CSCMP'S ANNUAL
STATE OF LOGISTICS REPORT®

AUTHORED BY ATKearney

PRESENTED BY PENSKE
Rental | Leasing | Logistics

Cresting the Hill

2019 State of Logistics American Association of Port Authorities

Wednesday, June 19
2019

A successful collaboration…

CSCMP'S ANNUAL
STATE OF LOGISTICS REPORT
AUTHORED BY ATKearney

PRESENTED BY
PENSKE
Rental | Leasing | Logistics

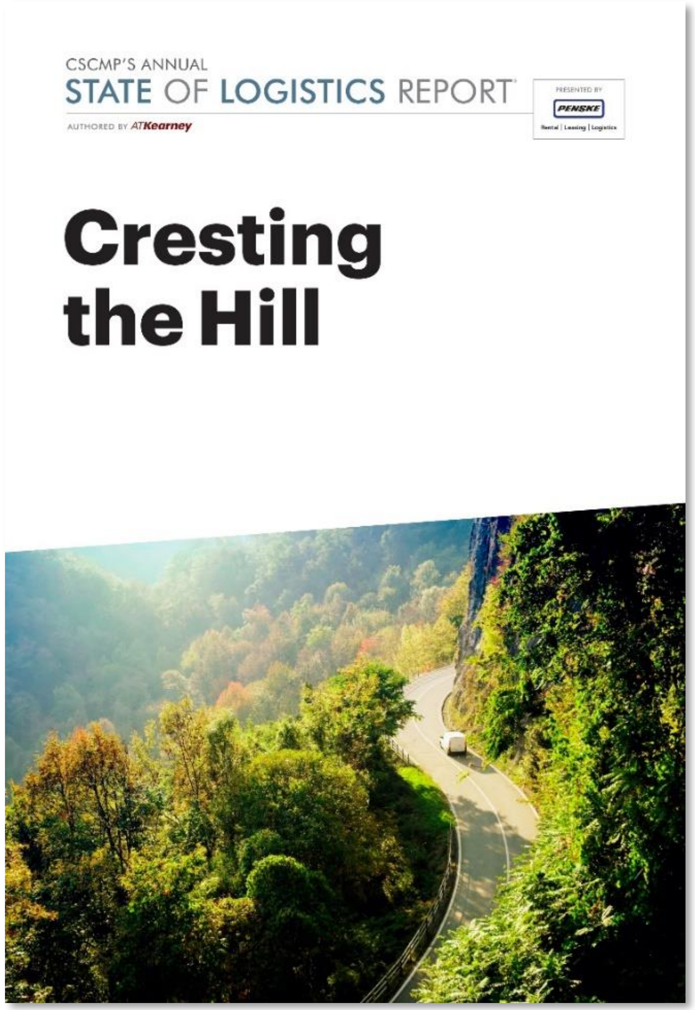
A proven approach for the report…

I Focused economic analysis

II Interviews with logistics industry leaders

III Logistics industry context and point of view of view

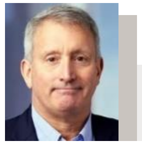
IV Trends and deep dives: global trends, technology, regulation



A.T. Kearney experts and external contributors

Michael Zimmerman

Partner, New York | michael.zimmerman@atkearney.com



Jeff Ward

Partner, Chicago | jeff.ward@atkearney.com

Balika Sonthalia

Vice President, Chicago | balika.sonthalia@atkearney.com

Alberto Oca

Principal, Arlington | alberto.oca@atkearney.com

Korhan Acar

Director, Chicago | korhan.acar@atkearney.com

Yan Sun

Consultant, Chicago | yan.sun@atkearney.com

A.T. Kearney experts

- Sameer Anand
- Akash Agrawal
- Neeti Bandodker
- Arjun Bhalla
- Josh Brogan
- Courtney Caffrey
- UnSoi Chio
- Laure DeMenonville
- Matt Engel
- Kushal Fernandes
- Alex Frank
- Ankit Gandhi
- Henrique Gonda
- Puneet Khurana
- Ben Kuo
- Lakshman Lakshmanan
- Niki Lewis
- Arsenio Martinez
- Elena McGovern
- Emily McInturff
- Rajeev Prabhakar
- Mani Selvam
- Hemali Shah
- Arpit Sharma
- Danny Simmons
- Henry So
- Rajesh Swaminathan
- Saurabh Vaidya
- Jennifer Xu

External contributors (not exhaustive)

- Stevan Bobb—NSF Railway
- Jill Donoghue and Sharon Regan— Bumble Bee Seafoods
- John Corsi, Pat Hunter, and David Drummond—National Gypsum
- Joe Carlier and Alen Beljin—Penske
- Jen Cicinelli—Macy's
- Ken Braunbach—Walmart
- Mark Magill—OnTrac
- Josh Dinneen—Lasership
- Scott Leveridge—TForce

CSCMP'S ANNUAL
STATE OF LOGISTICS REPORT®
AUTHORED BY ATKearney
PRESENTED BY PENSKE Rental | Leasing | Logistics

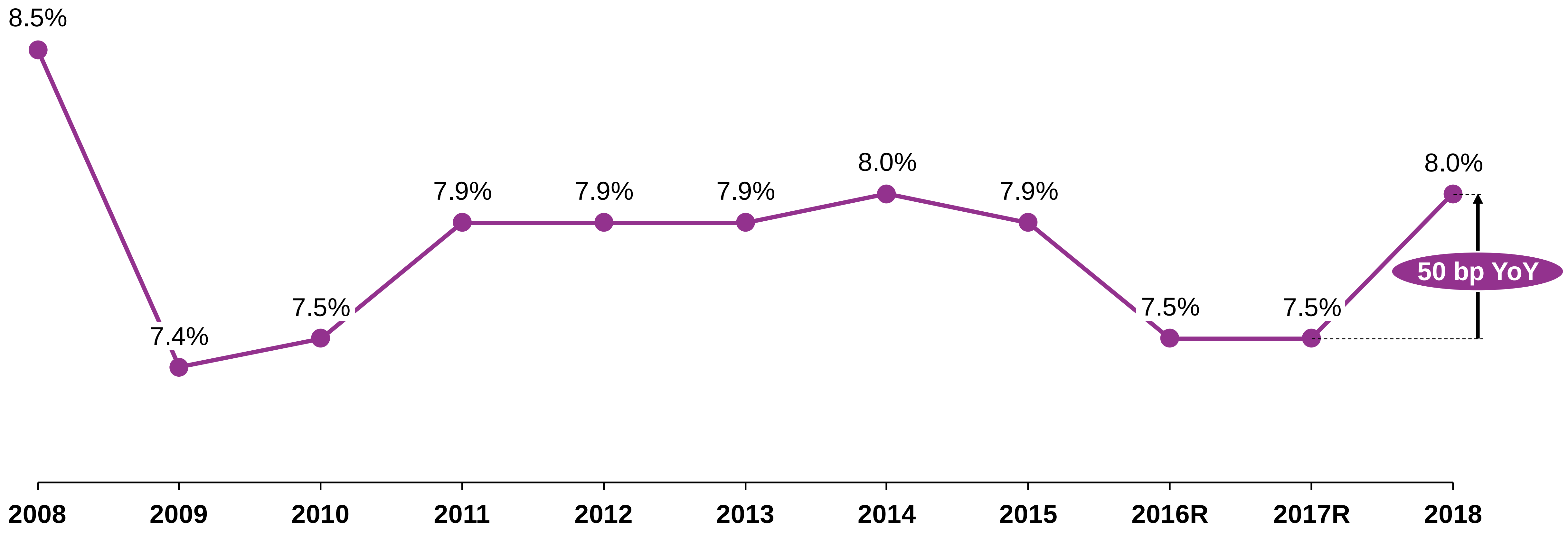
A transparent and consistent estimate of United States business logistics costs (USBLC)

$billion	2018	YoY 18/17	5-yr. CAGR
Transportation costs			
• Full truckload	296.1	7.6%	3.6%
• Less-than-truckload	71.8	8.3%	3.5%
• Private or dedicated	300.9	13.1%	7.1%
Motor carriers	668.8	10.1%	5.1%
Parcel	104.9	8.7%	8.0%
• Carload	61.4	7.2%	-0.6%
• Intermodal	27.0	28.7%	8.1%
Rail	88.4	12.9%	1.6%
Air freight (includes domestic, import, export, cargo, and express)	76.5	9.2%	3.8%
Water (includes domestic, import, and export)	45.7	12.8%	1.5%
Pipeline	53.0	12.7%	12.7%
Subtotal	**1037.4**	**10.4%**	**5.1%**
Inventory carrying costs			
• Storage	153.1	3.2%	3.0%
• Financial cost (WACC x total business inventory)	192.5	26.0%	3.0%
• Other (obsolescence, shrinkage, insurance, handling, others)	148.1	14.8%	3.0%
Subtotal	**493.7**	**14.8%**	**3.0%**
Other costs			
• Carriers' support activities	52.3	10.3%	4.5%
• Shippers' administrative costs	52.1	2.8%	5.3%
Subtotal	**104.4**	**6.4%**	**4.9%**
Total US business logistics costs	**1,635.46**	**11.4%**	**4.4%**

