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PORT LAREDO LOGISTICS CLUSTER AND THE IMPACT OF TECHNOLOGY ON LOGISTICS

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INDU TWIN BACHELOR PROGRAM

Fachhochschule Dortmund - Universidad de Guanajuato

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INTRODUCTION

The current economic environment, technological advancements, and changes in international trade policies have forced global companies to reevaluate their competitive advantages.

2020 has been a prime example of what we define in innovation research as a VUCA environment. We live in an environment full of Volatility, Uncertainty, Complexity, and Ambiguity, and managing these fluctuations is more critical today than ever.

Previously, the formulation, implementation, and evaluation of strategic planning were enough for companies and individuals to face these challenges.

Today, we see how strategic planning moves from a planning concept to a constant adaptation concept; therefore, companies and organizations must adapt quickly and fit systematically to this new reality. Today's talk will focus on one alternative companies are exploring to further their competitiveness and efficiency: Logistics 4.0.

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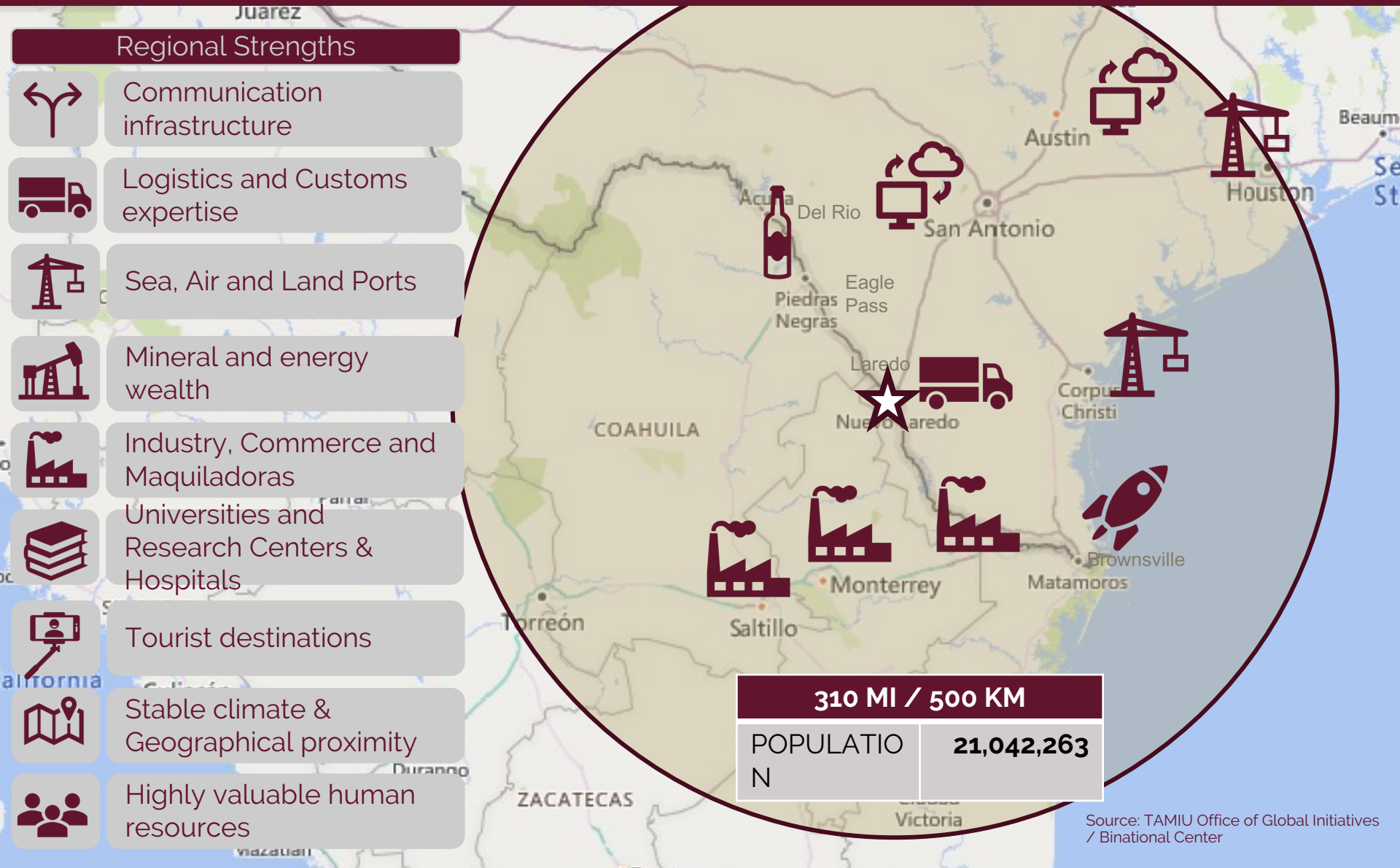
CIRCLE OF INFLUENCE



Source: TAMIU Office of Global Initiatives / Binational Center

REGION LAREDO

LAREDO		NUEVO LAREDO
262,491 (2019)	POPULATION	421,058 (2020)
29.2 (2019)	MEDIAN AGE	28 (2020)
$47,593 USD (2019)	MEDIAN HOUSEHOLD INCOME	$10,534 USD (Tamaulipas 2020)
7.61% (2020)	UNEMPLOYMENT	4.13% (Tamaulipas 2020)

Source: Texas LAUS / INEGI (ENOE/ETOE)

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REGION LAREDO

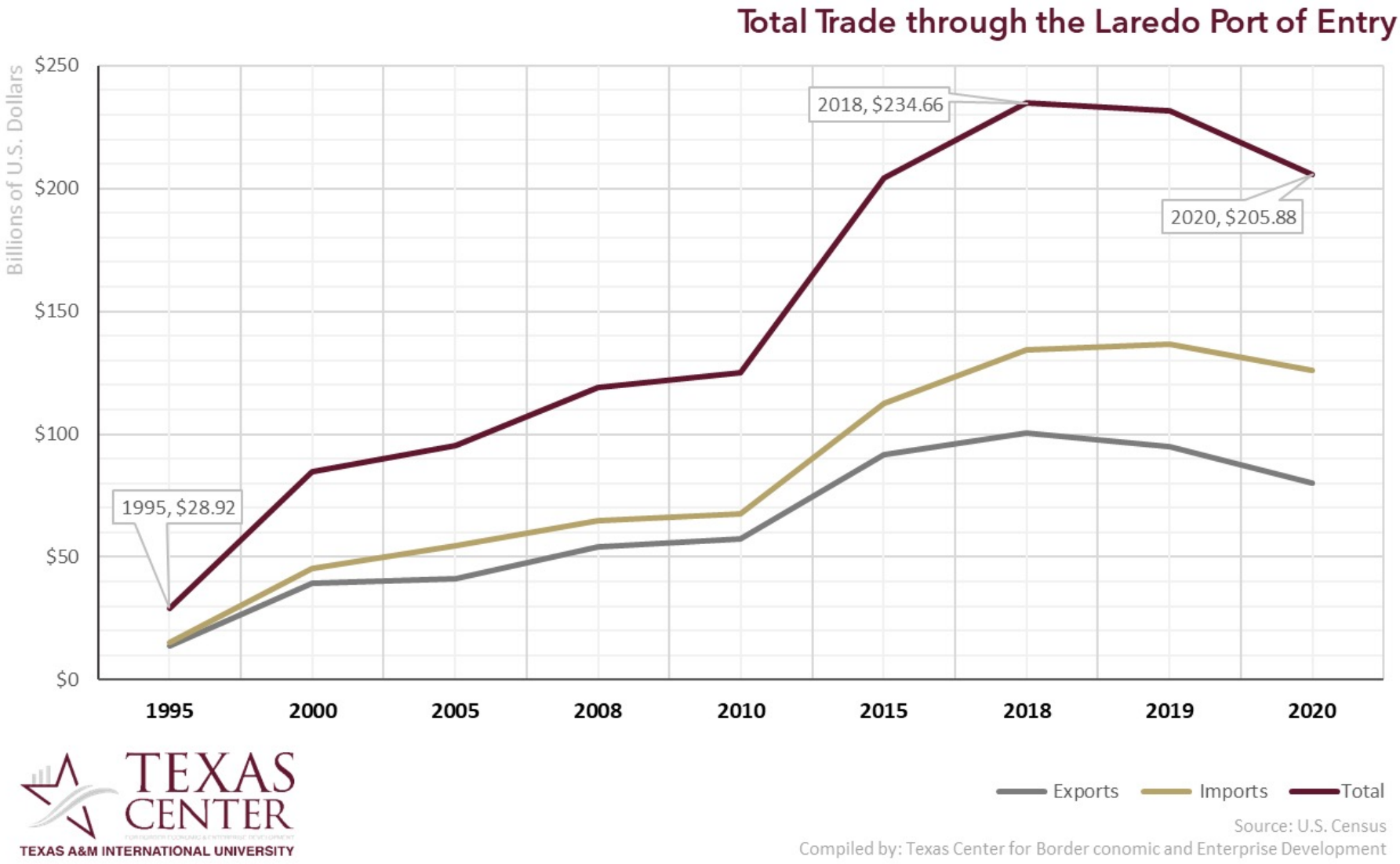
$205.9 Billion of Annual Trade (2020)

$14+ Billion Gross Domestic Product

2.32 Million north bound trucks handled by the Laredo Port of Entry

Source: U.S. Census, BTS, INEGI, Federal Reserve Bank, St. Louis

CURRENT TRADE DATA



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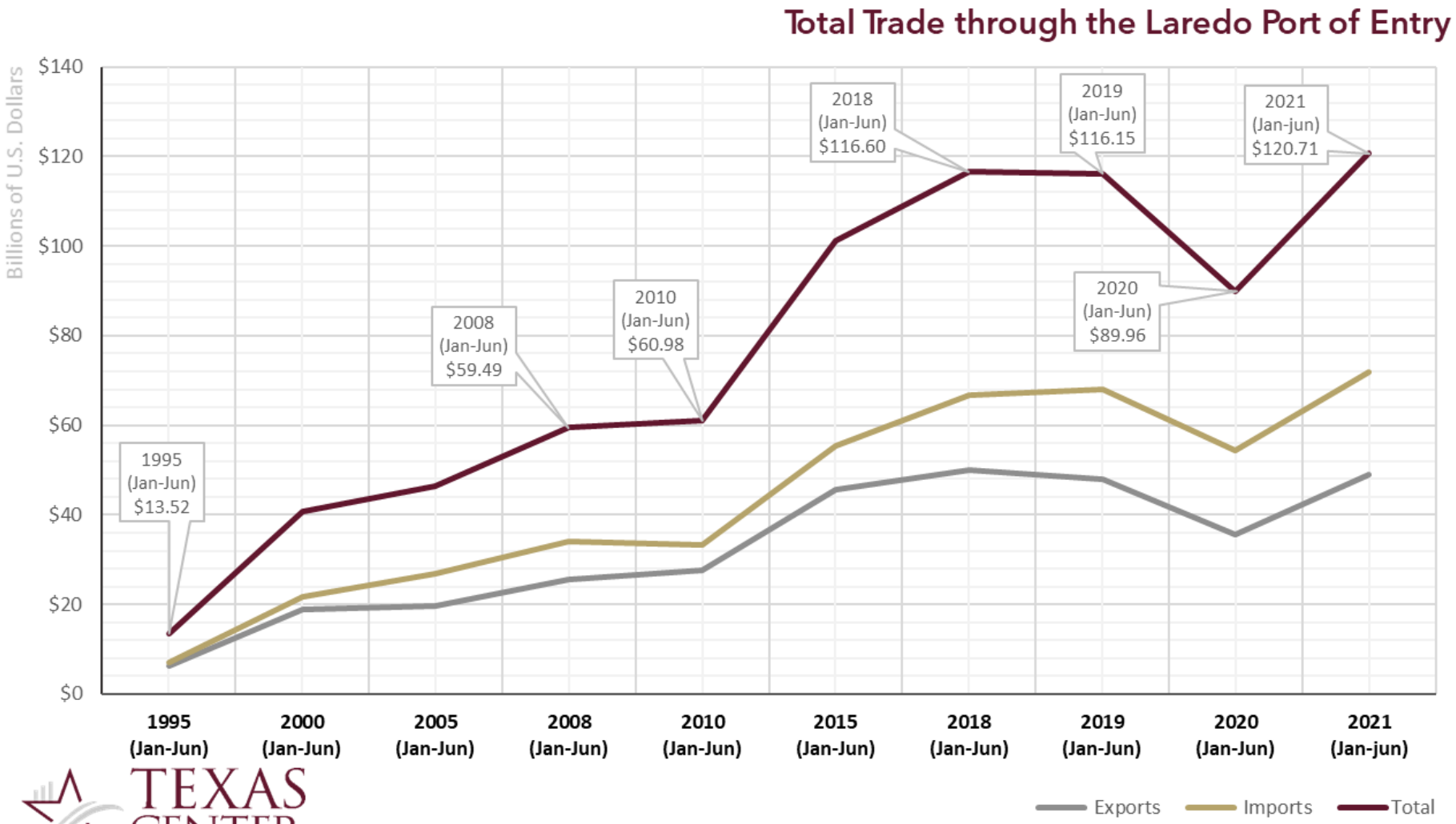
CURRENT TRADE DATA



