EASTERN PA FREIGHT SUMMIT

Global Logistics Drivers and Implications for Freight Logistics

21-22 June 2018

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PAUL KENT, PHD
Senior Vice President/Global Advisor for Ports and Logistics
Nathan Associates Inc.
pkent@nathaninc.com/+1-703-516-7830

Importance of Ports

- Im**port**ant (English)
- Im**port**ante (Italian, Spanish, Portuguese)
- Im**port**ant (French, Romanian)

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Strategic Drivers Shaping Logistics

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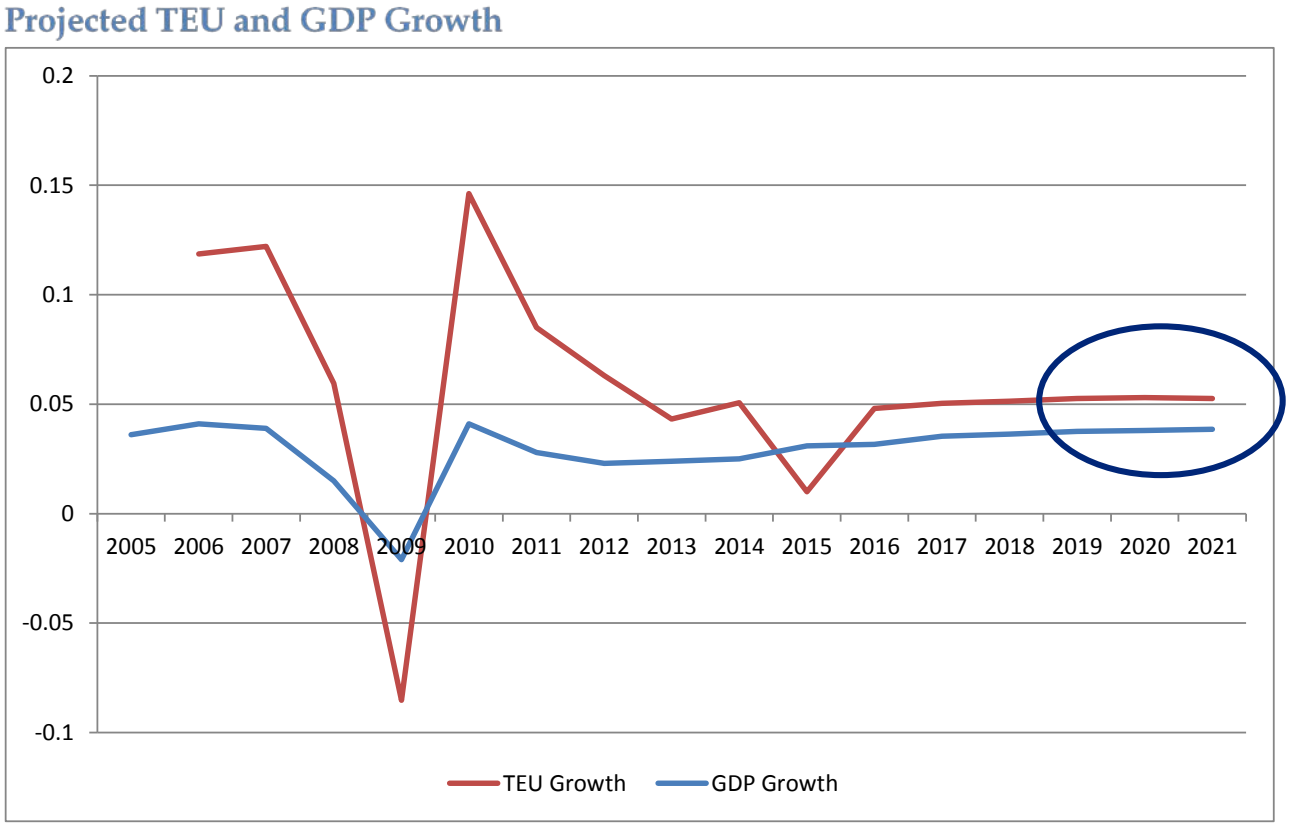
Global Economy and Trade Growth

- Gap between GDP growth and trade growth narrowing
- Excess fleet capacity/liner concentration
- Global urban population growth
- Disruptive technologies