$billion	Units	2012	2013	2014	2015	2016	2017	2018
• Nominal GDP	$ billion	16,197.0	16,784.9	17,521.7	18,219.3	18,707.2	19,485.4	20,500.6
• Total business inventory	$ billion	2,337.9	2,395.4	2,524.4	2,513.8	2,527.6	2,628.6	2,750.2
• Inventory carrying rate	%	17.5%	17.8%	16.2%	17.0%	16.3%	16.4%	18.0%
• Transportation costs	$ billion	785.8	809.9	903.4	907.0	904.2	939.9	1037.4
• Inventory carrying costs (ICC)	$ billion	408.9	426.1	408.0	427.2	412.9	430.0	493.7
• Other costs	$ billion	79.3	82.2	89.4	94.7	93.8	98.1	104.4
• Total USBLC	$ billion	1,274.0	1,318.2	1,400.8	1,428.9	1,410.9	1,468.1	1,635.5
• Total USBLC as % of GDP	%	7.9%	7.9%	8.0%	7.8%	7.5%	7.5%	8.0%
• Total business inventory as % of GDP	%	2.5%	2.5%	2.3%	2.3%	2.2%	2.2%	2.4%
• Transportation as % of GDP	%	4.9%	4.8%	5.2%	5.0%	4.8%	4.8%	5.1%
• ICC as % of GDP	%	2.5%	2.5%	2.3%	2.3%	2.2%	2.2%	2.4%
• Total business inventory as % of GDP	base 100	98.6	99.2	91.0	91.6	86.3	86.2	94.1
• Transportation as % of GDP	base 100	100.6	100.1	107.0	103.3	100.3	100.1	105.0
• ICC as % of GDP	base 100	98.6	99.2	91.0	91.6	86.3	86.2	94.1
• Total USBLC as % of GDP	base 100	100.1	99.9	101.7	99.8	96.0	95.9	101.5

Base 2011=100

USBLC rose 11.4 percent to reach $1.64 trillion, or 8.0 percent of 2018's $20.5 trillion GDP



In 2018, all subsegments of USBLC costs increased to the highest level since 2014

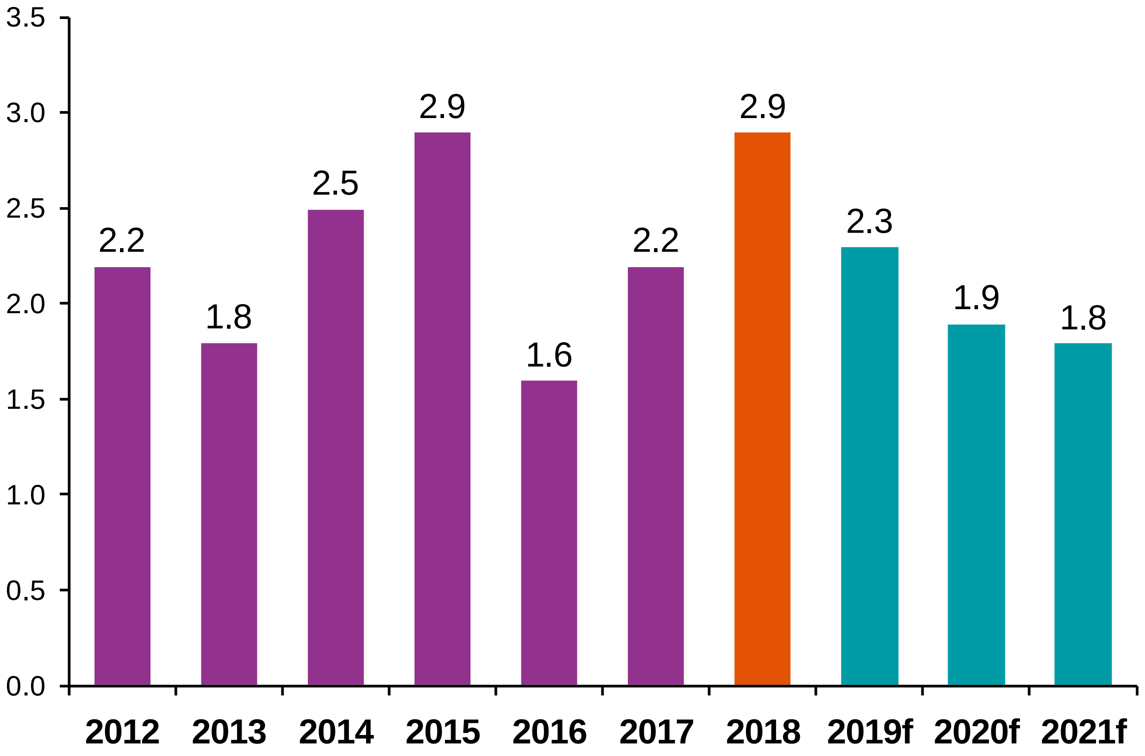
$billion	2018	YoY 18/17	5-yr. CAGR
Transportation costs			
• Full truckload	296.1	7.6%	3.6%
• Less-than-truckload	71.8	8.3%	3.5%
• Private or dedicated	300.9	13.1%	7.1%
Motor carriers	668.8	10.1%	5.1%
Parcel	104.9	8.7%	8.0%
• Carload	61.4	7.2%	-0.6%
• Intermodal	27.0	28.7%	8.1%
Rail	88.4	12.9%	1.6%
Air freight (includes domestic, import, export, cargo, and express)	76.5	9.2%	3.8%
Water (includes domestic, import, and export)	45.7	12.8%	1.5%
Pipeline	53.0	12.7%	12.7%
Subtotal	1037.4	10.4%	5.1%
Inventory carrying costs			
• Storage	153.1	3.2%	3.0%
• Financial cost (WACC x total business inventory)	192.5	26.0%	3.0%
• Other (obsolescence, shrinkage, insurance, handling, others)	148.1	14.8%	3.0%
Subtotal	493.7	14.8%	3.0%
Other costs			
• Carriers' support activities	52.3	10.3%	4.5%
• Shippers' administrative costs	52.1	2.8%	5.3%
Subtotal	104.4	6.4%	4.9%
Total US business logistics costs	**1,635.46**	**11.4%**	**4.4%**

- In transportation, private and dedicated fleets led the way (up by 13%) and FTL and LTL increases were close behind at 8.3% and 7.6%.
- Parcel was up over 8% reflecting strong e-commerce growth and pricing power from the providers.
- On the rails, intermodal led the way with a near 29% increase and carloads continued its relative underperformance with a 7.2% increase and a 5-year CAGR at -.6%.
- Air freight costs rose 9.2% and over the water swelled 12.8% as both strong international commerce and carrier pricing discipline were confirmed over the year.
- The pipeline sector was strong as recent capacity investments caught up to surging demand from oil and gas production, and exports.
- Inventory carrying costs powered a striking cost rise as the inventory buildup in the back half of 2018 drove inventory costs up 14.8% overall.
- Other costs from carrier and shipper support activities rose 6.4%.

Macroeconomics

Economic slowdown expected, and trade uncertainty assures volatility

Real US GDP growth



- At 3.7% the global economy registered robust growth, while the US economy grew by a strong 2.9% in 2018.
- The US economy is flashing warning signs, as the IMF and leading investment banks indicate economic growth will slow to sub 2% in 2020. Despite the rebound in consumer sentiment and GDP growth in Q1 2019, talk of recession is in the air. Trade uncertainty ripples through logistics markets, since even trade tension fears cause inventory buildups that shift logistics services demand.
- Employment showed consistent strength in 2019 with the unemployment rate falling to 3.7% and wage growth climbing to 3%, suggesting wages in logistics will probably rise further.