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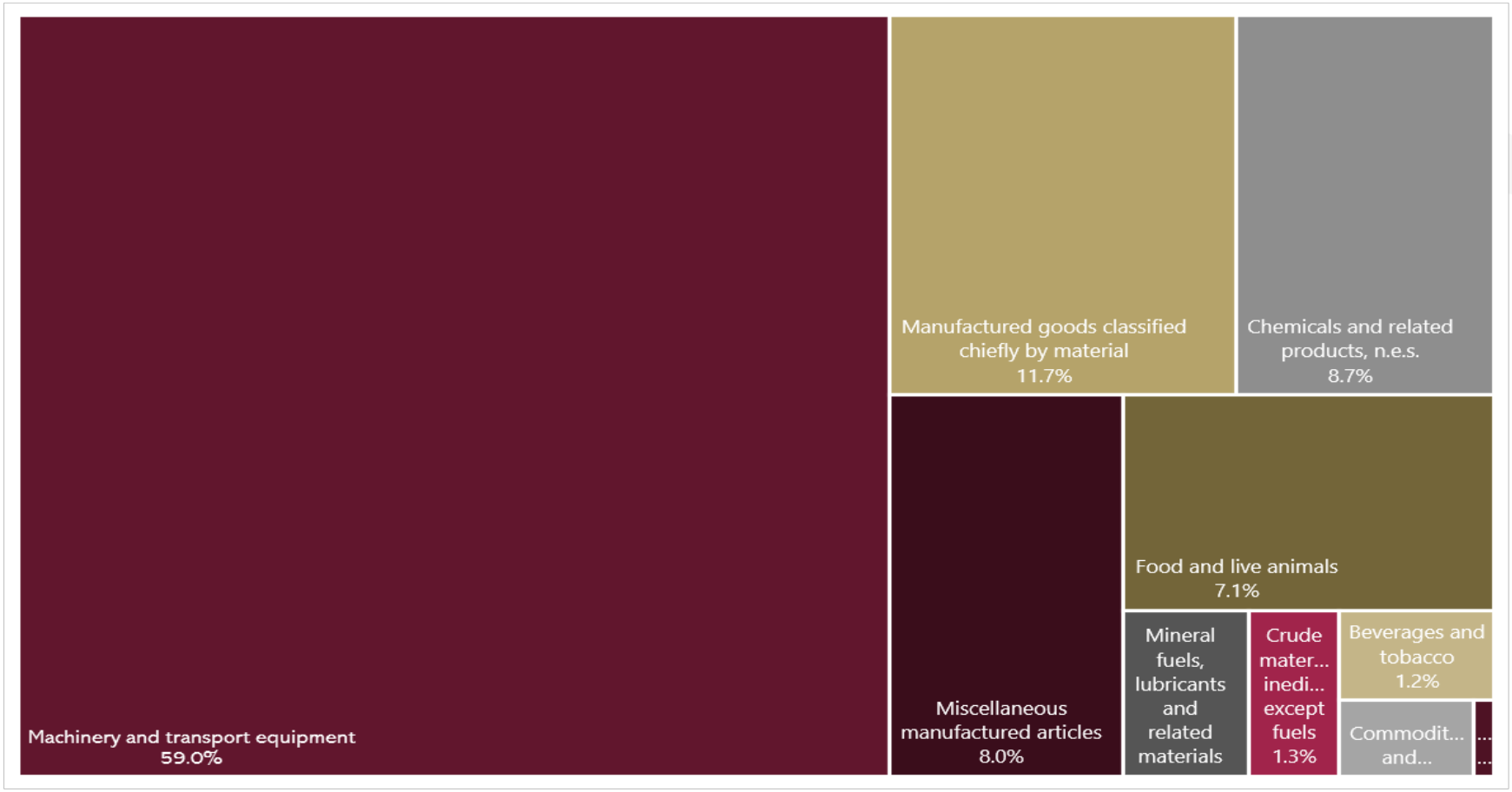
Source: U.S. Census
Compiled by: Texas Center for Border conomic and Enterprise Development

CURRENT TRADE DATA

2020 % Share of Trade through Port of Laredo



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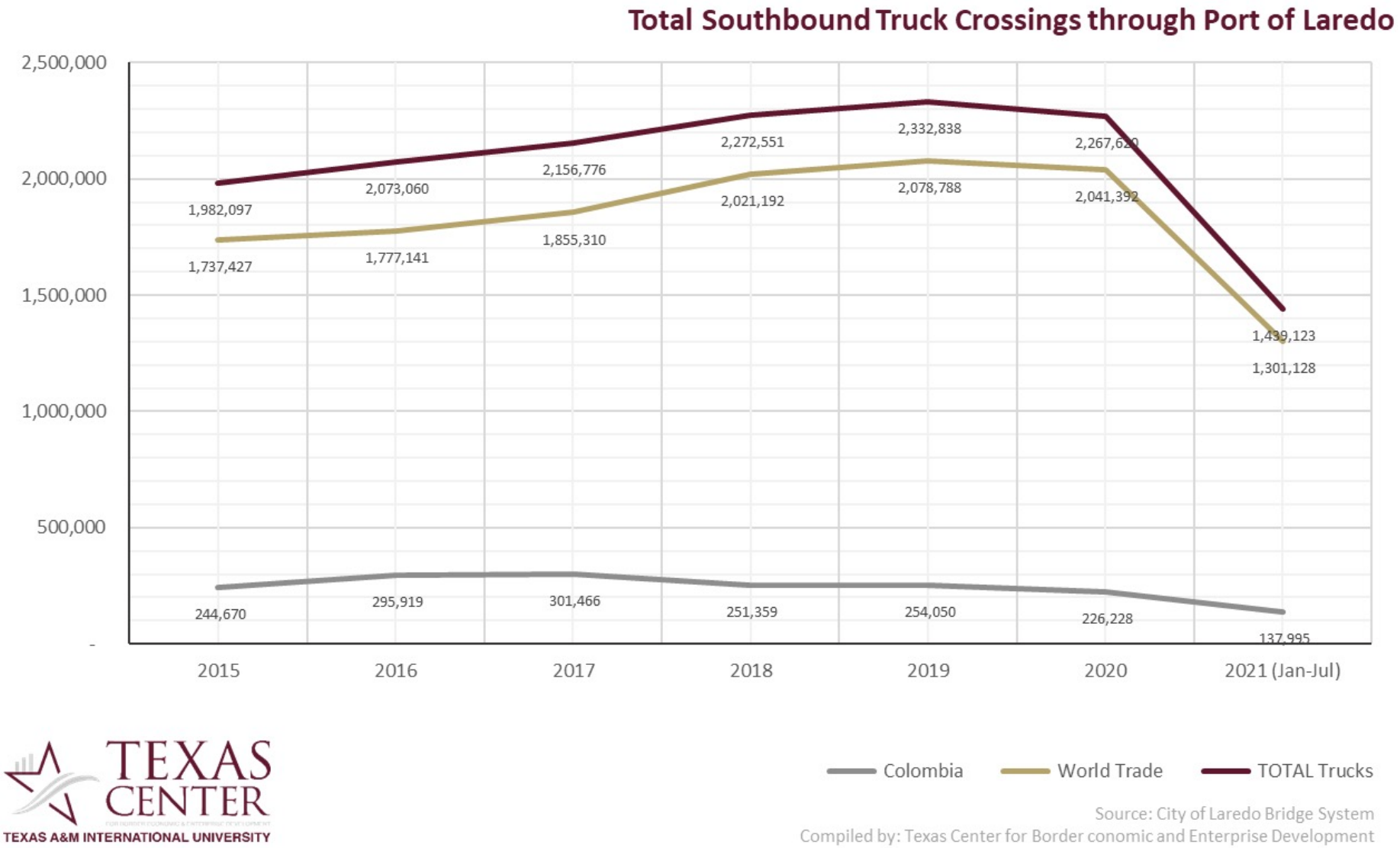
Source: U.S. Census
Compiled by: Texas Center for Border conomic and Enterprise Development

CURRENT TRADE DATA



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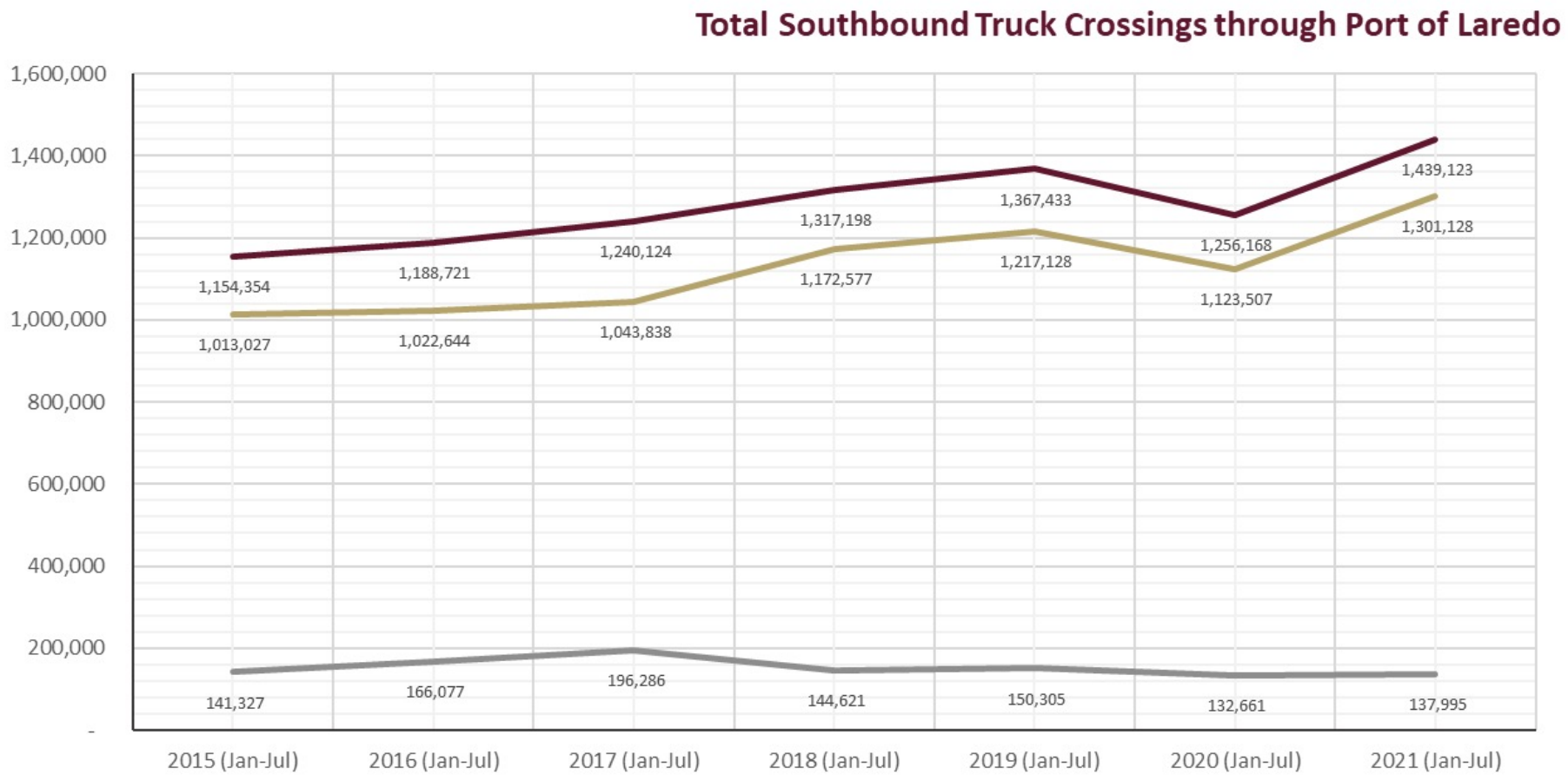
Source: City of Laredo Bridge System
Compiled by: Texas Center for Border conomic and Enterprise Development