Source: Author's TEU forecast based on OECD Data, GDP Long-Term Forecasts, https://data.oecd.org/gdp/gdp-long-term-forecast.htm#indicator-chart and UNCTADSTAT historic container statistics, available at http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=13321 (note: Container volume represents throughput of 126 countries/territories)

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Liner Consolidation

- New and larger alliances emerging, largely driven by excess capacity
- Of top 20 carriers, only 2 have not joined an alliance, with Maersk recently acquiring Hamburg Sud
- Top 5 carriers control 62% of container trades
  - Increased from 44% just 4 years ago

Year of Formation			
Q4 2009	**Q1 2012**	**Q2 2015**	**Q2 2017**
NWA	G6 Alliance	G6 Alliance	THE Alliance
APL/NOL	APL/NOL	APL/NOL	MOL
MOL	MOL	MOL	K-Line
HMM	HMM	HMM	NYK Line
Grand Alliance IV	Hapaq-Lloyd	Hapaq-Lloyd	Yang Ming
Hapag-Lloyd	NYK Line	NYK Line	Hapag-Lloyd
NYK	OOCL	OOCL	Ocean Alliance
OOCL	CKYH	CKYHE	CMA CGM
CKYH	Hanjin	Hanjin	COSCO CS
Hanjin	K-Line	K-Line	OOCL
K-Line	Yang Ming	Yang Ming	Evergreen
Yang Ming	COSCO	COSCO	2M
COSCO	MSC/CMA CGM	Evergreen	MSC
	MSC	2M	Maersk Line
	CMA CGM	MSC	HMM
		Maersk Line	
		Ocean Three	
		CMA CGM	
		China Shipping	
		UASC	
Top 20 Carriers Not Part of Alliance			
Maersk Line	Maersk Line	PIL, Zim Line	PIL, Zim Line
MSC		Hamburg Sud	Hamburg Sud
CMA CGM		Wan Hai	Wan Hai
Evergreen	Evergreen		

Source: Notteboom, Theo, PortEconomics, Rounds of alliance formation in container shipping, May 2016, revised by Nathan Associates Inc. in accord with recent reports.

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Global Arctic Route? The New Silk Road

- Suez Canal at risk of losing 60% of its trade
- Panama Canal at risk of losing 30% of its trade

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Source: Notteboom, Theo, PortEconomics, Rounds of alliance formation in container shipping, May 2016, revised by Nathan Associates Inc. in accord with recent reports.

Disruptive Technology: 3D Printing

- Most attention given to benefits to manufacturing
  - Reduces raw material input waste associated with subtractive manufacturing
  - Reduces lead time for developing prototypes
  - Customizable
- Shortens supply chains – renewed emphasis on local manufacturing and distribution
- Assuming available 3D printing technologies today, estimated 15% of trade flows can be substituted with 3D printing