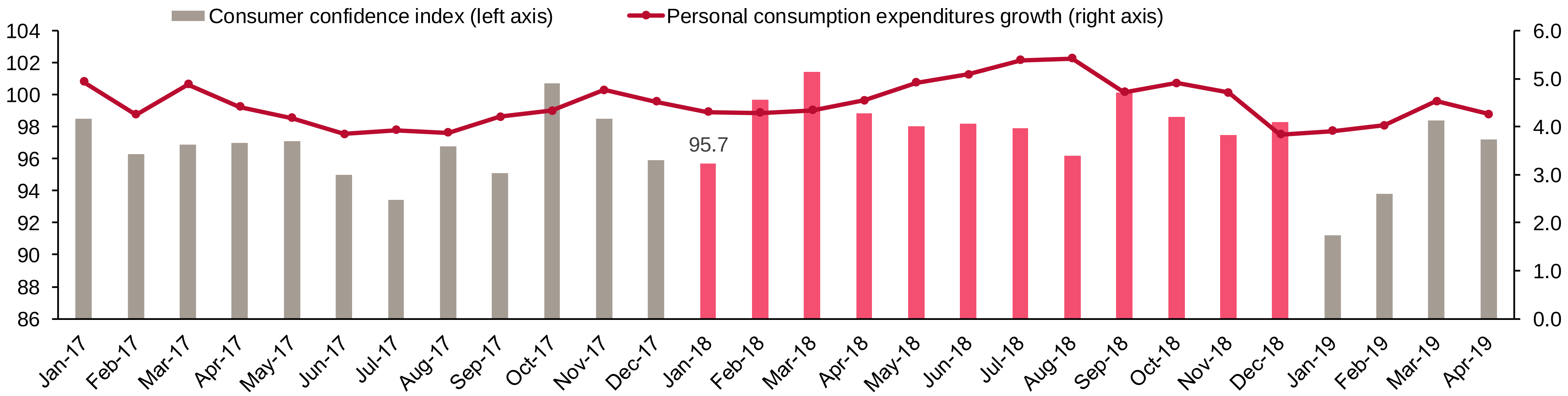
Source: International Monetary Fund World Economic Outlook

Macroeconomics

Consumer confidence hovered over 95% in 2018

US consumer confidence and personal consumption expenditures growth

Index values (year-over-year percent change)



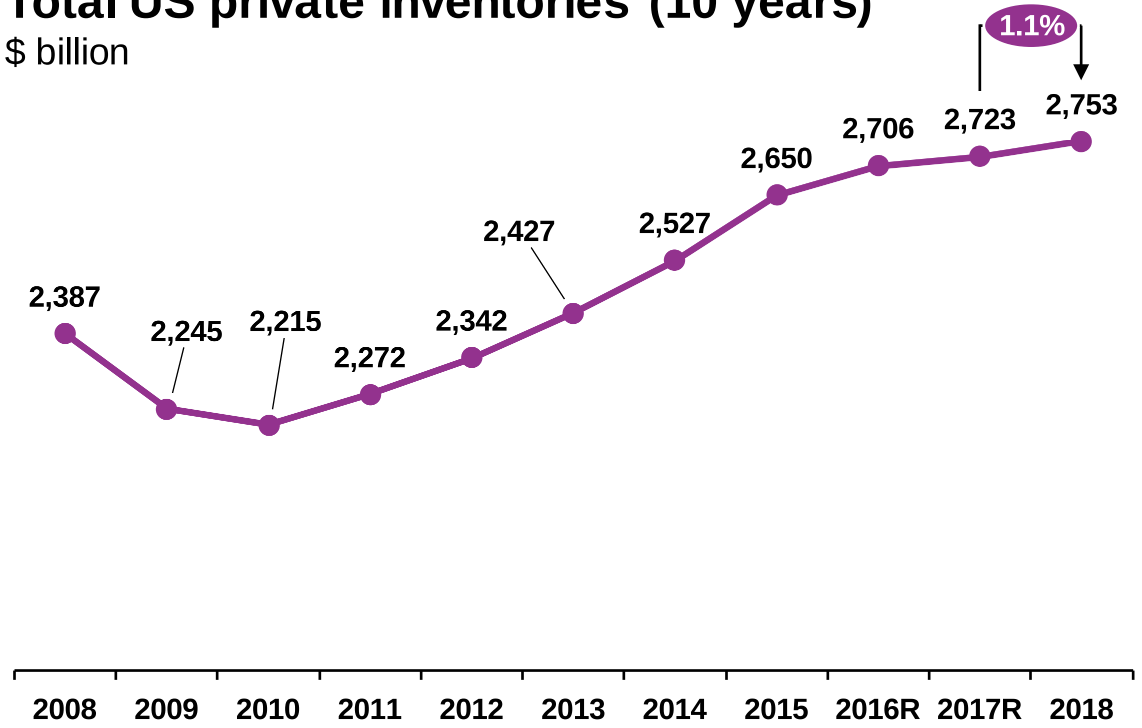
Sources: University of Michigan, US Federal Reserve; A.T. Kearney analysis

Macroeconomics

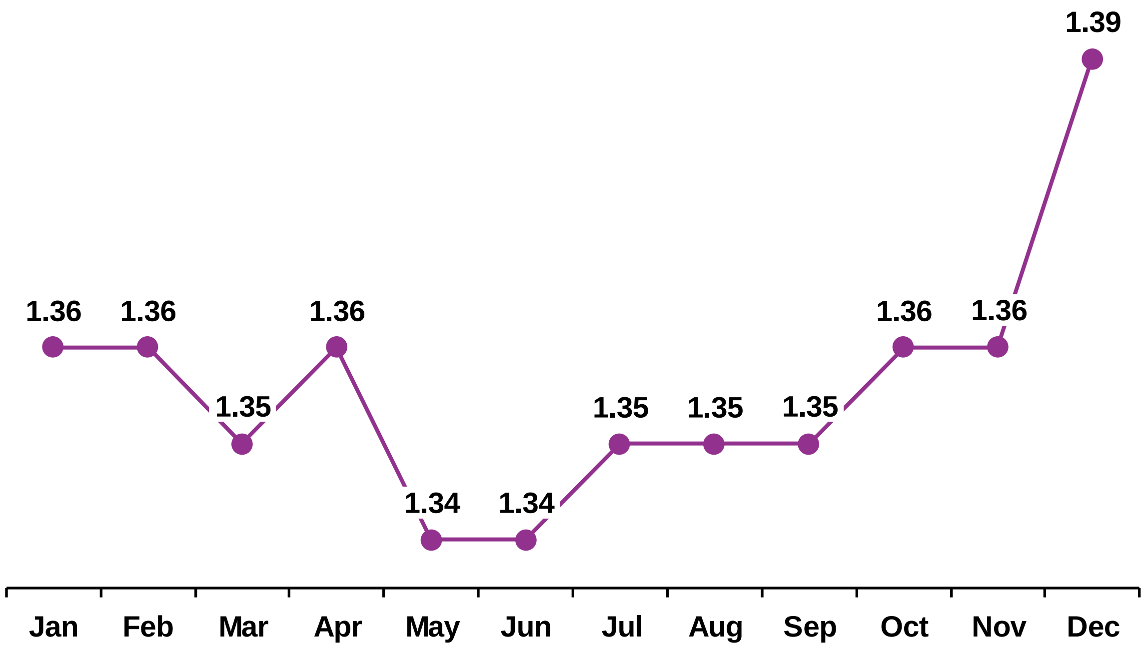
2018 followed 2017 with a stable 1.1% growth in inventory levels to ~$2.75 trillion

Total US private inventories (10 years)

$ billion



Inventories to sales ratio (2018)



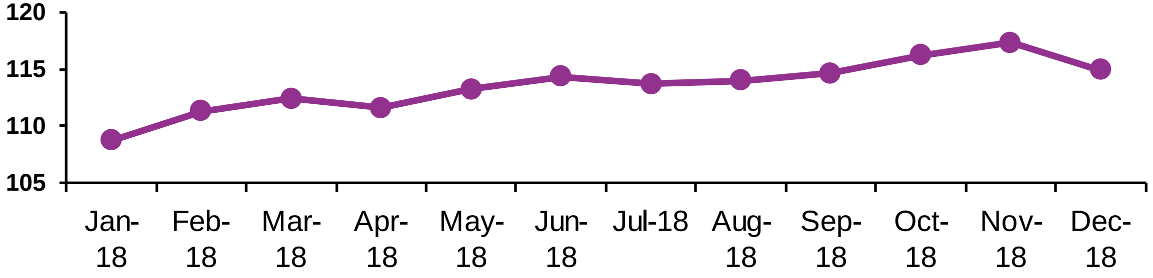
Note: Total US private inventories includes manufacturing, retail, and wholesale and represents stock or goods available for sale. Annual numbers are the yearly average.
Sources: Bureau of Economic Analysis, FRED S, A.T. Kearney Analysis

Motor carriers

Excess demand, tight capacity, high rates delivered gain for carriers and pain for shippers