CURRENT TRADE DATA



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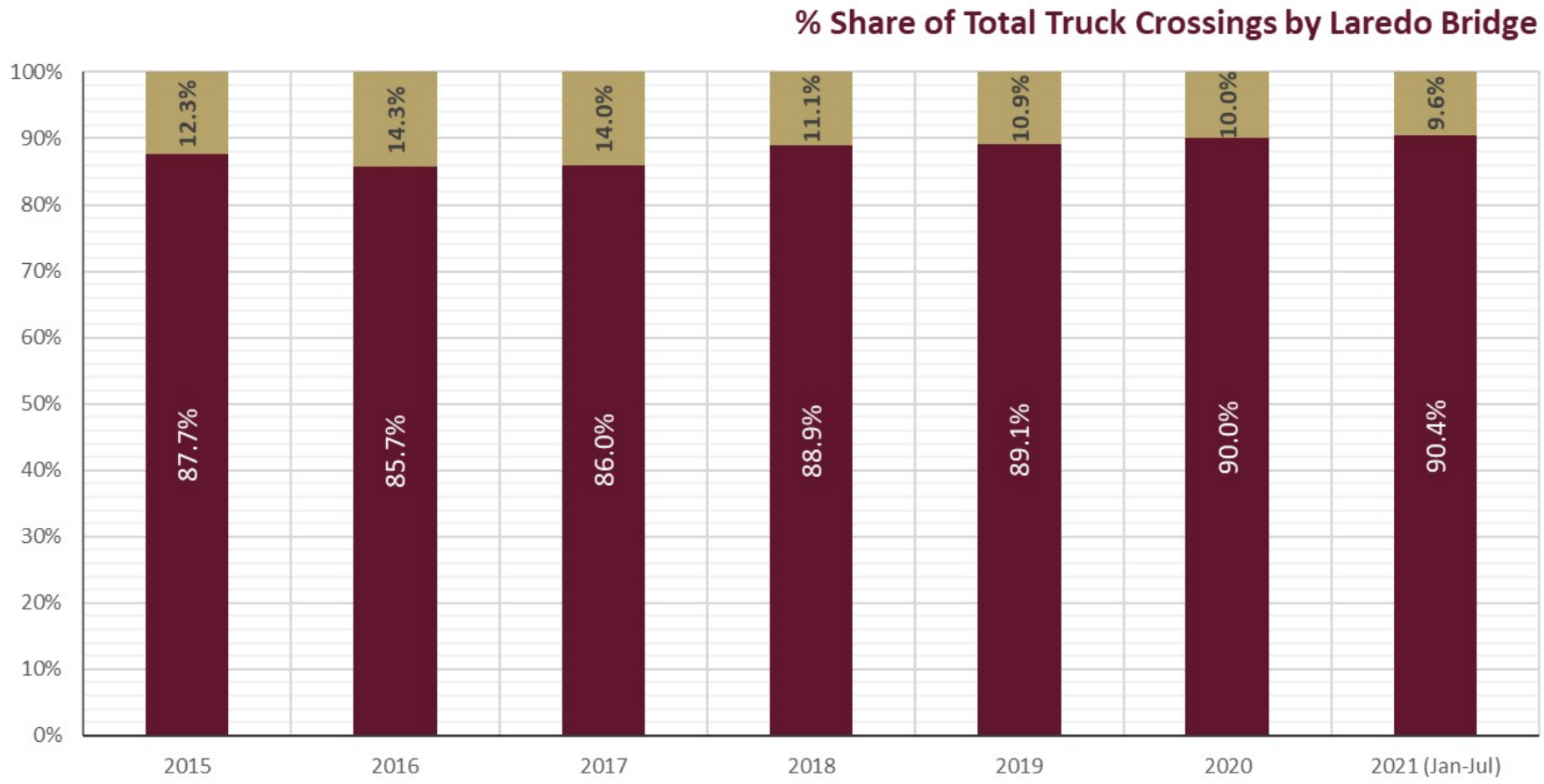
Source: City of Laredo Bridge System
Compiled by: Texas Center for Border conomic and Enterprise Development

CURRENT TRADE DATA



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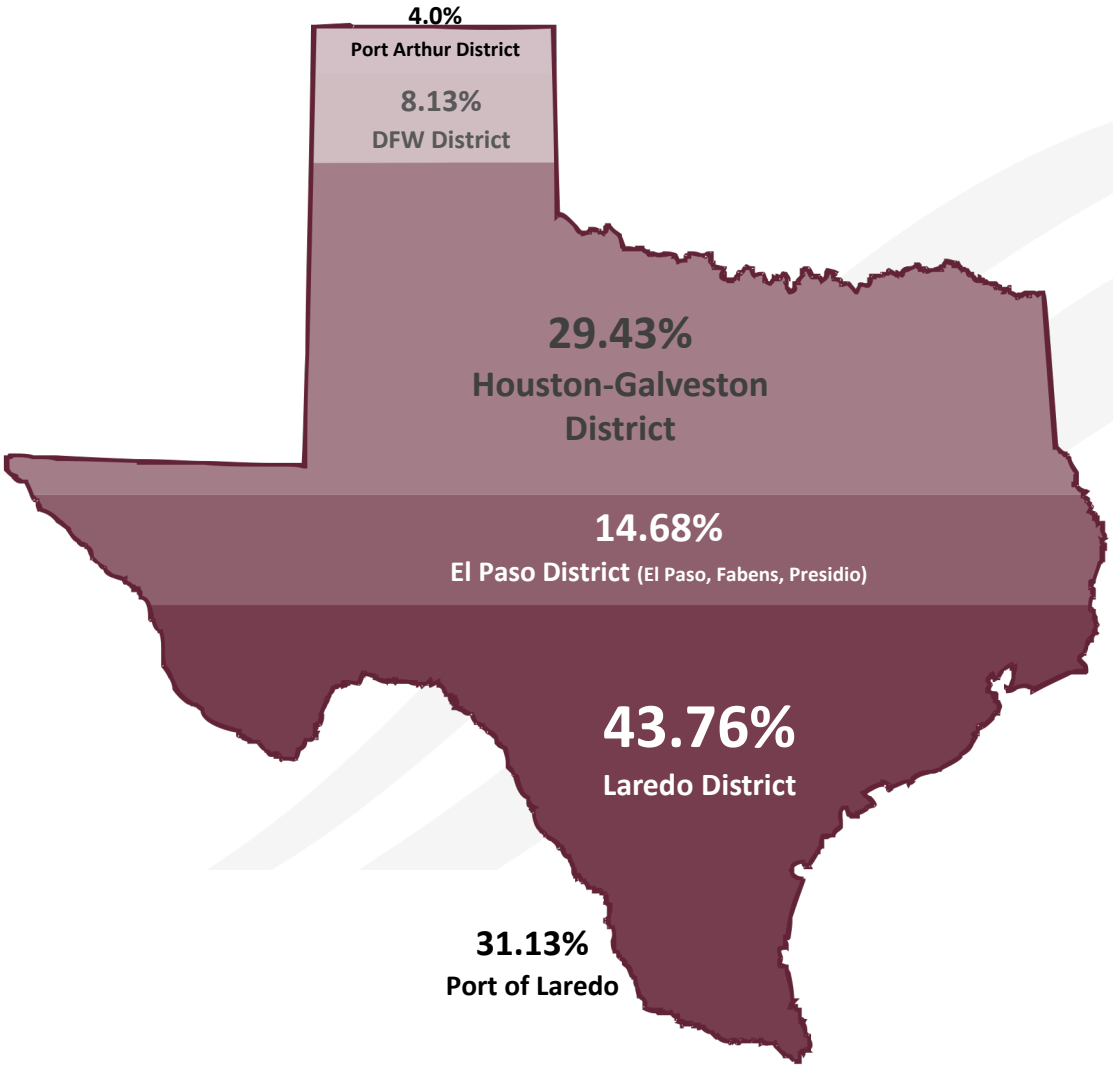
Source: U.S. Census
Compiled by: Texas Center for Border conomic and Enterprise Development

2020 U.S. WORLD TRADE

Through Texas Ports of Entry



$661.33B
Total U.S.Trade to the world through TX POE

$386.5B
58.44% through TX-MX Border POE's

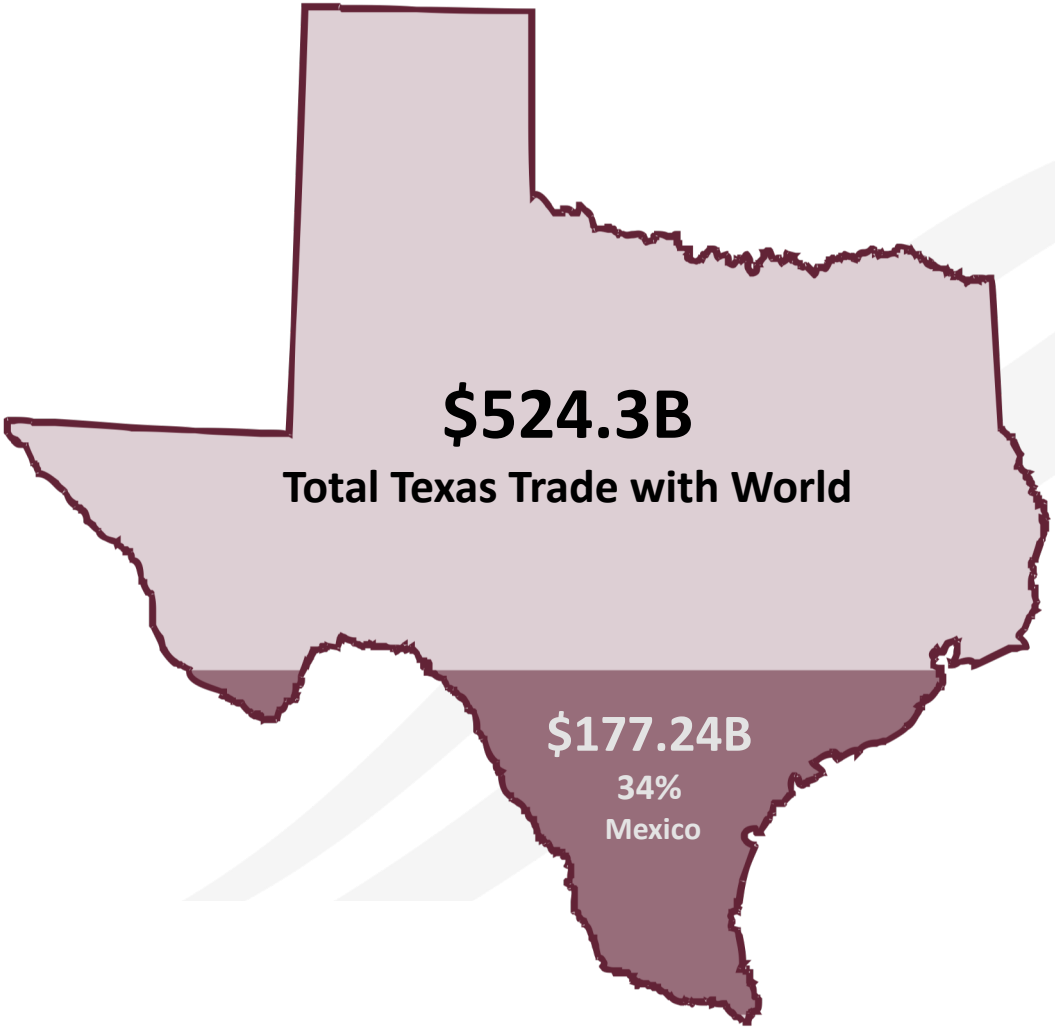
$205.86B
31.13% through Laredo POE

Laredo Customs District :
Laredo, Hidalgo/Pharr, Brownsville, Edinburgh Airport, Progreso, Rio Grande City, Roma, Valley International Airport (Harlingen), Eagle Pass and Del Rio