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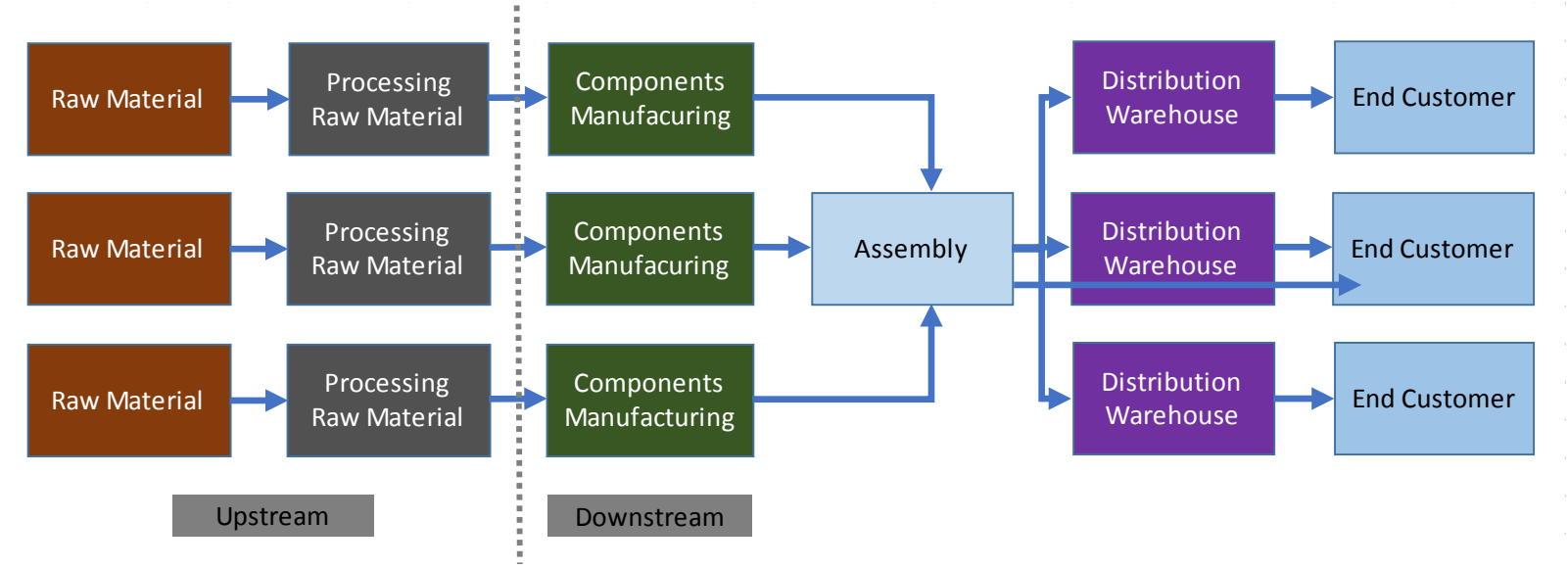
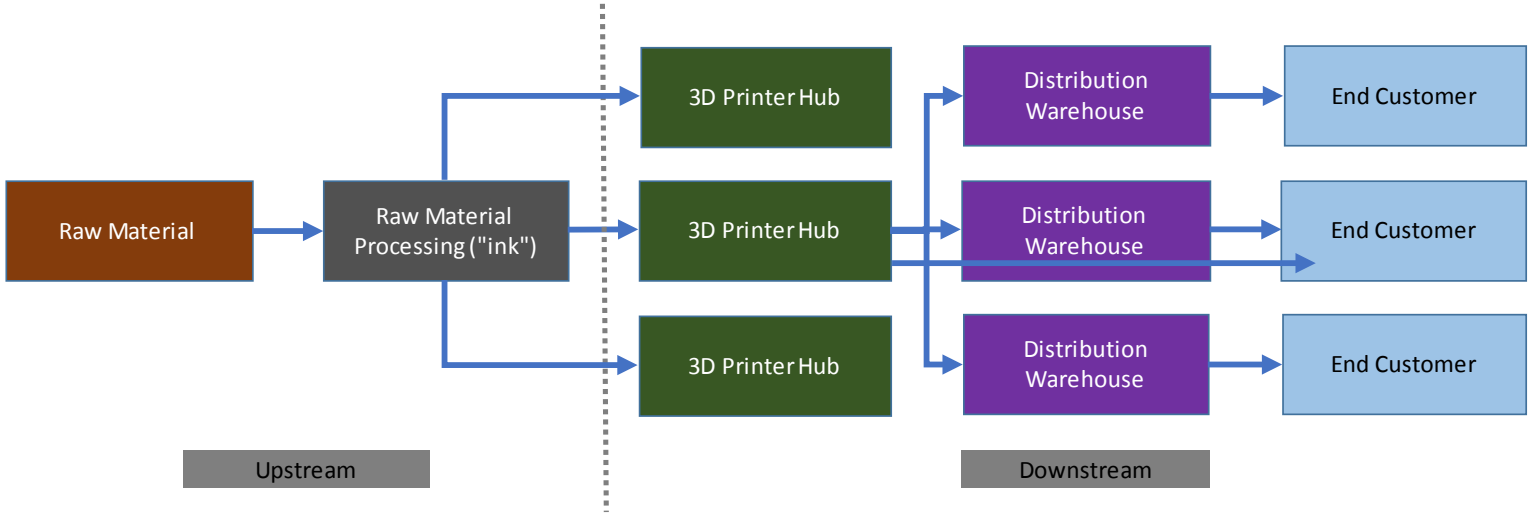
3D Printing – Shortening the Supply Chain