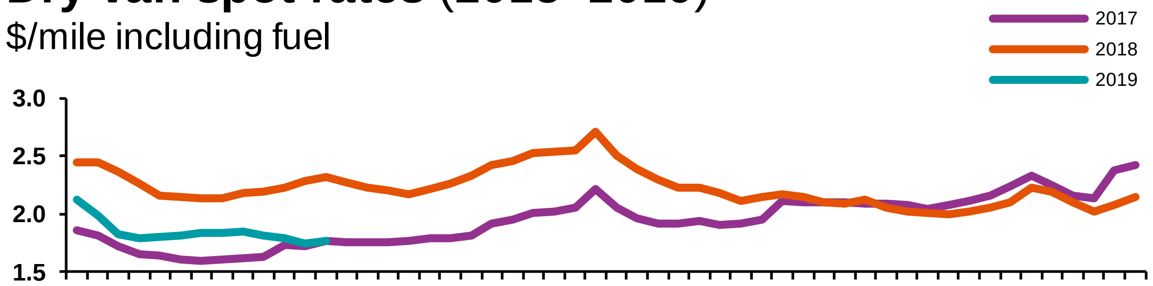
Truck tonnage

Seasonally adjusted monthly values (2015 [index year] = 100)



Dry van spot rates (2018–2019)

$/mile including fuel



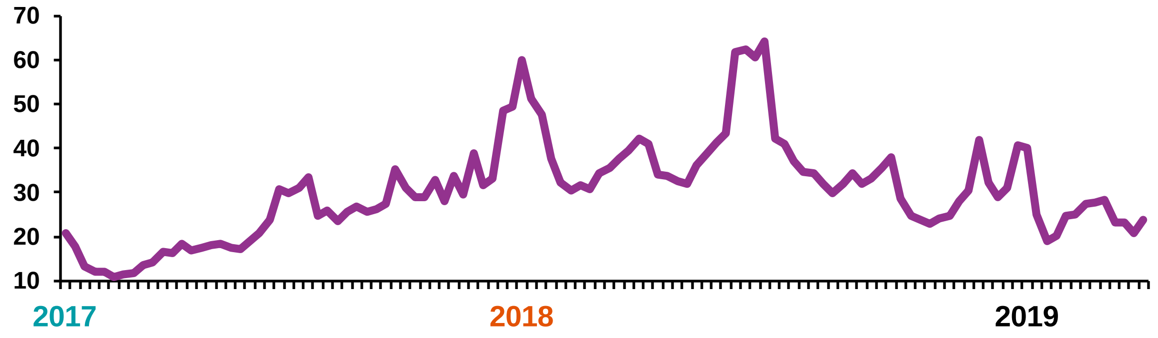
- Truck tonnage continued its upward trend in 2018 with a slight dip in December.
- After a mid-2018 peak, freight rates marched steadily back to “normal” levels, with more capacity available in 2019 against softer demand.
- Carriers found that the challenge of keeping drivers is a structural problem: a generational change in the labor pool combined with competition from well-paying jobs such as working at e-commerce fulfillment centers.
- A variety of tactics were deployed by shippers to soften the blow, including dedicated models, operational improvements, freight efficiency initiatives, and shipper of choice programs.
- The take: carrier profits spiked, shipper budgets blown.

Sources: Bureau of Transportation statistics, A.T. Kearney Analysis

Motor Carriers

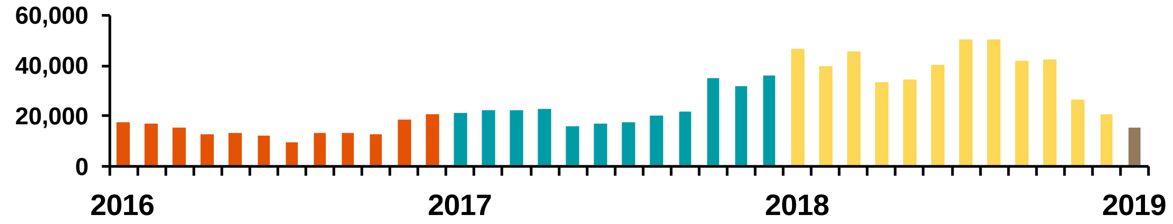
Spiking demand, tight capacity, and high rates replenished carrier coffers for investment

Dry van load-to-truck ratio (2017—2019)



Class 8 orders

Net orders (in thousands)



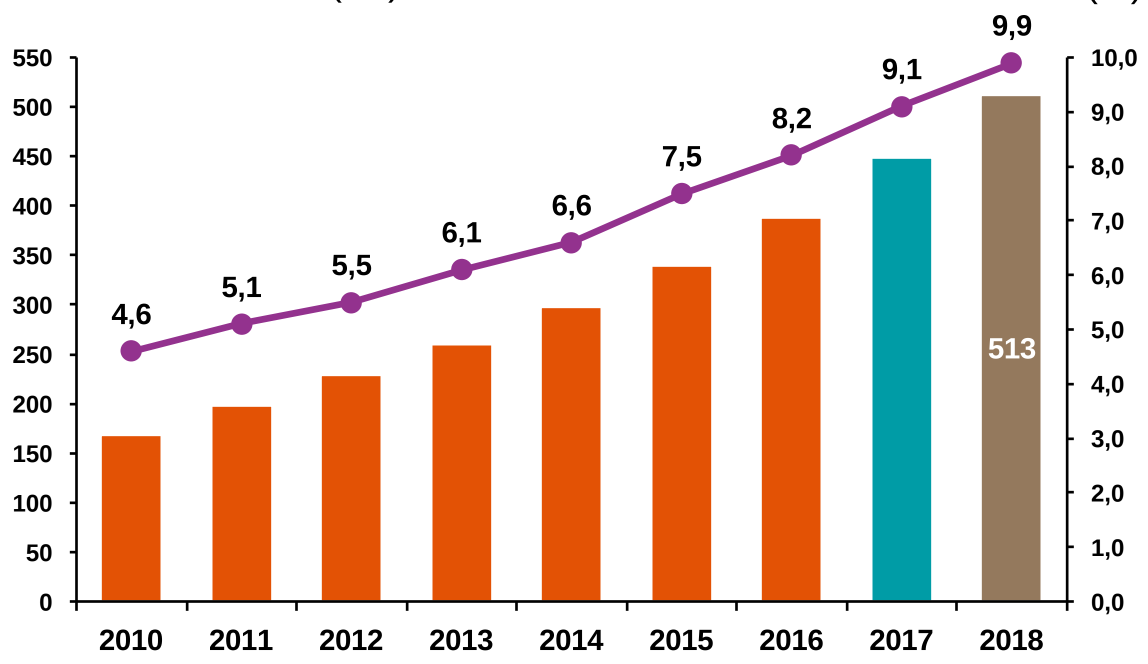
- The load-to-truck ratio was elevated in 2018, peaking in June 2018 and dropping down to 62% of its June peak by March of 2019.
- Oil was expensive, peaking at $81.03 per barrel before dropping to $57.36 in Q4.
- After reaching a high in Q3 of 2018, net Class 8 truck orders dropped precipitously in the last two months of 2018.
- In this context, carriers saw 2018 driving improvements in profitability (better operating ratios) and productivity (better revenue per truck) that replenished their coffers.
- Carriers are investing in new technology such as in-cab telematics, predictive analytics technology, and near real-time optimization of tractor planning and operation.
- At the crest of this hill, we see both hope and evidence of a better road being taken as leading shippers looking to control logistics costs have leaned more in the direction of constructive engagement and innovation than ever before, and carriers have been pleased with the new collaboration, while themselves opening for novel solutions to transportation challenges

Sources: Truckstop.com, FTR Associates via Bloomberg, North America Monthly Class 8 NET Orders, A.T. Kearney Analysis

Parcel and last mile

Relentless competition - where will the shippers choose to compete?

E-commerce sales are now 9.9% of total retail



- As e-commerce sales hit $513 billion or 9.9% of total retail, parcel expenditures rose 8.7% to $105 billion in 2018. Rising volumes and customer expectations for shorter delivery windows forced a capital-intensive “re-think” of last mile delivery.
- FedEx and UPS re-thought their ties with Amazon as they continued to raise base rates by about 5% and more than 10% for surcharges.
- Expectations for same-day (or shorter) will continue to grow with a 5-year CAGR of 19.5%; it is now a greater than $5B market.
- In a world of compressing delivery windows, “freight recovery” models continue to evolve into item baskets and membership models.
- Amazon is training customers to expect ever-faster deliveries—and training its competitors to chase those expectations.
- Amazon enters fright brokerage, raises Prime shipping to same-day, expands in assets, and acquires non-vessel-operating common carrier license.
- The chase sparks a furious last-mile innovation pace, partnerships, and technology advances.