Source: U.S. Census, USA Trade

2019 Texas State Trade

Exported and Imported Goods from the State of Texas



Mexico is Texas #1 Export and Import Market

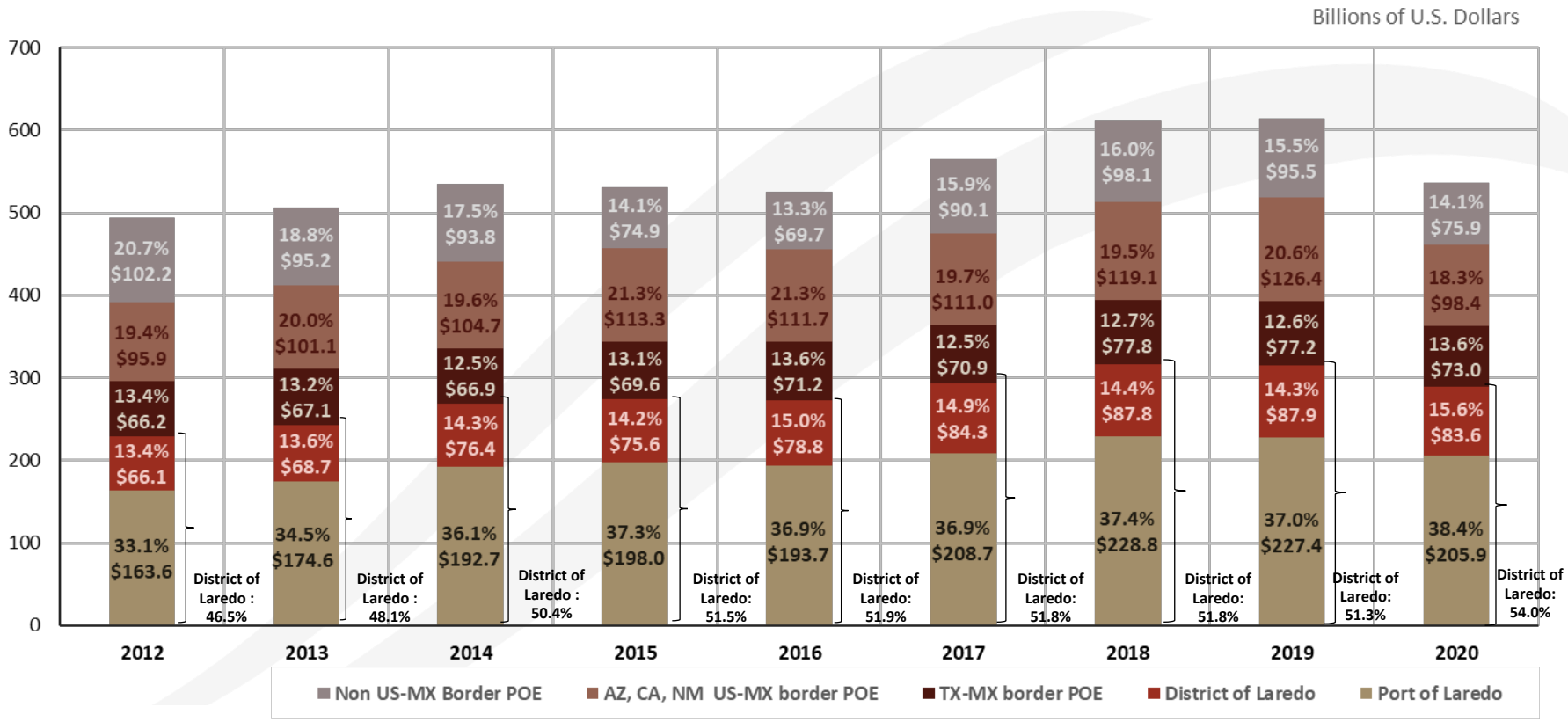
$88.7B
2020 Texas Imports from Mexico

$88.6B
2020 Texas Exports to Mexico

Trade With Mexico	
21.9	Electronics, Electric Equipment
21.7	Nuclear Reactors, Boilers
14.1	Oil, Mineral, Mineral Fuels
9.8	Vehicles except Railway/Tramway
3.9	Plastics
2.0	Iron

Source: U.S. Census, USA Trade

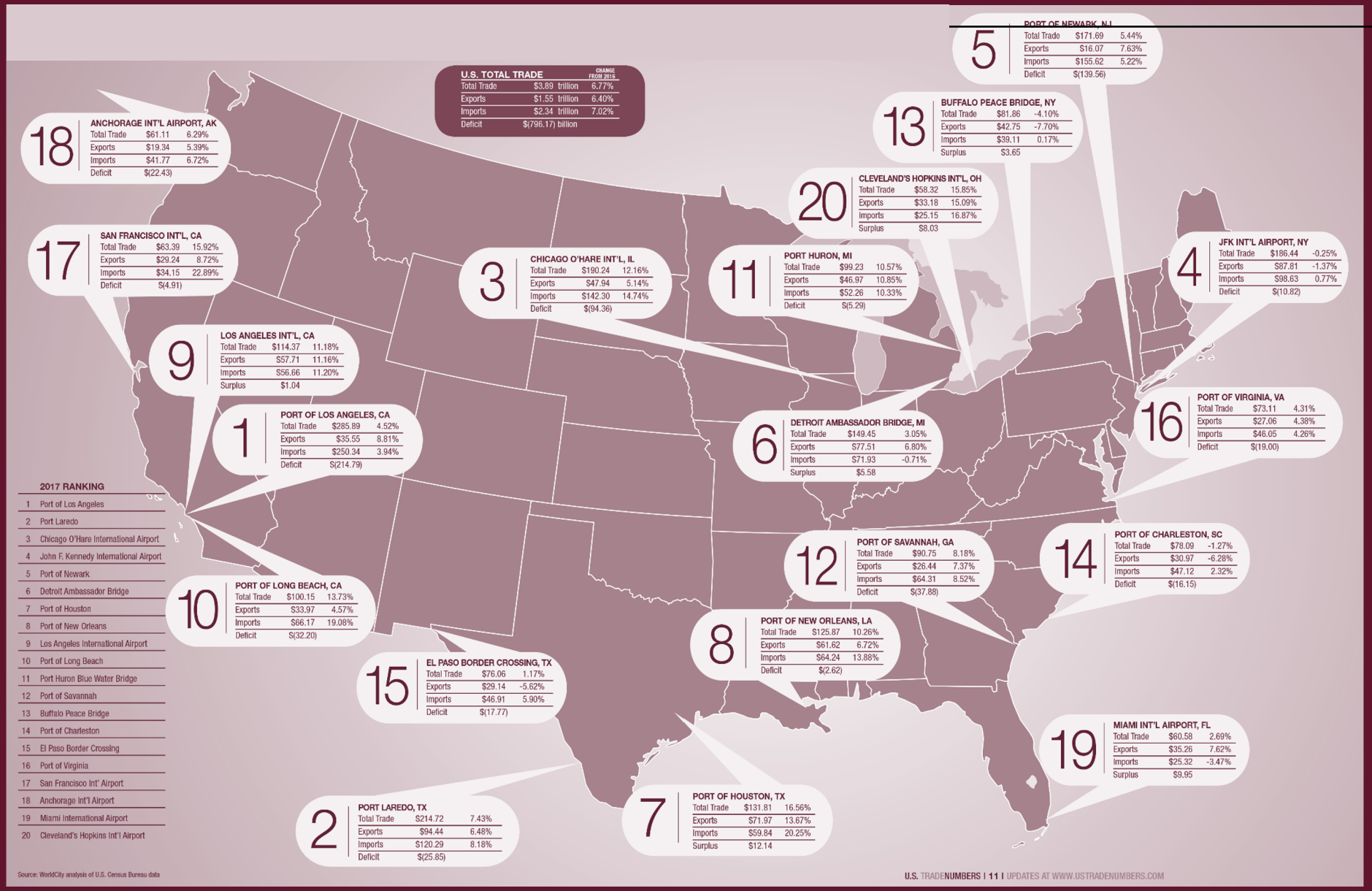
2020 U.S. – Mexico Trade



Data compiled by Texas Center for Border Economic and Enterprise Development, TAMIU
Source: U.S. Department of Commerce Bureau of the Census, Foreign Trade Division

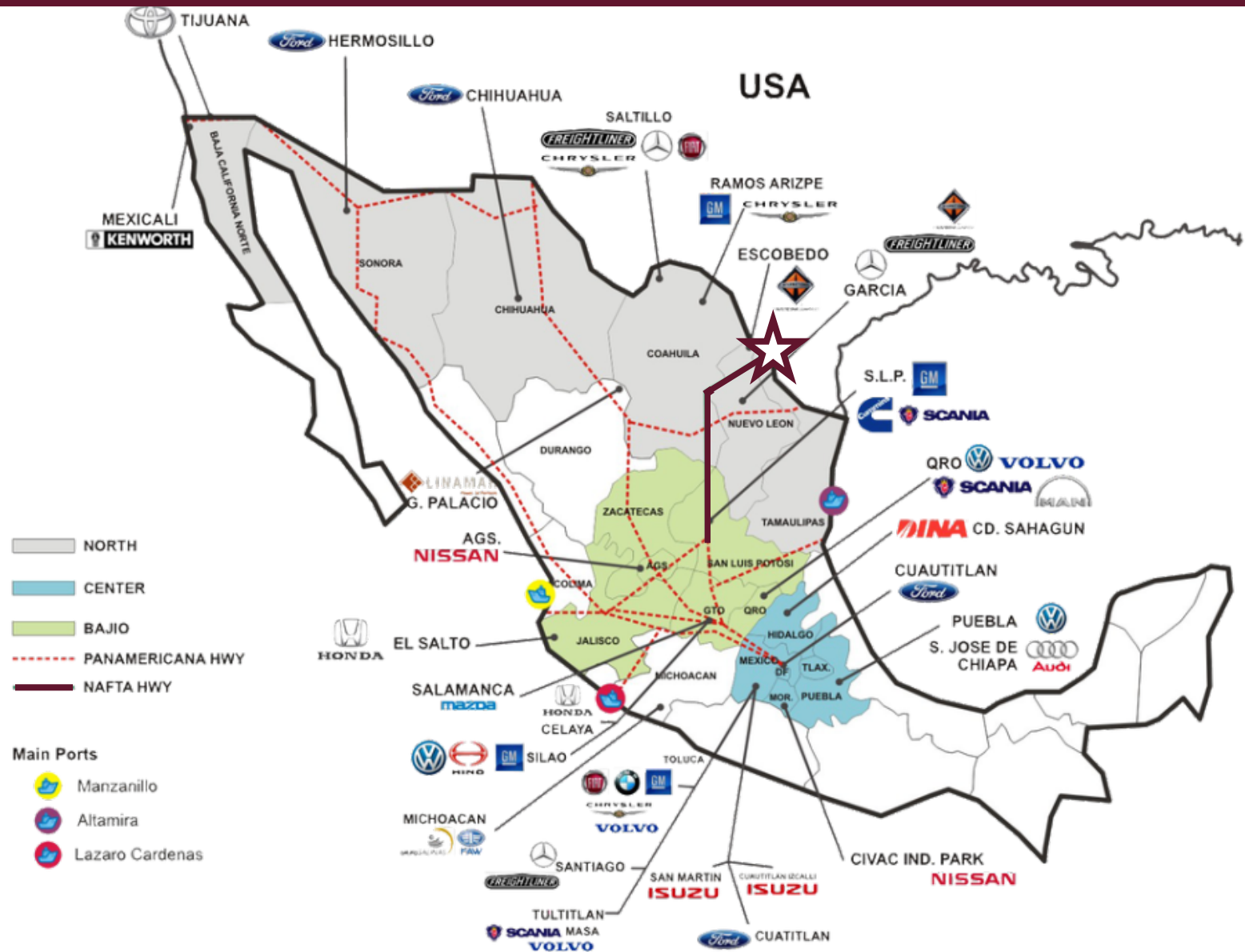
Laredo Customs District :
Laredo, Hidalgo/Pharr, Brownsville, Edinburgh Airport, Progreso, Rio Grande City, Roma, Valley International Airport (Harlingen), Eagle Pass y Del Rio

TOP 20 U.S. PORTS (2017)



Source: WorldCity analysis of U.S. Census Bureau data

MEXICO AUTOMOTIVE INDUSTRY



TRADE FLOWS

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PORTER'S DIAMOND MODEL

FIRM STRATEGY, STRUCTURE & RIVALRY

Rivalry leads to firms discovering new ways to increase production and to the advancement of innovations. The consolidation of market power, degree of competition, and businesses' ability to compete and enter a nation's market are essential here.