- Traditional Manufacturing Supply Chain



- Additive Manufacturing Supply Chain



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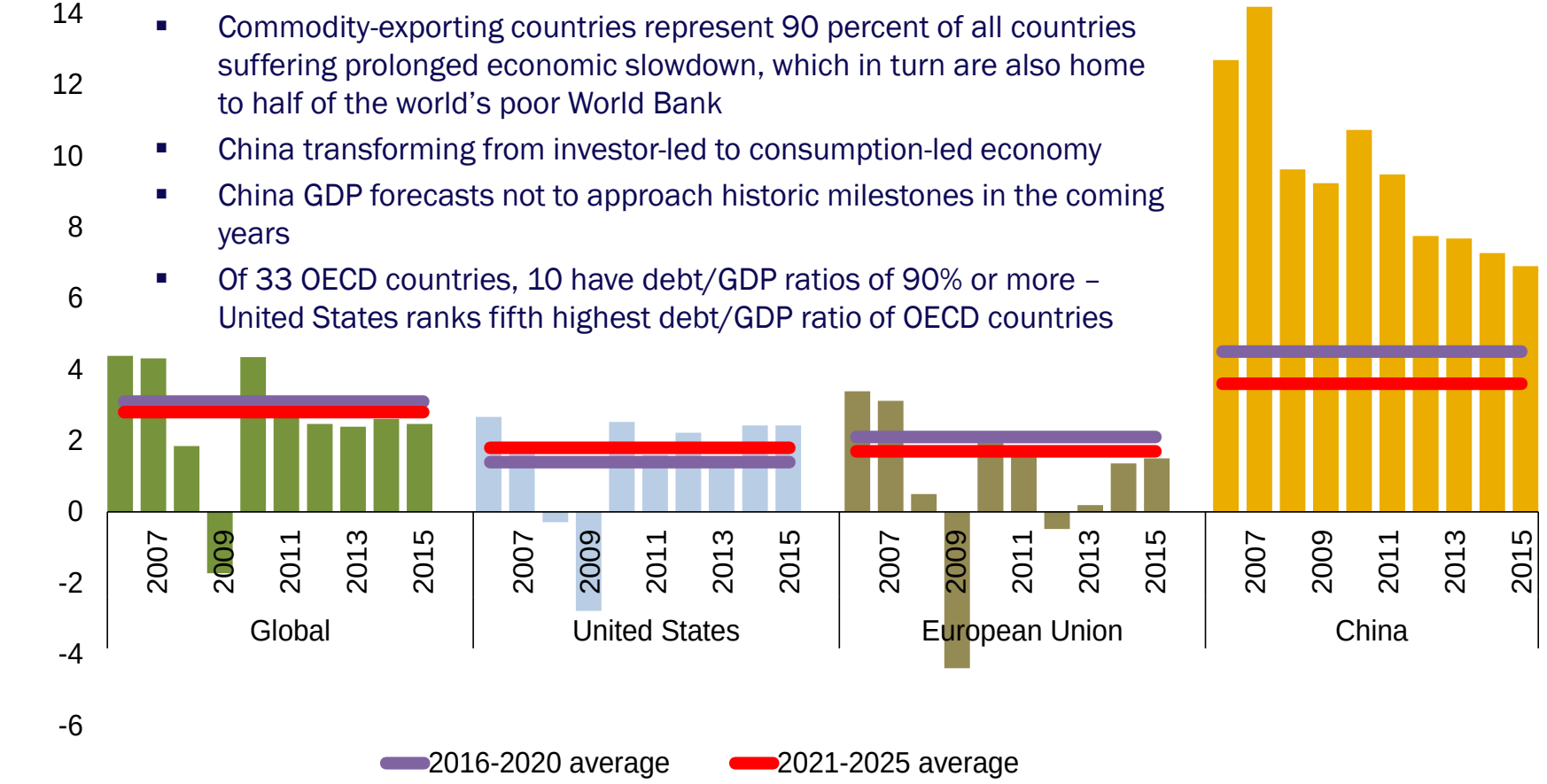
Intelligent Logistics System – Enabled by Internet of Things/Transactions Facilitated and Secured by Blockchain