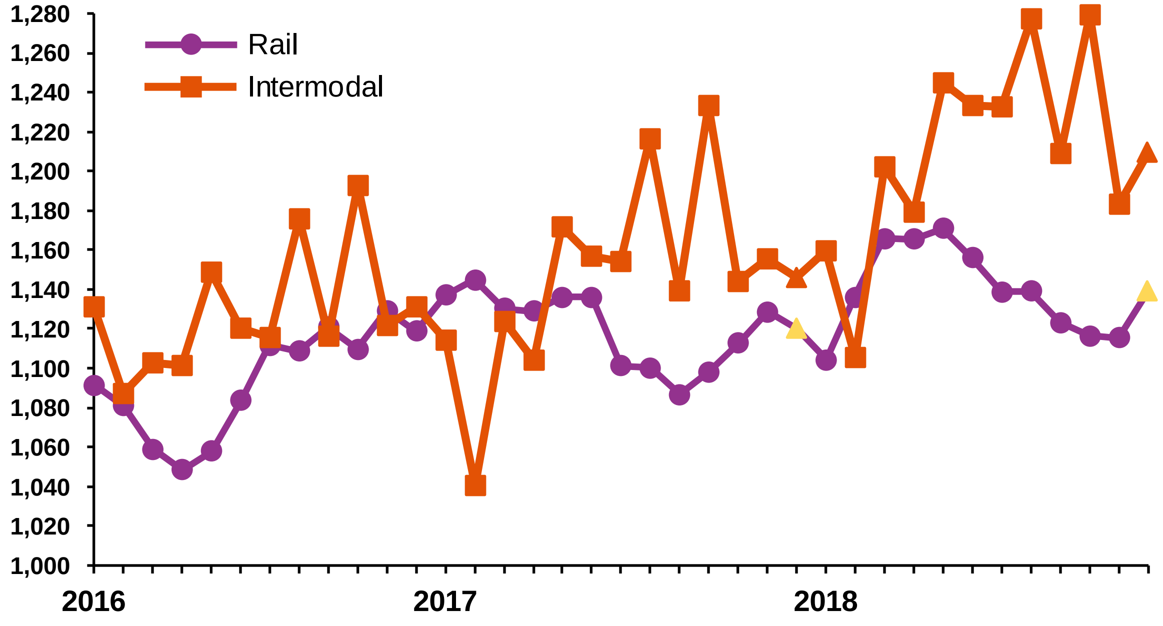
Sources: US Census Bureau Quarterly E-Commerce Report ,A.T. Kearney Analysis

Rail

On track—for now

Rail and intermodal US class I Rail Traffic

Thousand carloads



- Rail and intermodal expenditures rose 12.9%, with intermodal leading the way.
- Precision railroading is driving profits for the railroads, which are using a disciplined approach to asset and labor productivity. But the process has caused shippers to experience localized service failures and extended transit times.
- Railroads try to retain profitability while improving service to retain long-term customers.
- Class I railroads are improving their operating ratios, however the earliest adopters are outperforming.
- Railroads have significantly outperformed the S&P 500 since 2016 as they have implemented precision railroading.
- Major shifts in coal volume are unlikely in the short term, unless energy generation policy changes.
- In the long term (15+ years), we expect rail and intermodal challenged by OTR innovation (full digitization, autonomy, electrification), making trucking more competitive and pushing rail conversion thresholds from 500 to 2000+ miles.

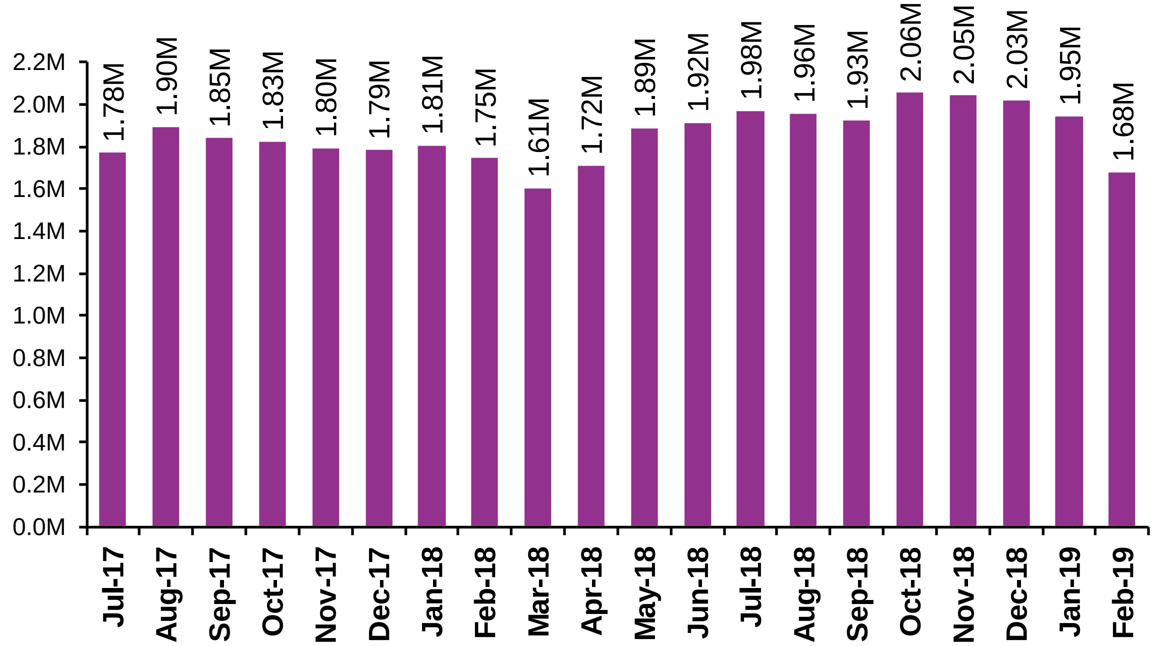
Sources: Association of American Railroads; A.T. Kearney analysis

Water and ports

After a great year, turmoil is coming from IMO 2020 sulfur regulations

Monthly inbound container traffic 2017—2019

TEU – (millions)

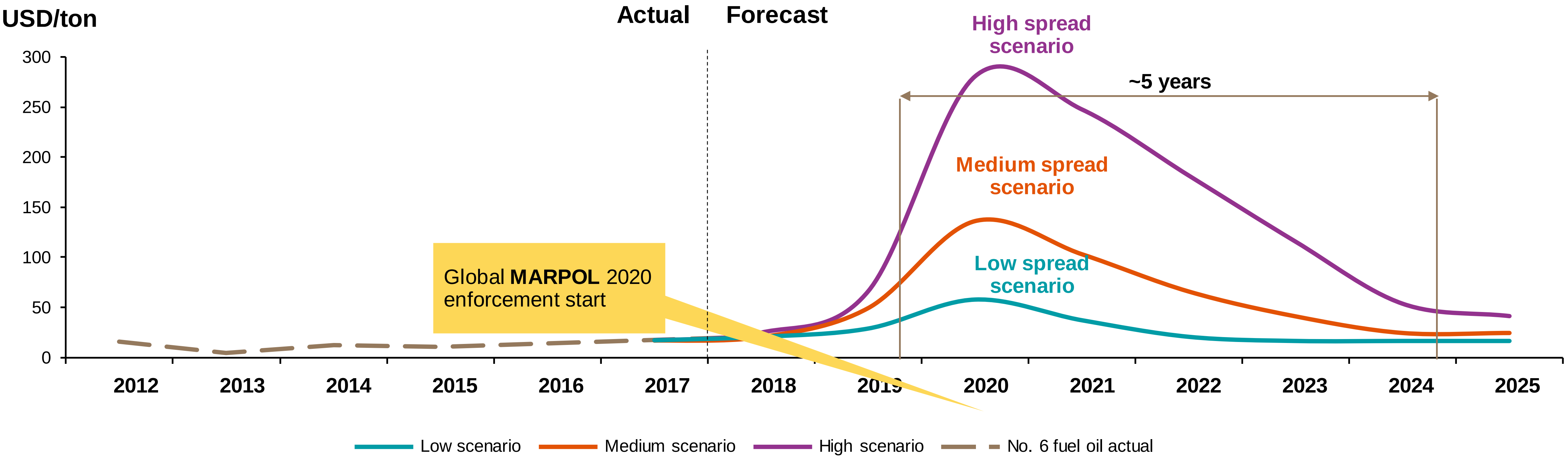


- Water expenditures rose 12.8% in 2018.
- Transpacific carriers were among the chief beneficiaries of US-China trade tensions—their expanded 2018 peak season saw some rates double as Q4 saw an extraordinary 13 percent spike in imports over the previous year. Rates will likely settle this year, at levels higher than last year.
- Carriers were more disciplined in resisting price wars and deploying capacity: while global capacity grew at 5.7 percent—outpacing 4.4 percent demand growth—rates were at times the highest they have been over the past three years.
- There were long delays as imports hit US ports to avoid tariffs for January 2019 with demand soft in early 2019 as most of the cargo was front-loaded due to trade disputes.
- Carriers must gear up for the implementation on January 1, 2020 of the IMO 2020 sulfur regulations, which will require significant capital expenditures or the purchase of expensive low-sulfur fuel.