DEMAND CONDITIONS

Size and nature of the customer base for products, which also drives innovation and product improvement. Larger, more dynamic consumer markets will demand and stimulate a need to differentiate and innovate, as well as simply greater market scale for businesses.

RELATED AND SUPPORTING INDUSTRIES

Upstream and downstream industries (suppliers and customers) that facilitate innovation through interchanging concepts. These can drive innovation through knowledge transfer.

FACTOR CONDITIONS

Factor conditions are the components that a country's economy can produce for itself, such as a large skilled labor market, technological innovation, infrastructure, and capital.

Source: Porter, M. E. "The Competitive Advantage of Nations." Harvard Business Review 68, no. 2 (March–April 1990): 73–93..

PORTER'S DIAMOND MODEL

Port Laredo Logistics Cluster

01 FIRM STRATEGY, STRUCTURE & RIVALRY

+ Historical cross-border economic cooperation
+ UMCA as a stable trade regulation framework in the region
+ Mexico as one of the countries with the greatest commercial openness, the US with the greatest commercial activity and Port Laredo as the largest export / import port between both countries
+ Competition from other regions in cross-border transport and other means of transport (air or rail)

- Lack of completion of strategic projects (ex: strategic in-bond site)
- Cross-border lack of coordination in the promotion of new infrastructures, in the face of significant progress in other regions
- Social instability due to violence and drug trafficking that increase transportation costs (security)
- Little competition between available means of transport, due to the lack of execution of strategic infrastructure (ex: new railway port, cargo airport and bridge 4-5))

02 DEMAND CONDITIONS

+ Sophisticated customers in the US and manufacturing clusters in Mexico with recurring needs (ex: carriers and customs agents)
+ Demanding cross-border transport security requirements requiring specialized activity
+ Need for support services for commercial activity and transport

- High dependence on other sectors (ex: automotive) and economic factors (ex: rising oil prices)
- High price elasticity
- Dependence on government and business decision-making centers outside the region

Source: Covarrubias, J.D., et.al "Cluster de Logistica Region Laredo."
Microeconomics of Competitiveness Course, Orkestra – Basque Institute of Competitiveness..

PORTER'S DIAMOND MODEL

Port Laredo Logistics Cluster

03

RELATED AND SUPPORTING INDUSTRIES

+ Manufacturing cluster in Mex as a products and goods supplier sector for the cluster
+ Automotive cluster in the US as a demanding manufacturing and transportation sector
+ Hospitality and leisure cluster that supports transport activity
+ Important network of industry and export associations

- Need for further development of the hospitality and leisure cluster in Nuevo Laredo
- Absence of own association to coordinate cluster activities

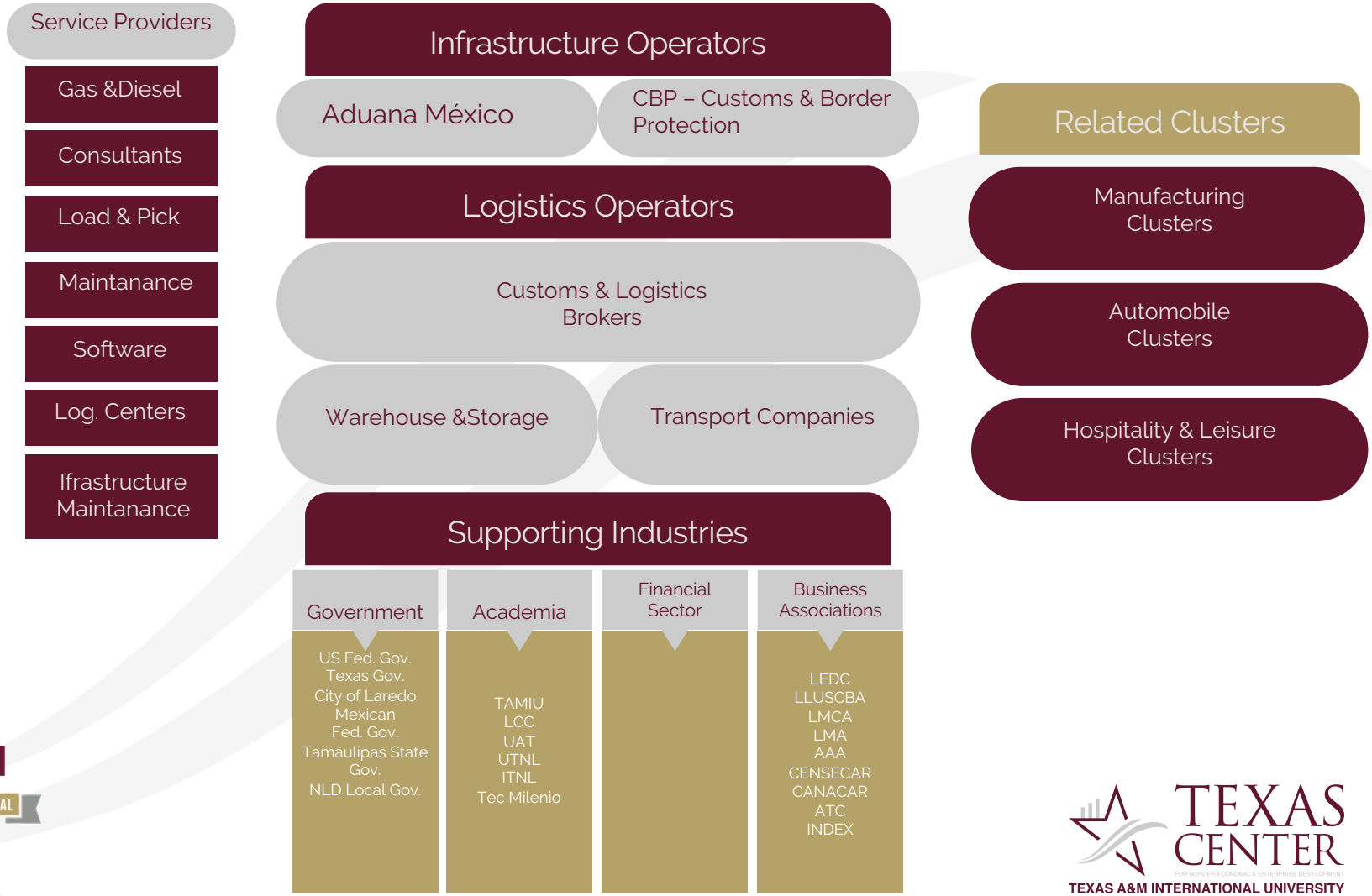
04

FACTOR CONDITIONS

+ Strategic location on the US / Mex border
+ Transport infrastructure built and maintained and (in the US) modernized with state-of-the-art technology
+ Human capital highly specialized in logistics and transport

- Slowdown in the modernization and expansion of transport infrastructures due to poor cross-border coordination
- English language barrier as a dividing factor in the transport sector

PORT LAREDO LOGISTICS CLUSTER MAP



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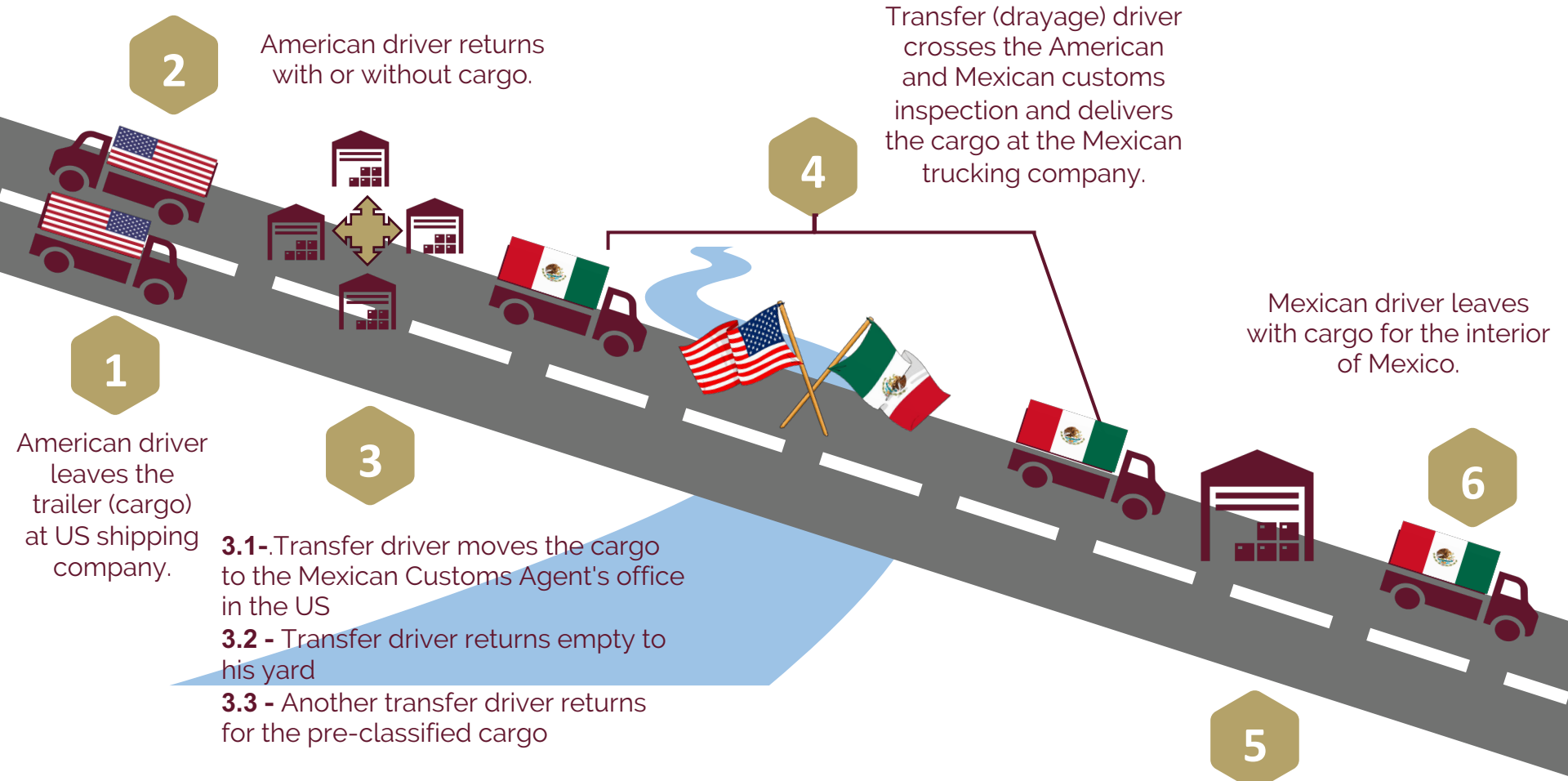
Source: Covarrubias, J.D., et.al "Cluster de Logistica Region Laredo."
Microeconomics of Competitiveness Course, Orkestra – Basque Institute of Competitiveness..

PORT LAREDO OPERATIONS

United States exports to Mexico



2

American driver returns with or without cargo.

Transfer (drayage) driver crosses the American and Mexican customs inspection and delivers the cargo at the Mexican trucking company.

4

Mexican driver leaves with cargo for the interior of Mexico.

1

American driver leaves the trailer (cargo) at US shipping company.

