State of Logistics Report 2018

CSCMP Steep Grade Ahead

CSCMP Roundtables
Feb 11, 2019 St. Louis
Feb 13, 2019 Houston

Korhan Acar
A.T. Kearney
A successful collaboration…
A proven approach for the report...

I Focused economic analysis

II Interviews with logistics industry leaders

III Logistics industry context and point of view

IV Trends and deep dives: global trends, technology, regulation
A transparent and consistent estimate of US Business Logistics Costs

<table>
<thead>
<tr>
<th>$billion</th>
<th>2017</th>
<th>YoY</th>
<th>5-yr. CAGR</th>
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</thead>
<tbody>
<tr>
<td>Transportation costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Full truckload</td>
<td>289.4</td>
<td>6.4%</td>
<td>4.8%</td>
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<td>• Less-than-truckload</td>
<td>62.4</td>
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<td>59.0</td>
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<td>• Intermodal</td>
<td>21.4</td>
<td>10.7%</td>
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<tr>
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<td>80.5</td>
<td>8.2%</td>
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<tr>
<td>• Airfreight (includes domestic, import, export, cargo, and express)</td>
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<td>• Water (includes domestic, import, and export)</td>
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<td>• Pipeline</td>
<td>36.4</td>
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<tr>
<td>Subtotal</td>
<td>965.5</td>
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<tr>
<td>Inventory carrying costs</td>
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<td></td>
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<tr>
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US Business Logistics Costs (USBLC) increased by 6.2% to ~ $1.5 trillion

USBLC as percent of nominal GDP

- 2008: 8.5%
- 2009: 7.4%
- 2010: 7.5%
- 2011: 7.9%
- 2012: 7.9%
- 2013: 7.9%
- 2014: 8.0%
- 2015: 7.9%
- 2016: 7.6%
- 2017: 7.7%

-3.2% 5 Year CAGR

14 bp YoY
2016’s expenditure declines in 9 segments turned into increases for all 16 segments in 2017

- Intermodal and private/dedicated fleets had highest jumps
- Parcel increased 7% in 2017, following a strong 10% in 2016
- Water and airfreight saw relatively modest increases
- Inventory costs rose 4.6% in 2017 vs a -3.2% decline in 2016 led by higher inventory and financing costs
- Other costs increased 4.9% in 2017 from a -2.0% decline in 2016 led by administrative costs

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Macroeconomics: Robust in near term

US economic growth rates to hover around 2.5%

Real US GDP growth

- At 3.2% the global economy continued to register modest growth, while the US economy grew by 2.3% in 2017
- In 2018, unemployment rate was 49 year low at 3.7%
- Consumer confidence near 5 year high in late 2018, followed by declines in December and January
- Consumer sentiment drops 7% in Jan 2019, lowest level during Trump administration
- Oil prices hovered around $50 per barrel in 2017, peaked to $80 in 2018 now around $60
- Fed monetary policy continues to seek to balance growth and inflation risk
- Some mixed signals in Dec/Jan but could be due to stock market noise late 2018
Consumer spending, the main driver of logistics activity, grew ~4% in 2017 and 2018.

Inflation remains within Fed targets, 1.79% in Jan 2019, should be in close watch after historical lows in unemployment.
Inventory levels and productivity continue to improve at the same time

Total US private inventories

$ billion

Inventory to Sales Ratio

Note: Total US private inventories includes manufacturing, retail, and wholesale and represents stock or goods available for sale. Annual numbers are the yearly average.
Source: Bureau of Economic Analysis
Motor carriers: Truck tonnage continues 2018 in uptrend

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

Source: Bureau of Transportation Statistics
After a 30% increase in 2017 spot market started to ease mid 2018