Note: TEU is twenty-foot equivalent unit.
Sources: port statistics; A.T. Kearney analysis

Tremendous uncertainty surrounding the cost of low-sulfur fuel oil

1% Low Sulfur Fuel Oil (LSFO) and currently used 3.5% Sulfur Fuel Oil[1]—price spread 2012 to 2025



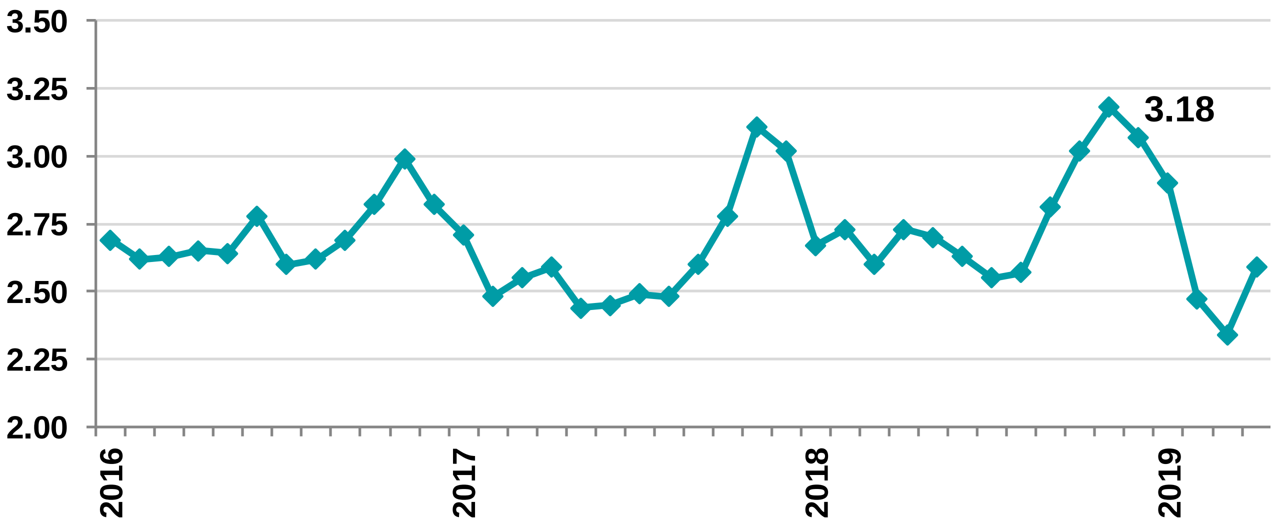
Note: LSFO is a low-sulfur fuel oil & No. 6 Fuel oil (1% vs. 3.5% Sulfur weight percentage)
Sources: Bloomberg; A.T. Kearney Analysis

Air

Soaring on e-commerce and making strides in digitization

Drewry East-West Average Air Freight Rate

($ per Kg)



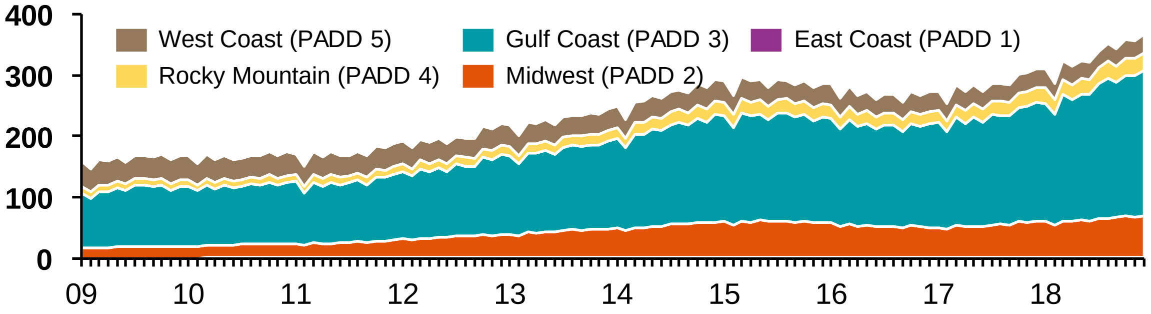
- Air expenditures rose 9.2% in 2018. Freight capacity rose by 5.4 percent in 2018, outpacing demand growth, resulting in a fall in load factors. Despite this, carrier rate discipline saw air freight rates increasing in 2018, jumping about 5 percent year over year in the East-West lanes and peaking at $3.18 in November.
- Despite near-term weakness, e-commerce—and consumer demands for quick delivery—continue to fuel a longer-term positive outlook for air freight.
- The past year saw strides made in digitization, including Internet of Things tracking and visibility, automation of back office and freight services, and other specialized applications such as blockchain. For example, carriers of high-value cargo requiring special handling are expanding real-time smart sensor technologies to track and monitor shipments.
- Additionally, online freight exchanges offer shippers unprecedented transparency into rates while carriers are now starting to price dynamically.

Note: Weighted average of all-in air freight buy rates paid by forwarders to airlines for standard deferred airport-to-airport air freight services on 21 major East-West routes. Rates are expressed in $/kg and include three components: the base rate, the fuel surcharge, and the security surcharge.
Sources: Drewry; A.T. Kearney analysis

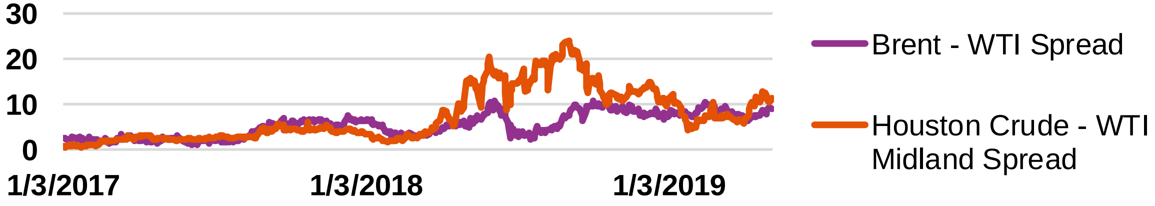
Pipeline

Catching up

Crude oil production (thousand barrels/bn)



Crude oil price spread: Houston crude oil (export market) – WTI Midland (production basin)



- Strong growth continued in oil and gas production.
- US became a net exporter of natural gas despite strong domestic demand growth powered by natural gas-based electricity production.
- Oil exports continued their dramatic growth since lifting of the oil export ban
- The production growth was largely concentrated in the Permian basin for oil and the Marcellus for natural gas.
- Dramatic production increases led to pipeline capacity constraints (driving crude price spreads higher) that were partially relieved by significant capacity additions in 2018; additional projects are expected to be completed in 2019.
- Private equity interest in the pipeline sector continued to remain strong with 2018 investments surpassing the record levels of the prior year.

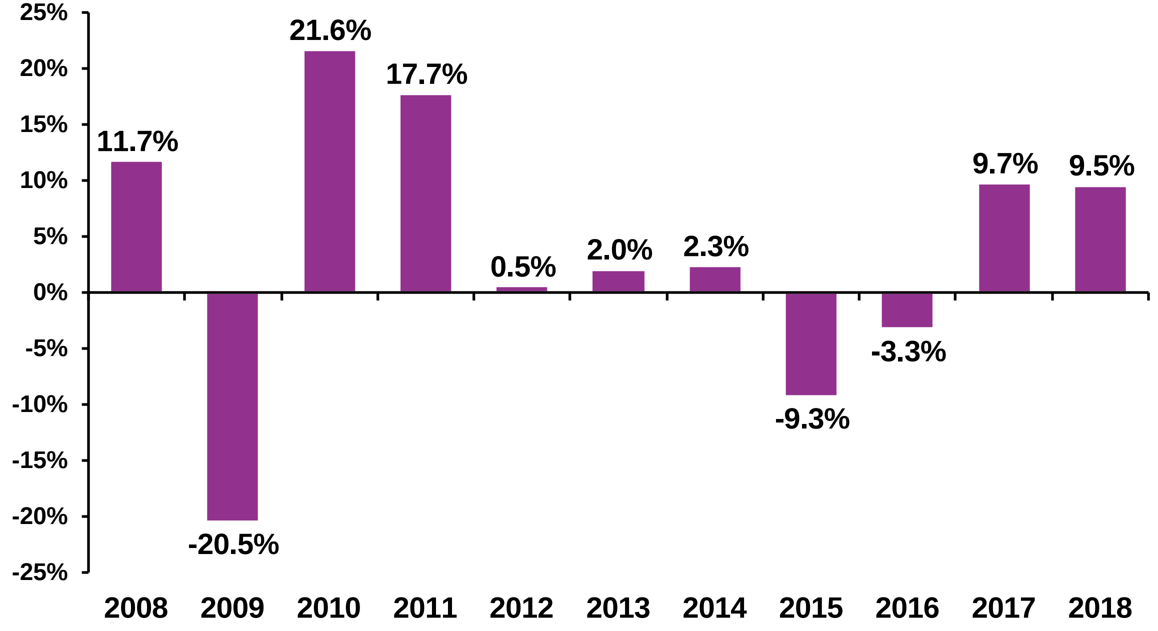
Notes: PADD is petroleum administration for defense districts.
Source: Energy Information Administration; A.T. Kearney Analysis