3

3.1-.Transfer driver moves the cargo to the Mexican Customs Agent's office in the US

3.2 - Transfer driver returns empty to his yard

3.3 - Another transfer driver returns for the pre-classified cargo

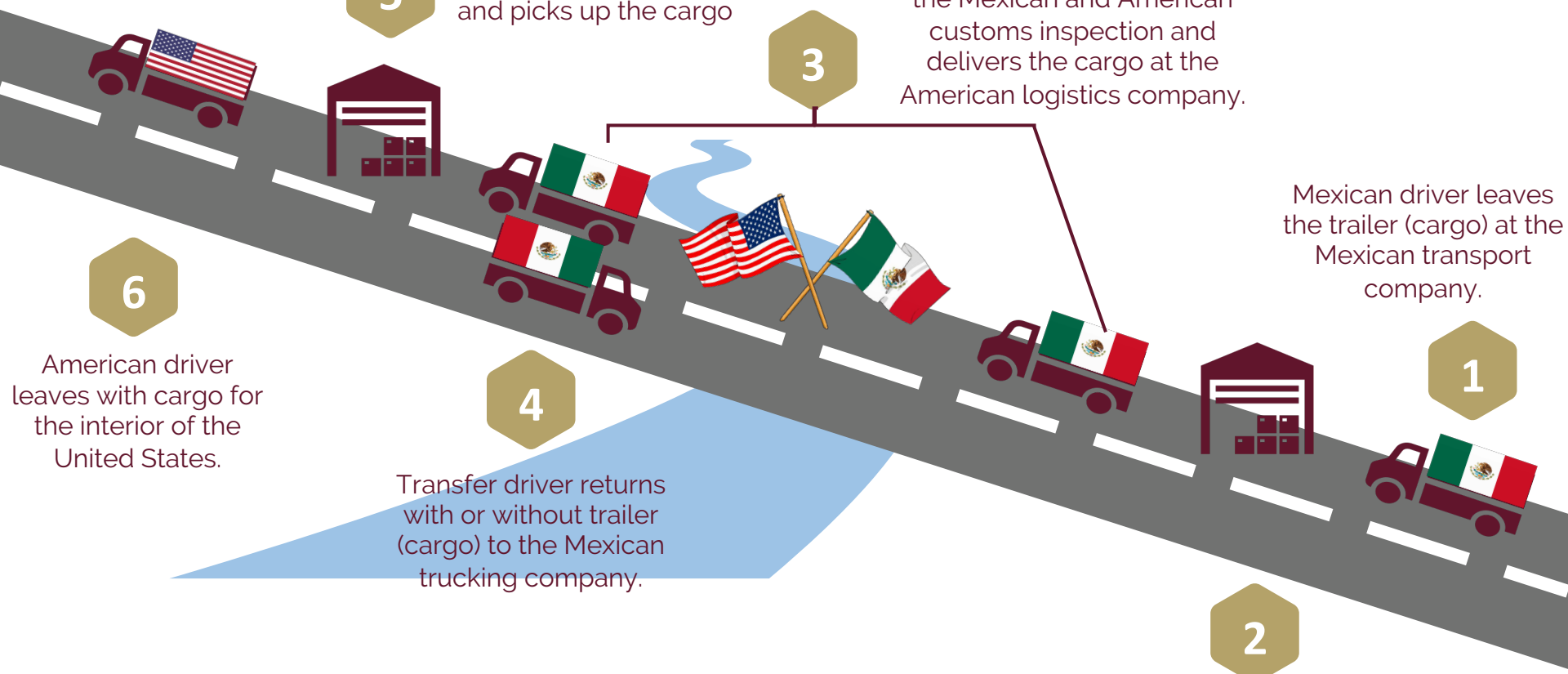
6

5

Mexican driver arrives and picks up the load.

PORT LAREDO OPERATIONS

Mexico imports to the United States



1. Mexican driver leaves the trailer (cargo) at the Mexican transport company.
2. Mexican driver returns with or without cargo.
3. *Transfer (drayage) driver crosses the trailer through the Mexican and American customs inspection and delivers the cargo at the American logistics company.
4. Transfer driver returns with or without trailer (cargo) to the Mexican trucking company.
5. American driver arrives at the logistics company and picks up the cargo
6. American driver leaves with cargo for the interior of the United States.

* About 15% of cargo is taken by American trucks with Mexican drivers on B1 Visas

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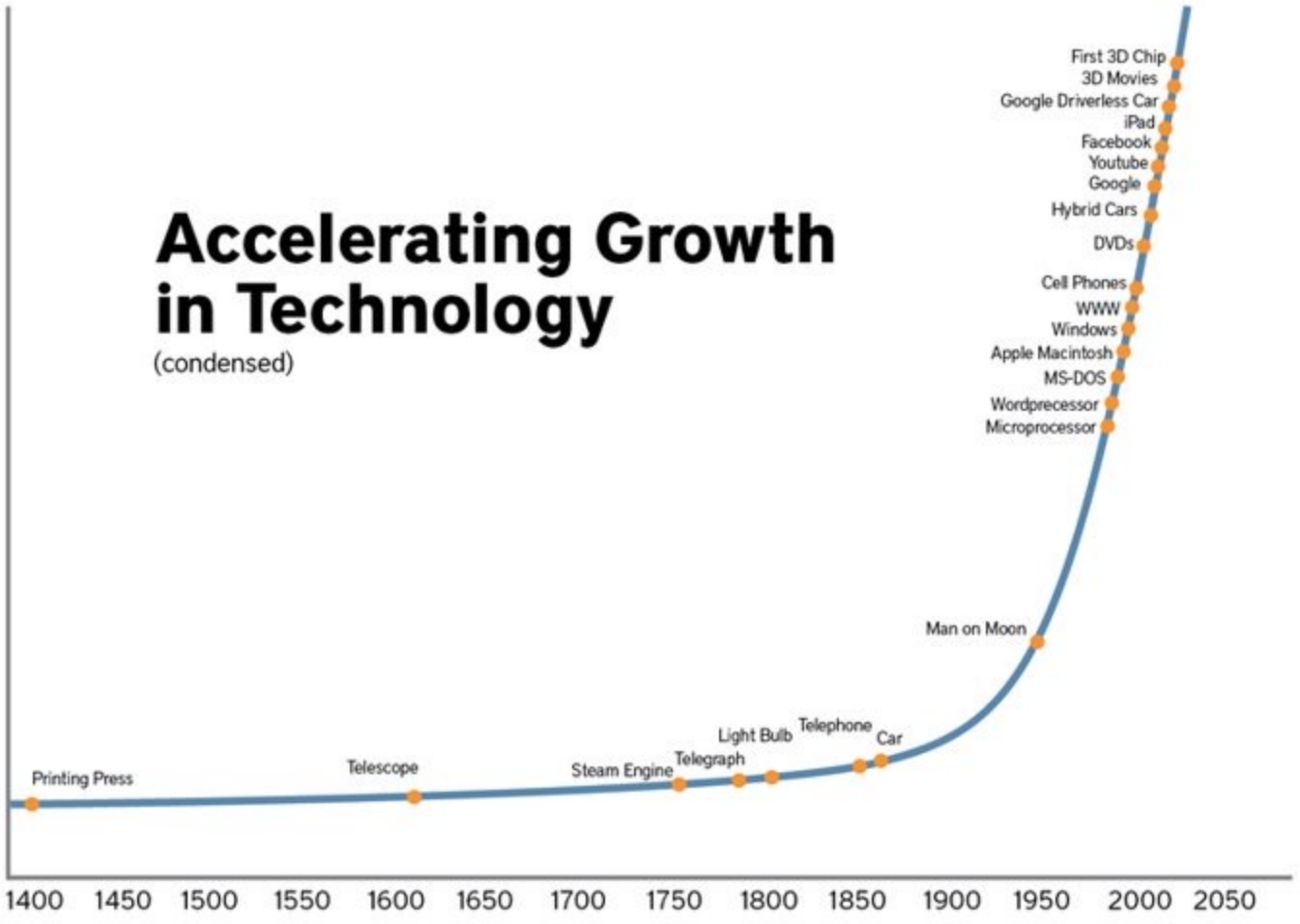

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Source: Asgard Human Venture Capital for Artificial Intelligence

STRATEGIC INITIATIVES

2003 Manufuture (EU)
Technology & R+D

2008 Smart Manufacturing (USA)
Universities

2008 Factories of the Future (EU)
EU Commission & Private Sector

2011 Advanced Manufacturing (USA)
Government

2011 Industry 4.0 (Germany)
Universities & R+D

2012 Industrial Internet (USA)
GE & Other Private Companies

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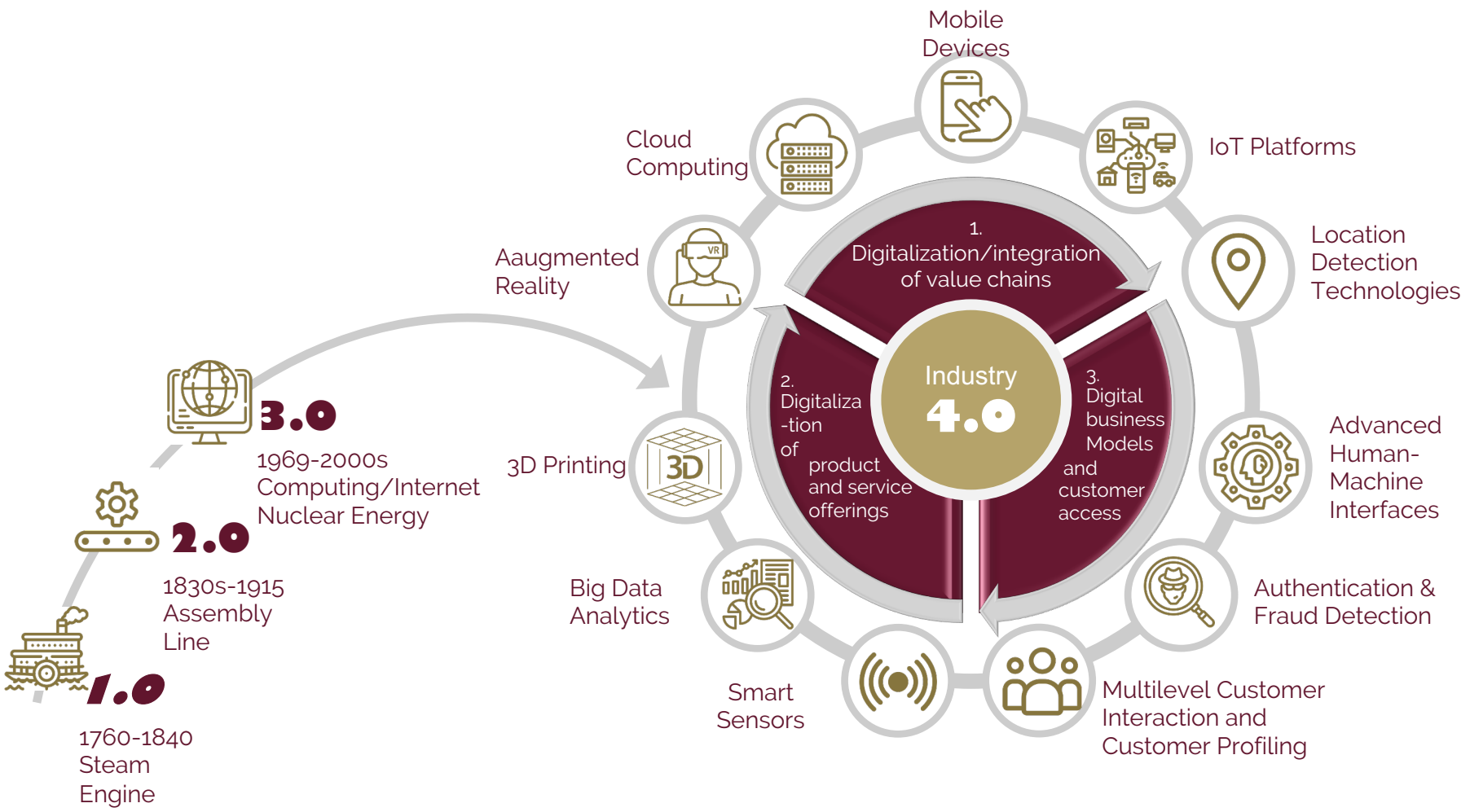
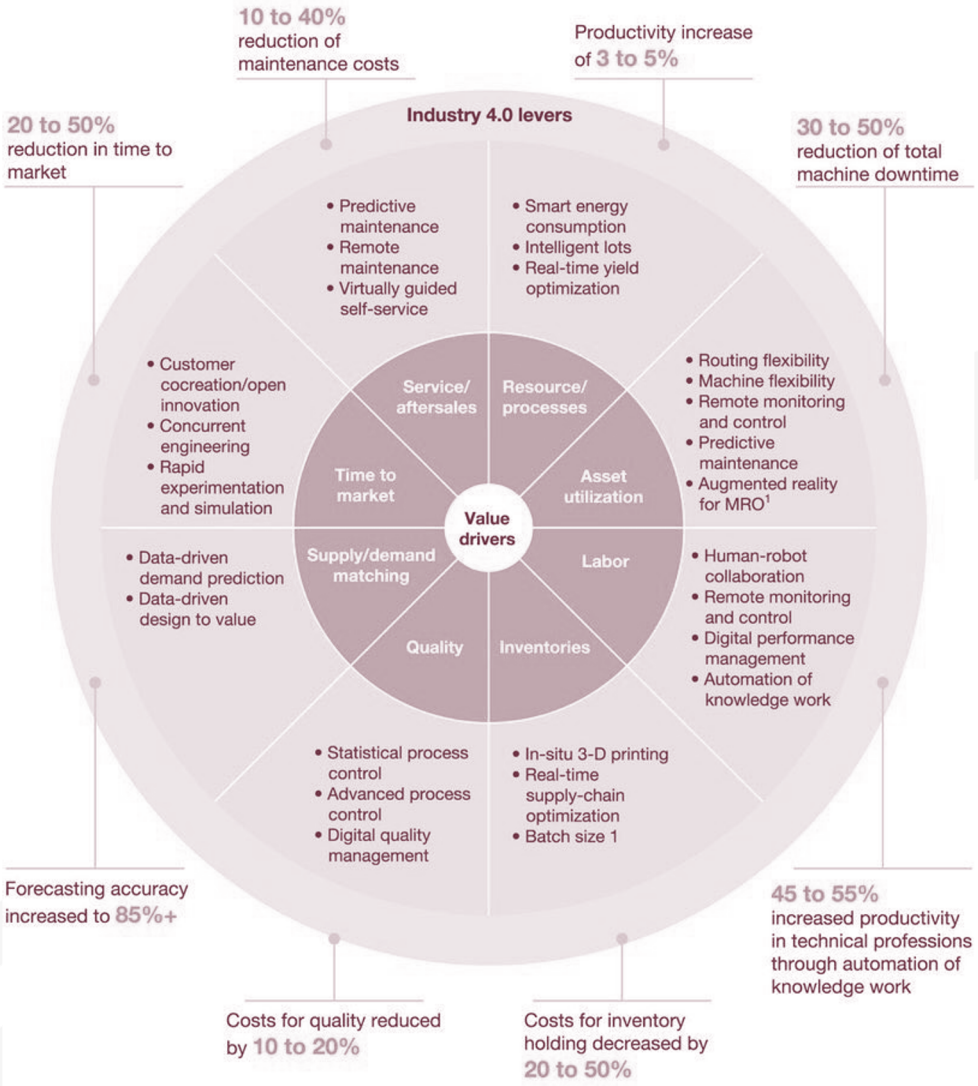
FOURTH INDUSTRIAL REVOULUTION