Dry van spot market rates by week

<table>
<thead>
<tr>
<th>Week</th>
<th>2018 Prices</th>
<th>2019 Prices</th>
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<tbody>
<tr>
<td>1</td>
<td>$3.00</td>
<td>$2.75</td>
</tr>
<tr>
<td>4</td>
<td>$2.75</td>
<td>$2.50</td>
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<tr>
<td>7</td>
<td>$2.50</td>
<td>$2.25</td>
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<tr>
<td>10</td>
<td>$2.25</td>
<td>$2.00</td>
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<tr>
<td>13</td>
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<tr>
<td>16</td>
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<td>22</td>
<td>$1.25</td>
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<td>25</td>
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<td>28</td>
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<td>31</td>
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<tr>
<td>34</td>
<td>$0.25</td>
<td>$0.00</td>
</tr>
</tbody>
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- Prices started 2019 ~9% below 2018
- After 2018 August prices started to come down 2x steeper than expected
- In 2017 prices climbed and carriers largely responded by purging their least profitable customers and ordering record numbers of new assets
- Variety of tactics deployed to soften the blow: researching dedicated models, operational improvements and freight efficiency initiatives
- CASS and Morgan Stanley Indexes tell similar stories of softening

Source: Truckstop.com

Van, Flatbed, Reefer (last 4 weeks)

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<tr>
<th>Week</th>
<th>2018 Prices</th>
<th>2019 Prices</th>
</tr>
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<tbody>
<tr>
<td>1/12</td>
<td>$2.00</td>
<td>$1.75</td>
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<tr>
<td>1/19</td>
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<td>1/26</td>
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<td>2/02</td>
<td>$1.25</td>
<td>$1.00</td>
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<tr>
<td>2/09</td>
<td>$1.00</td>
<td>$0.75</td>
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<tr>
<td>2/16</td>
<td>$0.75</td>
<td>$0.50</td>
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<td>2/23</td>
<td>$0.50</td>
<td>$0.25</td>
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<tr>
<td>3/01</td>
<td>$0.25</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

Source: DAT.com
Oil Continued 2018 in uptrend then fell from a peak of $81

Brent Oil ($/barrel)

Source: Bureau of Transportation Statistics, EIA Energy Information Administration
Contract rates caught up with trend in Q4

Spot rates excluding fuel down 23% in Q3 (truckstop.com)

Contract rates started to decline in Q4 (dat.com)
Class 8 orders hit record highs in 2018 and dropped to 2016 levels in 2019

Class 8 orders
Net Orders (in 1000s)

Source: FTR Associates via Bloomberg, North America Monthly Class 8 NET Orders
Parcel: e-commerce growth drives growth

E-commerce grew ~15% to reach ~$516 billion in 2018, 9.6% of Total Retail

- Parcel expenditures rose 7% to almost $100 billion in 2017
- Rising volumes and customer expectations force a capital-intensive “re-think” of last mile supply chain
- Carriers have room to raise prices while markets are figuring out who will bear investment burdens
- Same day/shorter expectation will continue to grow, increasing inventories
- Parcel cost headwinds may impede e-commerce strategies, particularly in cost-sensitive segments
Consumer trends and evolving needs require new logistics’ capabilities

**Consumer Direct**
- Shippers developing B2C capabilities
- Partnerships with Parcel Carriers

**Assortment Explosion**
- Fragmented Flows (Online only vs. in-store SKUs)
- Creative inventory deployment strategies

**Fast and Free Delivery**
- Emergence of crowdsourced and local asset based delivery
- Real time tracking and dynamic routing

**Personalization and Local**
- Shorter supply chains
- Retailers exploring dedicated or private final mile fleets

**Expanded Role of Stores**
- Sharing of assets between B2B, e-commerce, stores
- Pressure on DSD model

**Long-haul and Dedicated fleet**
- Expedited deliveries to retailers (stock-outs)
- Real time tracking and dynamic routing of in transit shipments
- Point of sale visibility to inventory to aid just in time replenishment
- Reverse logistics services
- Routing and asset optimization for dedicated fleet
- Value added services such a scheduling, sourcing and payments processing
- Direct store delivery execution

**International**
- International point-to-point service and visibility
- Customs clearance special operations

**Last Mile**
- Home delivery (cost, reach, service)
- Service to remote areas
- Real time tracking
- Routing and asset optimization

Source: A.T. Kearney
Cost to the rail operators increased 1-2% in 2018

Significant uptick seen in rail volume primarily driven by intermodal

Operating ratios continued to decline as railroads cut headcount, optimized asset utilization and rolling stock inventory, and increased train speeds and lengths

Increased demand and precision railroading triggered a rise in complaints in 2017