Freight forwarding

Customer service is crucial

Global trade growth

(Year-over-year, in USD, 2008–2018)



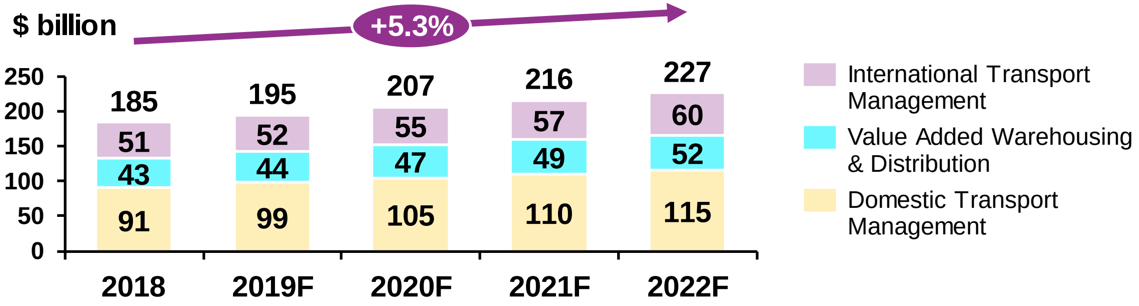
- Global trade grows 9%+ for second consecutive year.
- Freight forwarders' focus on customer services and needs will be pivotal to their endurance and continued profitability even thought they are the most profitable industry in the world.
- The trade-war scramble benefited forwarders: Panalpina, DSV, DHL, and Agility all reported high single-digit revenue growth with double-digit jumps in profits. US-based Expeditors had a strong year with profitable growth in ocean and air volumes—net revenue grew 13 percent and operating profit rose 14 percent.
- After initially rebuffing DSV and other suitors, Panalpina agreed to a $4.6bn bid from DSV who has developed a reputation for deals following its $1.35bn acquisition of UTi Worldwide in 2016.
- Will escalating trade tensions leave a mark on their fortunes? Or, as they did last year will they be able to use their global reach and relationships to help shippers re-align their supply chains?

Sources: gKNi (Global Kuehne + Nagel Indicators), operated by LogIndex AG; A.T. Kearney Analysis

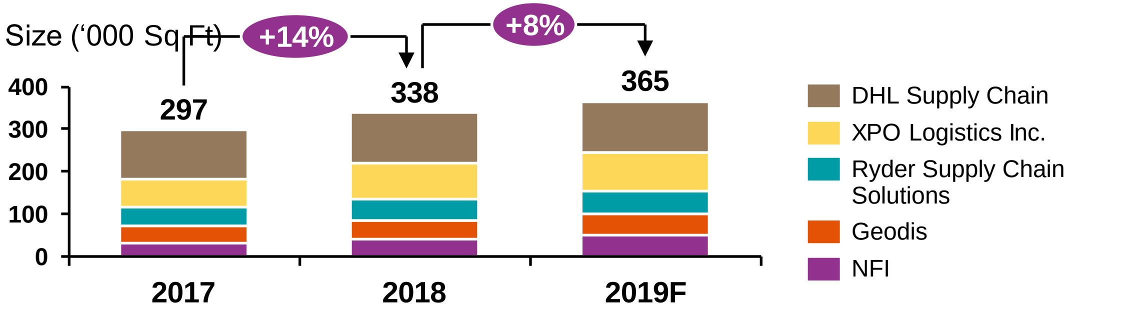
3PL

Increasingly strategic role

US 3PL revenue



Warehouse Footprint of Top 3PLs



- 3PL market is expected to grow 5.3% annually between 2018 and 2022.
- The 3PL warehousing footprint expanded by 14%.
- Management of speed, costs, and transparency involved in value-added warehousing and last-mile deliveries is becoming a necessity for 3PLs to survive the competition.
- Technology enablement is a competitive necessity and key differentiator for market leaders, with some companies doing this organically through in-house pilots while others take the inorganic approach of acquisitions.
- Three factors continue to weigh down 3PL-shipper relationships to tactical levels: trust in 3PL capabilities to manage core operational activities, temptation to switch partners for short-term monetary benefits, and concern of becoming a guinea pig in trials of technologies and capabilities that are unproven.

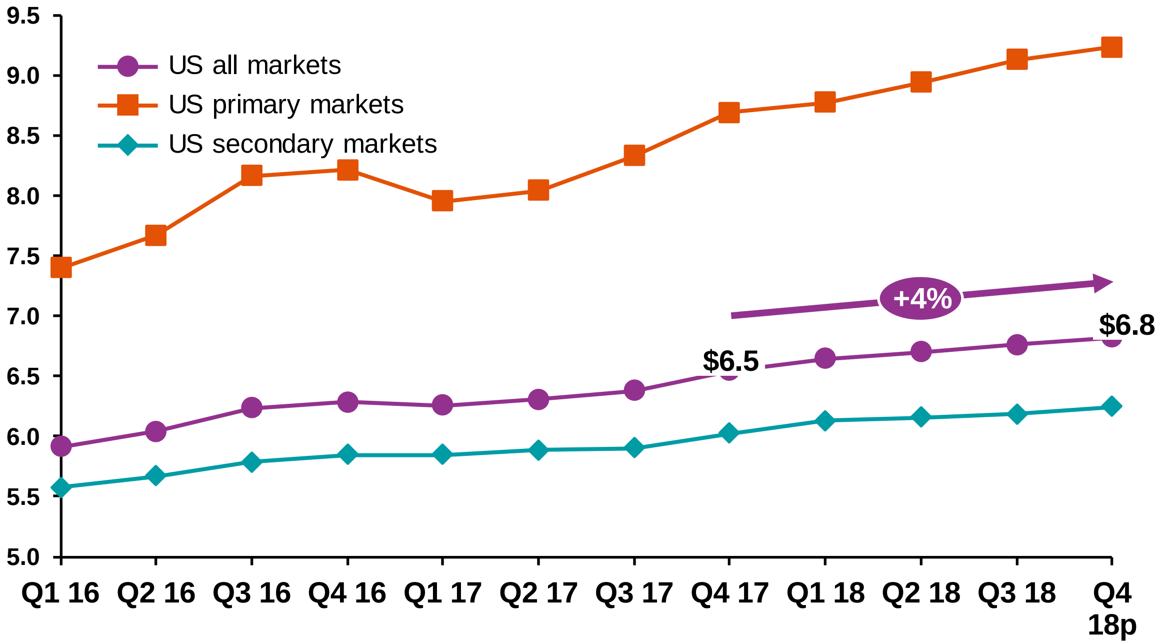
Note: 3PL is third-party logistics provider.
Sources: Armstrong & Associates, Source: https://www.ttnews.com/top50/warehousing; A.T. Kearney Analysis

