ **Paloma Salas**, Partner and Director of Infrastructure at FOA Consulting
- ❑ **Ahmazdreza Talebien**, Isfahan University of Technology (IUT)
- ❑ **Scudder Smith**, Parsons Brinckerhoff
- ❑ **Rohan Sha**, CDM Smith Consulting Firm
- ❑ **Cristopher Wilson**, Woodrow Wilson International Center for Scholars

# Transportation Research Board

## International Trade and Transportation (AT020)

### Triennial Strategic Plan

Mid-Year Meeting

Galveston, Texas

June 12, 2019

# Future Outlook Statement

## **Proposed Urgent and Long-Term Issues**

- Risks to Global Trade
- North American Trade and Transportation
- Future Trade Agreements
- Impacts from Climate Change
- Changes in Shipping Routes and Emerging Trends in the Maritime Shipping Industry

# Future Outlook Statement

## Other Key Issues

- Growth in Trade Relative to Economic Growth
- Drivers of Container Trade Growth
- Impacts of Sustainability Initiatives
- Impacts of 3D Printing
- Practice and Accuracy of Trade Forecasts
- Can U.S. Transportation Investments Lead to Increased Export Competitiveness?
- Impact of Autonomous Vehicles/Vessels on International Trade
- Impact of Vertical Integration in the Supply Chain

# Committee Goals

- **Goal 1:** Foster and contribute to research and public policy discussions on the global trade environment and its impact on international and domestic freight transportation trends.
- **Goal 2:** Educate transportation system stakeholders on the value and application of research on international trade and transportation issues.

# Goal 1 (Global Trade Research) Strategies

- **Strategy 1:** Identify critical, cross-cutting issues that affect international trade and transportation.
- **Strategy 2:** Encourage, develop, review, and present research on international trade and transportation.

# Goal 1 (Global Trade Research) Strategies

- **Strategy 3:** Identify mechanisms to encourage international collaboration in international trade and transportation research.
- **Strategy 4:** Work with other TRB committees in the Freight Systems Group and the Marine Transportation Group, as well as other TRB committees, to identify common goals and pursue mutual research objectives.

## Goal 2 (Educate Stakeholders) Strategies

- **Strategy 1:** Organize international trade and transportation presentations and sessions for the TRB Annual Meeting and the TRB Summer Meeting where appropriate.
- **Strategy 2:** Develop international trade and transportation topics and sessions for specialty conferences hosted by TRB committees or other organizations.
- **Strategy 3:** Use the Internet and other mediums to improve committee communication and collaboration among Members and friends.

# Transportation Research Board

## International Trade and Transportation (AT020)

### Economics and Trade Subcommittee

Mid-Year Meeting

Galveston, Texas

June 12, 2019

**Transportation Research Board**

**International Trade and Transportation  
(AT020)**

**Annual Meeting Session Planning**

Mid-Year Meeting

June 12, 2019

# Annual Meeting Session Planning

## Due Dates

- **June 1:** Preliminary list of Annual Meeting sessions (lectern, poster, and workshop)
- **June 15:** For workshops, preliminary information
  - Workshop Title
  - Workshop Length – Half Day (3 hours) or Full Day (6 hours)
  - Description (maximum of 500 characters)
  - Attendance Estimate
  - Sponsoring and Co-Sponsoring committees
  - Name of person taking the lead on organizing
  - Special room setup requests

# Annual Meeting Session Planning

## Due Dates

- **July 1:** For lectern session, how many sessions are expected
  - Title
  - Co-sponsoring committees
  - Name of the person taking the lead on organizing
- **Mid-July:** Chairs will hear if their workshop proposals have been accepted
- **October 1:** Final details for all sessions (lectern, poster, and workshop)

# Annual Meeting Session Planning

## Lectern Sessions

- Two Lectern Sessions
- Four presentations in each session
  - Paper Presenters
  - Experts to present on a topic relevant to the AT020 Committee.
  - Combination of paper presenters and experts.
- Each session organized around a common theme
  - We will know better once we have finalized the paper peer review process
  - Suggestions on experts that we would like to invite to present at the Annual Meeting.

# Annual Meeting Session Planning

## Poster Sessions

- May include more than four papers organized around a theme
  - We will know better once we have finalized the paper peer review process
- Papers accepted for presentation in lectern or poster sessions must meet the same review criteria
- Paper assigned to poster sessions – Factors take into account:
  - Direct interaction between author and audience

# Annual Meeting

## Committee Meeting

- Ideas to make meeting more efficient?
  - Have a pre-meeting to discuss internal topics
  - Invite presenters
  - Debate?
- Social Event
  - Dinner

# Communications

## *Stay Informed*

Share information with Committee Members and Friends

Website

<https://www.trbtradetransportation.org/>

LinkedIn

<https://www.linkedin.com/groups/4362564/>

Twitter

[@and\\_trade](https://twitter.com/and_trade)

Telegram

Conferences - Workshops - Events: International trade and transportation

<https://t.me/trbtradetransportevents>

International Trade and Transportation

<https://t.me/trbtradetransportation>