Source: ICT Works

The McKinsey Digital Compass maps Industry 4.0 levers to the 8 main value drivers.



[1]Maintenance, repair, and operations.

Source: "Industry 4.0: How to navigate digitization of the manufacturing sector," McKinsey Digital, 2015

McKinsey&Company

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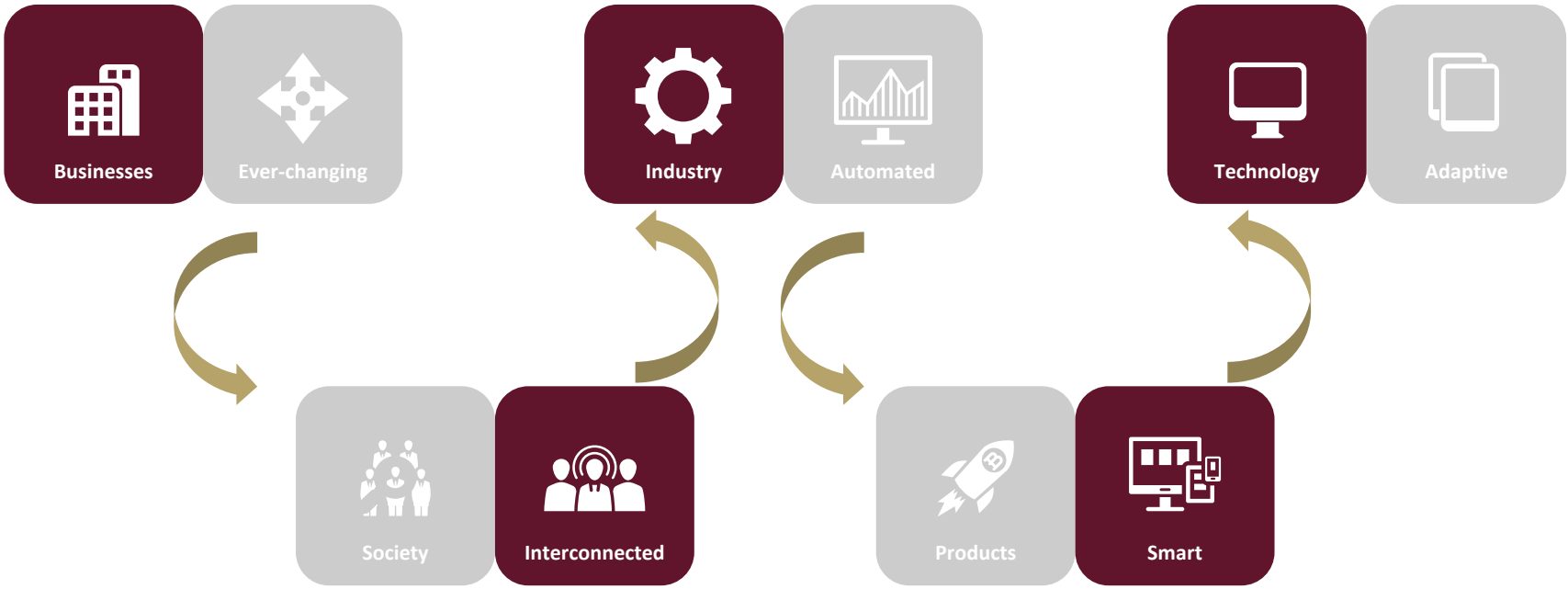
INDUSTRY 4.0 – CHANGE OF MODEL



TECHNOLOGIES

Industry 4.0 is a revolutionary trend, brought about thanks to the use of Information and Communication Technology (ICT) services to optimize, monitor, automate, and adapt manufacturing processes within companies, making them more productive and efficient.

IoT

The Internet of things is the network of physical objects, ("things") that is used for the purpose of connecting and exchanging data with other devices.

Cybersecurity

The state of being protected against the criminal or unauthorized use of electronic data, or the measures taken to achieve this.

Big Data

Extremely large data sets that may be analyzed computationally to reveal patterns, trends, and associations.

AI

Theory and development of computer systems able to perform tasks that normally require human intelligence.

Computer Vision

Field of computer science that works on enabling computers to see, identify and process images in the same way that human vision does..

AR & VR

AR adds digital elements to a live view often by using the camera on a Smartphone. VR implies a complete immersion experience .

The applications of Industry 4.0 are in almost all areas of a company, such as operations, quality control, management, maintenance, HR, logistics, and IT.

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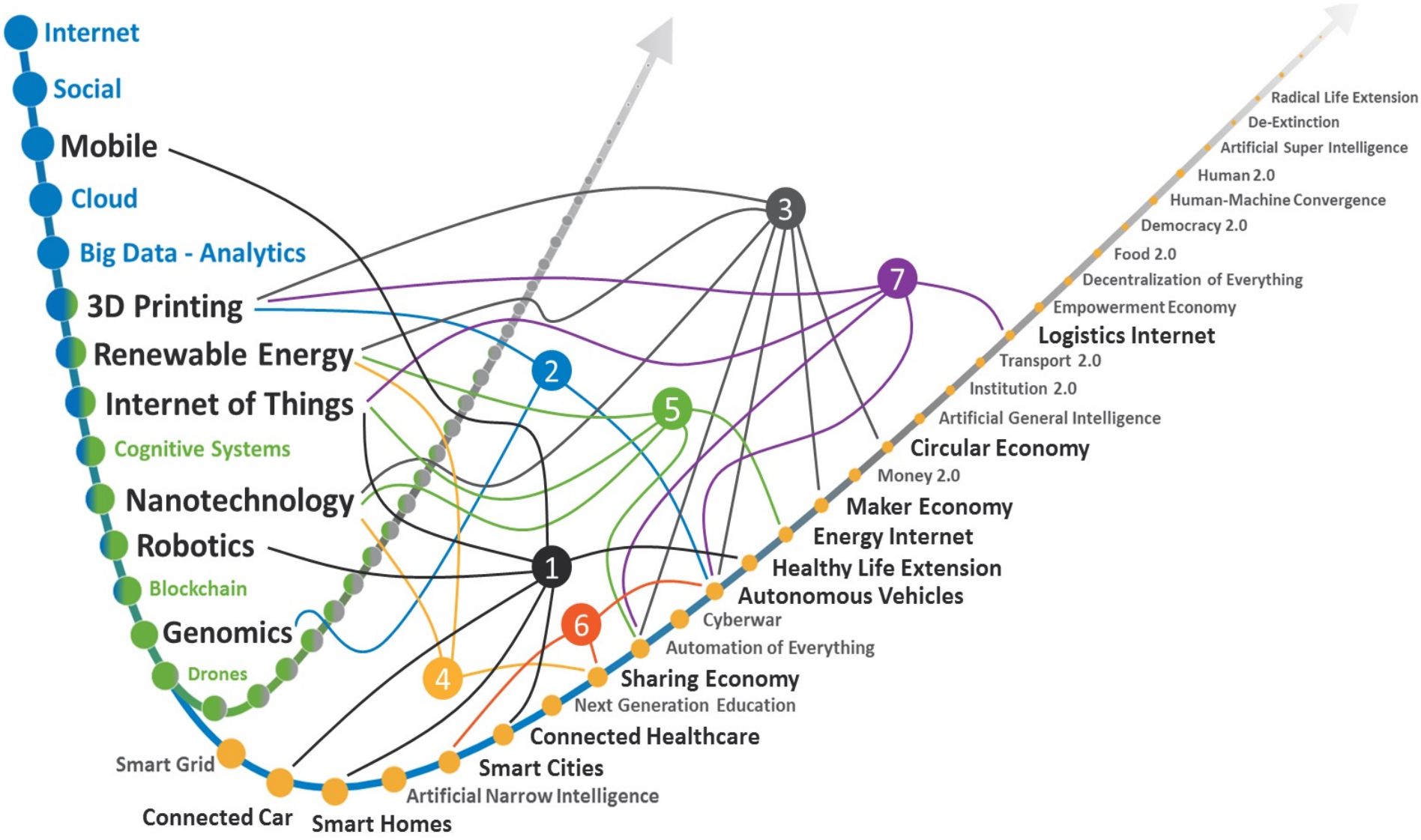
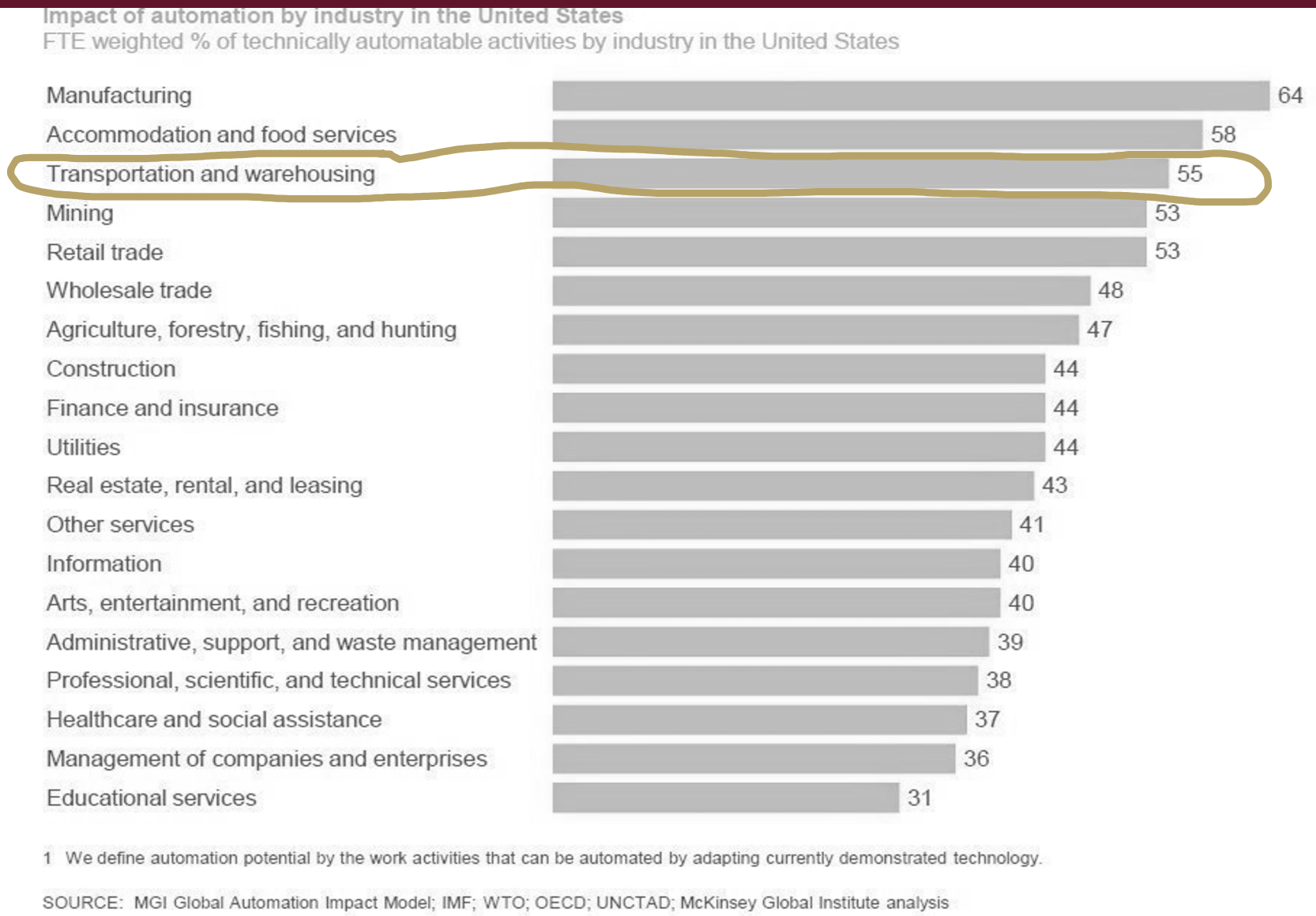
ACCELERATED CONVERGENCE