Rail and intermodal will continue to grow in the short-medium term due to industrial and agricultural output, but long-term concerns exist given the decline in coal production

Major shifts in coal volume unlikely in the short term, unless energy generation policy changes

In the short term we expect an estimated 4 - 6% increase in the rates over Jan 2018

In the long term, we expect rail/intermodal challenged by OTR innovation making trucking more competitive
Water and ports: a stormy year

Drewry World Container Index ($/40ft)

- Robust global economy will continue to create demand for Ocean
- Low Sulfur IMO 2020 regulations will start impacting prices early 2019, impacts estimated ~30% on BAF and 8-10% on net rates
- Long delays as imports hit US ports to avoid tariffs for Jan 2019. The demand could be soft early 2019 as most of the cargo was front-loaded due to trade wars

Note: TEU is twenty-foot equivalent unit.
Sources: port statistics, A.T. Kearney analysis
Airfreight: Need for speed drove volumes and prices up in 2017

**Drewry East-West Average rate**

- $ per kilo

- Air freight volumes rose 9% in 2017 due to surging demand for ultra-fast shipments while the prices rose 4%
- 3.5% drop on December 2018
- Rates are expected to continue to decrease in January 2019

Note: Index shows average of all-in airfreight buy rates paid by forwarders to airlines for standard deferred airport-to-airport airfreight services. Source: Drewry's Sea & Air Shipper Insight
Warehousing: innovate or die

Rental rates rose 4% nationally in 2017 and 5% in 2018

Weighted Average Asking Rent $ PSF

- Pop-up warehouses are back by popular demand
- Warehouse efficiency becomes paramount for companies striving to meet ever-shrinking e-commerce delivery lead times
- Autonomous mobile robots (AMRs) are popular again, to address rising pressure to improve worker productivity
- Robotic-centric solutions are easier to set up and use; and are faster, smarter, cheaper
- Overall vacancy dropped to 4.8%, well below 5 yr avg. of 6%

Third-party (3PL) Logistics: Efficiency pressures intensify

The US 3PL is poised for 5.5% growth after 2016 acquisitions

- Market is expected to grow 5.5% between 2017-19
- Shipper-3PL interactions continue to focus on short term cost-cutting, while mutual mistrust prevents them from forging long-term strategic partnerships
- Technologies underpinning the Fourth Industrial Revolution hold the key to enable such partnerships
- As shippers trying to get more efficient, they are intensifying pressure on 3PLs

Source: Armstrong & Associates
Trends: Technology is promising yet it will be a long term solution

Technology offerings to battle capacity issues and rising costs

Innovation Grid: a Ten-Year Outlook

<table>
<thead>
<tr>
<th>Impact</th>
<th>0 Years</th>
<th>5 Years</th>
<th>10+ Years</th>
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<tr>
<td>High</td>
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<tr>
<td>Medium</td>
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<tr>
<td>Low</td>
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**Near – Mid Term Technology Solutions**
- Artificial Intelligence
- Autonomous Mobile Robots
- Autonomous Vehicles
- Blockchain
- “Uberization” of Freight

**Near Term Factors**
- Investments in crumbling infrastructure
- Global trade wars
- Regulations
- Driver supply

Note: IoT is Internet of Things, UAV is Unmanned Aerial Vehicle, OTA is Over-The-Air. Source: A.T. Kearney Analysis
Supply chains must sense and pivot

Eliminate Waste

Improve communication between Shipper, Carrier and Customer (Integrated Planning)

Reinvent or Die

**Sensing:** Ability to anticipate with better accuracy, broader field of vision and longer lead time

**Pivoting:** The ability to make decisions, rewire processes and assets to respond to unanticipated events
For any questions please reach out:

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korhan.acar@atkearney.com
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Appendix:

Technology Impact

Shipper, LSP and Customer Collaboration

Trends Impacting Short and Long Term
Technology impacts the OTR cost structure by increasing near term rate while making long term dependent on shippers participation.

Factors expected to contribute to the cost reduction:
- Digitization: 15-20%
- Electrification: 10-15%
- Autonomous: 15-25%
- Potential: 40-60%

Cost to the carriers is expected to continue to increase in the near term.