Warehousing

Go big and go small

Warehouse rents

$/MSF

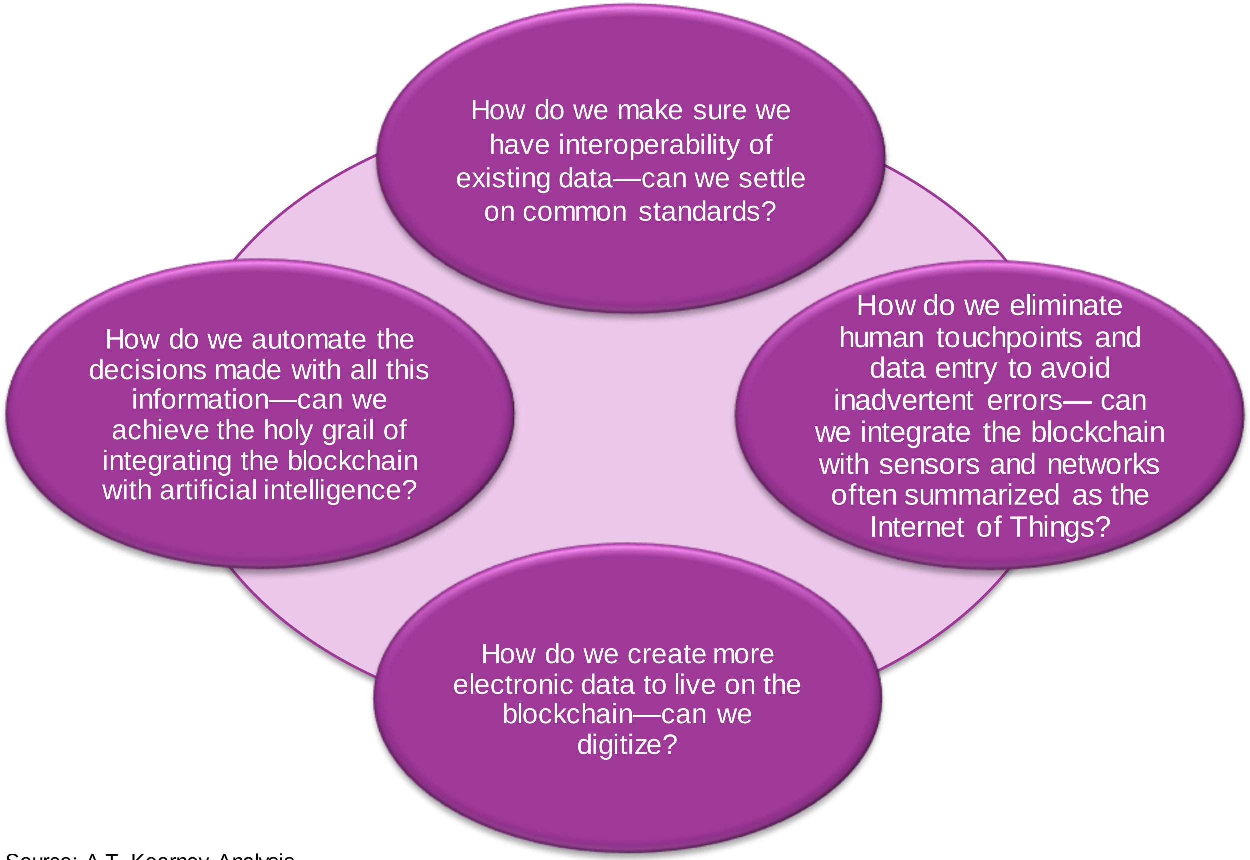


- Warehouse rent growth slowed but continued to extend the upward trend - rents increased at about 4%, albeit at a slower rate than in the past six years.
- Industrial vacancy rate continued to be at all time low - all eyes are on leasing activity.
- Development pipeline remained robust - speculatively built properties continued to dominate as a majority of all deliveries.
- Leasing activity trended toward smaller transactions and ecommerce continued to reshape the industrial sector.
- Traditional retailers made up nearly 13.6% of total U.S. leasing, followed by 3PLs.
- Warehousing automation is increasingly being driven by the need to overcome labor force scarcity, flexibility and speed to adapt to new consumer requirements, in addition to the traditional drivers such as operational cost and service level improvements.

Sources: Cushman & Wakefield; A.T. Kearney Analysis

Blockchain

Beyond the hype



- Relentless hype obscures what it promises.
- The value of blockchain can only be realized with a robust network of companies that are willing and able to adopt a joint solution.
- Today's hype is sometimes unrealistic concerning the problems that blockchain can solve.
- The big hurdle is not technology but participation—and clearing that hurdle requires ensuring the confidentiality of member data to minimize risks and incentivize enrollment.

Source: A.T. Kearney Analysis

5G

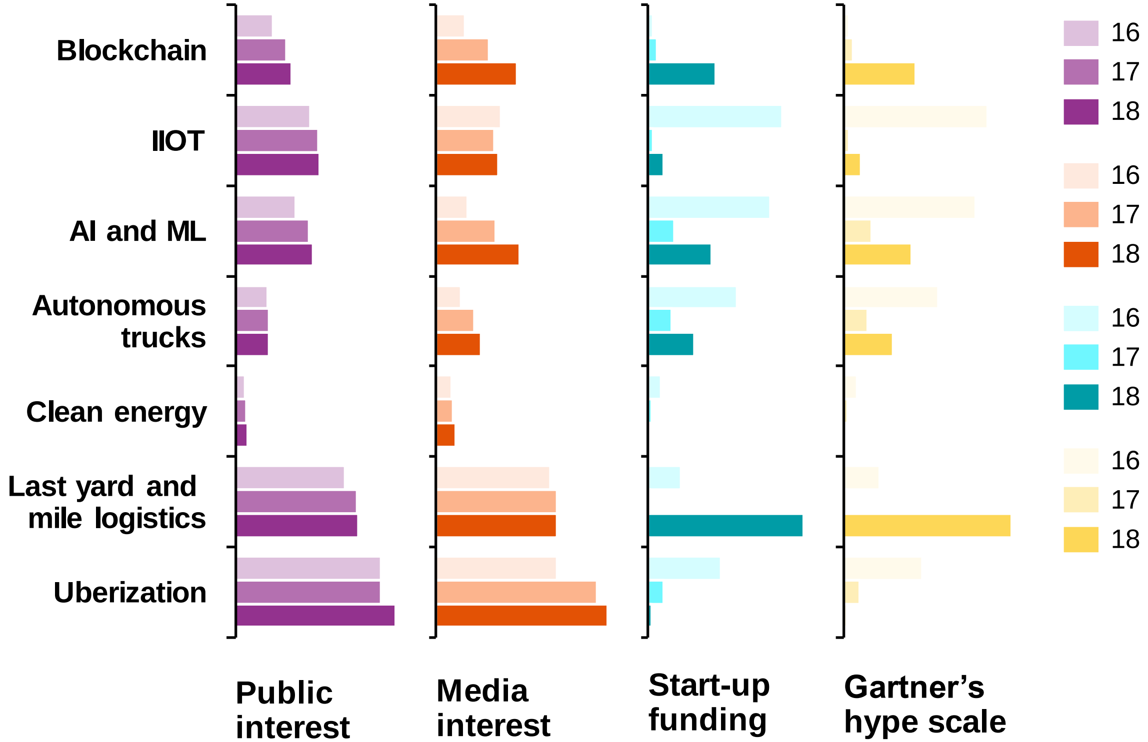
Setting the standard for logistics of the future

	Near-term (0-3 years)			**Long term** (3+ years)		
	5G will reduce cost of operations and increase visibility for all stakeholders across the supply chain, driven by huge improvements in transfer speeds, latency, and device density			5G's increased networking capabilities will enable massive IoT, robotics, AI tools, and real-time tracking, thereby transforming fundamental business economics to generate higher margins		
1 Operations execution	Visor or helmet computer AR	Augmented driver dashboards	Real-time vehicle video surveillance	Autonomous driving & responsive structures	Drone delivery for last mile	Unassisted, cloud robotics DCs
2 Planning and management	Multi-angle, hi-res video stream	Large sensors network	Remote quality inspection	Smart equipment and wearables	Predictive maintenance and real-time alerts	AI-unassisted supply chain management
3 Additional services	High-security supply chain encryption	Cloud-based tracking and intelligence	Advanced metering infrastructure (AMI)	Goods tracking across supply chain	Highly-customized logistics services	Reduced energy sensors

Note: 3PL is third-party logistics provider.
Sources: Armstrong & Associates, Source: https://www.ttnews.com/top50/warehousing; A.T. Kearney Analysis

Trends and outlook

Sustenance requires innovation



- Trade tensions are having a profound impact on the industry with the inventory pull-forward of late last-year gaining momentum and redrawing supply chains in the process.
- Players in the industry are being forced to digitally transform and innovate to sustain not least because of the new players from the valley but also because of structural issues like labor shortages.
- Several key technologies are enabling digital transformation in logistics with blockchain and last yard being the hot new developments while "uberization" and autonomous trucking entering phases of maturity in their development.
- eCommerce growth continues and with it Amazon is making bigger bets in the logistics industry across multiple modes.
- Trucking technology is rapidly evolving and Tesla's Semi is showing promise, with fleet owners targeted to be early adopters but they will need a robust recharging infrastructure in place to venture far.
- Threat of global trade tensions casts a fog of uncertainty.

Sources: Google Trends, Pitchbook, and Gartner; A.T. Kearney Analysis

Trends and outlook

Technology use case adoption and implications for logistics

Technological enablers	Planning	Operations	Assets	Warehousing	Business Model
AI and ML	• Routing • Load-matching • Booking	• Exception handling • Automated gates	• Predictive maintenance • Autonomous trucking	• Inventory positioning • Forecasting	• Crowdsourcing • On-demand • Sharing economy • Last mile/yard
IoT and 5G		• Asset tracking • Cargo provenance monitoring	• Predictive maintenance • Autonomous trucking	• Track and trace	• Crowdsourcing • On-demand • Sharing economy • Last mile/yard
AR and VR		• Training • Maintenance		• Picking	
Robotics			• Drones • Sidewalk robots	• Drones • Automated guided vehicles	
Blockchain		• Document management • Traceability			
Renewable energy			• Electric trucks • Hydrogen trucks	• Carbon neutral warehouses	

Sources: A.T. Kearney Analysis