Source: Peter Diamandis - Singularity University

AUTOMATIZATION BY SECTORS



LOGISTICS 4.0

Transport Mechanization
- Railroad and road transport
- Transoceanic transport (Cargo Ships)

Cargo Handling Automatization
- Automated Warehouses
- Container Ships

Logistics Administration Systematization
- WMS y TMS
- Electronic Customs Clearance

Smart Supply Chain
- Logistics opoerations based on IoT, AI, Big Data
- Robots in warehouses, drones and autonomous vehicles

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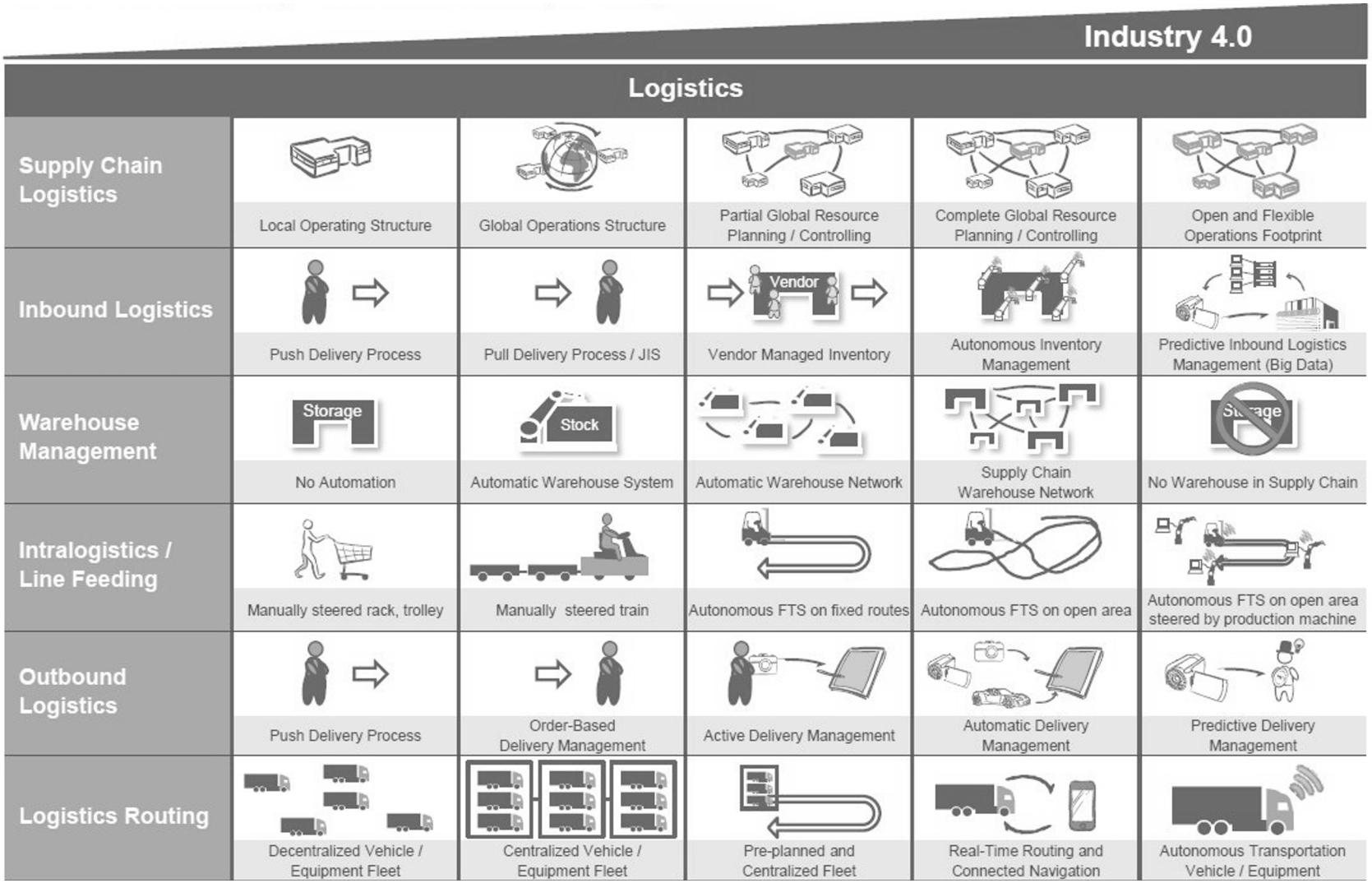
Source: Unity Logistics

LOGISTICS 4.0 - ROADMAP



Source: Unity Logistics

LOGISTICS 4.0 – CHANGE IN MODEL

Today, as supply chains become increasingly complex with more and more actors participating in them, there are endless documents to verify and lengthy processes to follow. This is where exponential technologies are applied within Logistics 4.0.

Companies are working with blockchain technology to accelerate the verification processes within the logistics sector, where each part of a supply chain is connected. It is expected to bring a paradigm shift by reducing the human errors that used to occur during long logistics processes and ensure reliability at every step of the supply chain.

IoT devices and big data analytics will help vendors and customers determine inventories spread across the world. Robots will be implemented to perform simple and repetitive warehouse work. With VWS (Virtual Warehouse Systems), warehouse managers will know the current status of their warehouse remotely. Additionally, autonomous trucks, drone delivery, and other advanced technologies and services will significantly impact Logistics 4.0.

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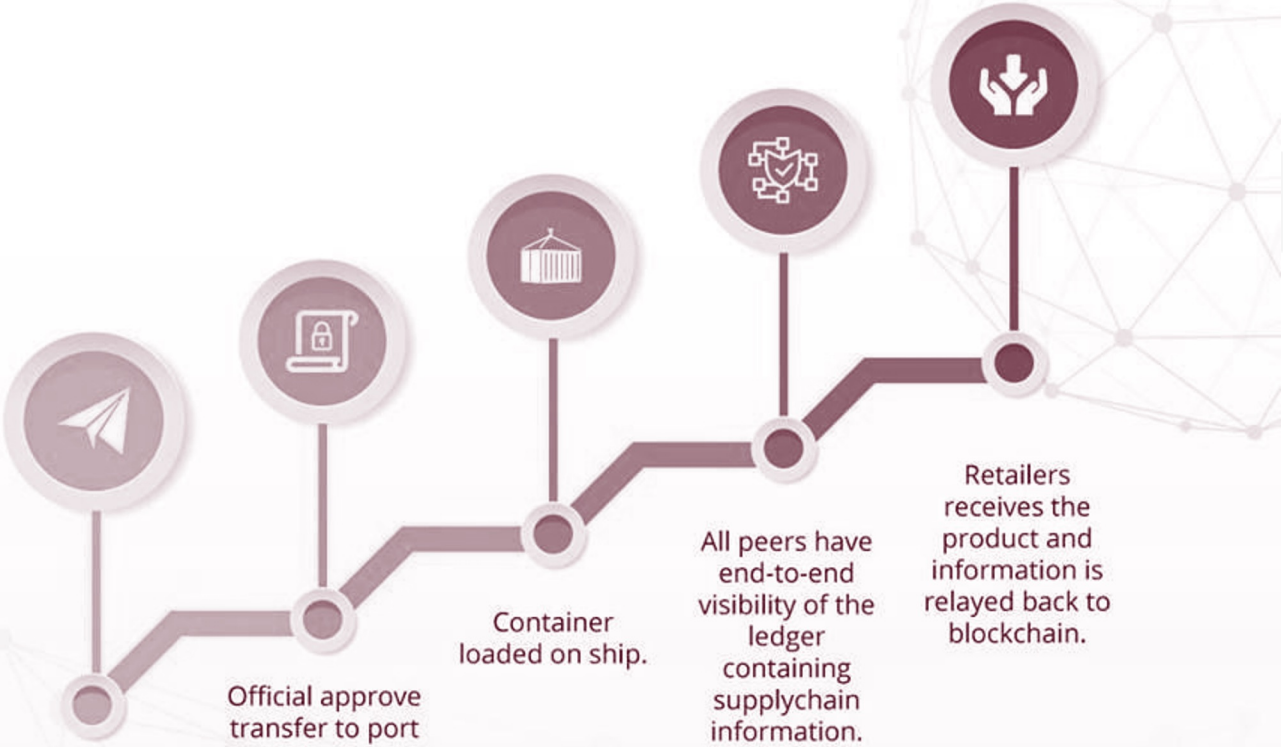
PROCESS FLOW OF SUPPLYCHAIN USING BLOCKCHAIN



Blockchain Council

www.blockchain-council.org

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LOGISTICS 4.0 - TRENDS

Intelligent Supply Chain	Cargo Control/Instant Delivery	Cost Reduction
Figuring out demand of each customer by analyzing purchase data	Real-time cargo tracking & control	Operating cost reduction through tech-driven innovations
Securing/recommending items customers might need in advance	Integrated management of orders and deliveries on a single platform	Automation facilities/robots to replace simple manual work
A virtuous cycle of manufacturing, retail, and logistics	Instant delivery in which delivery begins right after an order comes in.	Innovation leads to lower prices, ultimately benefiting customers

Source: Samsung SDS

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CONCLUSIONS

1.- Smart supply chains are currently being developed. Using big data analytics and artificial intelligence, companies analyze their customers' past purchase history, forecast highly accurate demand, and adjust their inventories accordingly from the start of the manufacturing process to avoid stockouts or overstocking of stocks of your final products.

2.- It is increasingly essential for businesses to provide global shipment visibility, manage cargo with the best quality, and offer instant delivery. They should be able to inform customers about the location and status of the shipment through real-time monitoring and supervision, using their integrated logistics platform that covers the entire logistics process. Additionally, companies should aim to provide instant delivery where the current three-day shipment is converted to a 24-hour delivery or instant delivery.

3.- Companies will continue to lower product prices and reduce costs by driving innovations with exponential technologies. Robots, autonomous vehicles, and paperwork and verification processes automation will eliminate simple and repetitive work scattered throughout logistics processes, leading to lower costs and higher quality of service.


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