- Reduces idle time of assets and freight
- Sensing and sense making
  - Enables supply chain managers to re-route trucks to avoid congestion points or avoid creating them, direct trucks to alternative routes or other pick-ups or deliveries until congestion dissipates
  - Through predictive analytics, traffic managers weigh congestion likelihood and revise algorithms to stage freight movements and available assets

2. Global Economy and Debt

Comparative Historic GDP Growth and Forecasts

- World Bank and OECD projecting constrained global GDP growth in next few years in the range of 2.8-3.0%
- Growth trends in commodity consuming countries has harmed commodity exporting countries
- Commodity-exporting countries represent 90 percent of all countries suffering prolonged economic slowdown, which in turn are also home to half of the world's poor World Bank
- China transforming from investor-led to consumption-led economy
- China GDP forecasts not to approach historic milestones in the coming years
- Of 33 OECD countries, 10 have debt/GDP ratios of 90% or more – United States ranks fifth highest debt/GDP ratio of OECD countries



The Call for Improved Supply Chain Efficiency

- Average cost of delay to shippers' operations = $56 per hour (Qi Gong, *et al,* 2012)
- Eliminating port inefficiencies can increase GDP growth by 0.5% (Kent and Fox, 2011)
- Reducing delay times by 70 minutes on S.A. portion of Maputo Corridor allows trucks to undertake 5.41 more trips/vehicle/year (Chibira and Mdlankomo, 2015)
- Supply chain managers challenged to increase freight velocity
  - Requires reducing idle time of both freight and equipment
- Desire to improve efficiency encouraged emergence of disruptive technologies for improving supply chain efficiency
  - 3D Printing
  - Internet of Things

Top 10 States with Highest Congestion Costs to Trucking Industry		
Rank	**State**	**2013 Cost (millions $US)**
1	California	$1,706
2	New York/New Jersey	$1,088
3	Texas	$1,053
4	Illinois	$498
5	Pennsylvania	$422
6	Virginia	$330
7	Maryland	$316
8	Georgia	$304
9	Massachusetts	$303
10	Florida	$256
11	Washington	$250
12	New Jersey	$242

Source: Congestion ranks and costs from Dave Pierce and Dan Murray, *Cost of Congestion to the Trucking Industry*, American Transportation Research Institute (ATRI), April 2014, Appendix B, pp. 28-29.

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Strategic Driver Implications

- Global GDP growth slowing
  - Countries enjoying GDP growth shift to purchases of services
  - Peak impact of trade agreements realized
  - Substitution of labor with capital
- Alliance rationalization efforts likely to result in fewer vessel calls/higher peak load volumes
- P3 likely to become more commonplace, out of necessity
  - Global infrastructure gap will generate investor competition
  - Ports must be able to develop bankable projects to secure 3P deals
- Competitiveness extends beyond port gates to market hinterlands
  - Sensitivity to time, cost, and reliability imperative for attracting customers/tenants
- Supply chains likely to be impacted by emerging disruptive technologies

Implications for Port Authorities

- Global GDP growth slowing
  - Countries enjoying GDP growth shift to purchases of services
  - Peak impact of trade agreements realized
  - Substitution of labor with capital
  - Population growth generally slowing, with strongest growth in urban areas

Freight Logistics Implications

1. Conditions outside the port gates are as important as those inside the gates
2. Greater reliance on competitive intelligence gathering
   - Identify transport logistics chains associated with relevant current and prospective markets
   - Measure TLC performance: time, cost, reliab., and variability and mitigate chokepoints
3. Establish stakeholder collaboration
   - Conduct regular forums for exchanging views on freight system issues
   - Lead cooperative efforts to communicate and advocate for needed logistics chain improvements
   - Collaborate to pursue strategic opportunities – logistics distribution
4. Organize strategic capture sessions with relevant partners to pursue leads
5. Play leadership role in leveraging government assistance and collaboration for improving hinterland transport systems
6. Engage in P3 transactions

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Future of Freight Logistics is Historic

In 50 years. . .the cost of distributing necessities and luxuries has nearly trebled, while the production costs have gone down one-fifth. . .What we are saving production we are losing in distribution.

Ralph Borsodi, *The Distribution Age*, **1929!**

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Thank You!

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