Capacity utilization is the highest in the last five years.

In the short term we expect an estimated 4 - 8% increase in contracted rates.

In the long term, we expect operating cost of the carriers to be 40 – 60% lower driven by technology and digital forces.

Truck driver availability and retention is constrained with 80%+ driver turnover.

Truck Driver Shortage

- Optimistic outlook for US economy drives up spending and demand for goods, increasing Freight demand
- Capacity remains tight as truck orders driver hiring trail demand growth
- Annual price inflation to continue in freight—both contract and spot

Load to truck ratio\(^{15}\) highest in 5 years

5 Year Range

- 2016
- 2017
- 2018

Optimistic outlook for US economy drives up spending and demand for goods, increasing Freight demand.

Capacity remains tight as truck orders driver hiring trail demand growth.

Annual price inflation to continue in freight—both contract and spot.

50% 52% 83% 98% 96% 95% 93% 81%
8% 9% 8% 9% 10% 10% 11% 9%

Source: A.T. Kearney
A short term call to action would be to examine logistic capability for opportunities internally, with LSPs and customers.
A short term call to action would be to consider relevant levers and their application to mitigate the transportation headwinds.

Source: A.T. Kearney
Rapid and accelerated technology innovation can transform logistics’ assets and cost structure (1/2)

**The Sharing Economy**

**What?**
- Shared logistics platforms can significantly reduce systemwide unused capacity

**How?**
- Mindset shift from single ownership to shared and multi-ownership models
- Automatic Freight Matching and Digital Freight Boards
- Variable use models / Truck-as- a Service
- Asset and Network Sharing
- Driver Relay Models

**Benefits**
- To shippers: Hassle free tenders, Larger base at hand, Real-time updates, Price transparency
- To carriers: Seamless billing, Fewer deadheads, Better utilization, Instant payments

**IoT and Big Data**

**What?**
- Digitization and Telematics can reduce the total cost of ownership of a truck by 10-20% through efficiency improvements

**How?**
- OTR17
  - Remote M&R diagnostics
  - Behavior monitoring
  - Compliance systems
  - Platooning
  - Usage based insurance
  - Predictive cruise control
  - Brake usage monitoring

**Rail**
- Digital terminal network management
- Predictive maintenance
- Dynamic locomotive power mgmt.
- Visualization based monitoring
- Self-Diagnosing assets
- Collaborative interchange management

**Developing IoT, ML, AI Use Cases**

**What?**
- Electric drive train technology can reduce trucking costs by 10-15%

**How?**
- Comparably lower fuel prices reduces incentives in the short run, but energy dependence, environment concerns and regional regulations are pushing R&D focus

**Benefits**
- Reduced dependence on fossil fuels
- Reduced maintenance
- Night time driving in sound and emission sensitive urban areas

**Challenges**
- Vast recharging infrastructure is required
- Steep investment; reaching scale essential for economics to work

**Adoption and Applications**
- Significant startup and venture capital interest in this space

Source: A.T. Kearney
Rapid and accelerated technology innovation can transform logistics’ assets and cost structure (2/2)

**Autonomous Driving**

Potential to address substantial portion of labor costs which range from 10-50% of freight costs in OTR and Rail

**Blockchain and Physical Internet**

Blockchain may give rise to new level of collaborative supply chains with seamless sharing of information

**Underlying Technology**
- Standardized data elements
- Traceable log of all transactions
- Secure foundation in cryptography

**Developing Sample Use Cases**
- International/ cross border transactions
- Real-time information and product tracking
- Payments and invoice processing

**Challenges**
- Regulatory framework across international jurisdictions
- Cyber security, fraud and enforcement concerns
- Impetus for large logistics players to be first movers

**Autonomous Trucking**

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<th>How?</th>
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<td>Long term</td>
</tr>
<tr>
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<td>Driver Assistance</td>
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**Driverless Locomotive in Development**

Autonomous trains under human supervision already in operation on a route operated by an Australia based mining company.

**Origin Supplier/ Mfg.**

**Warehousing**

**Customs Brokerage**

**Drayage/ Inland Trucking**

**Delivery to POS/ Final Mile**

Source: A.T. Kearney