



Industry 4.0

Opportunities to *Finally* Integrate Supply Chains



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My Personal Background



USC
MARSHALL
SCHOOL OF
BUSINESS

PEPPERDINE UNIVERSITY
Graziadio School of Business and Management



TEXTRON
Industrial Engineer



AmerisourceBergen
Operations Manager



TOYOTA **DENSO**
VP Operations (SCM)



[CSX]
(U.S.)



SeaLand
Vice President / Managing Director



FRANS MAAS
(Europe)





FISONS **Fisher Scientific**
VP Logistics



INTERNATIONAL PAPER
xpedx
VP Logistics



ConAgra Foods
VP Logistics




FORMICA
VP Logistics




J.B. HUNT **TRANSPLACE**
The 3PL & Technology Company
SVP Supply Chain Integration



AIR ROAD
President

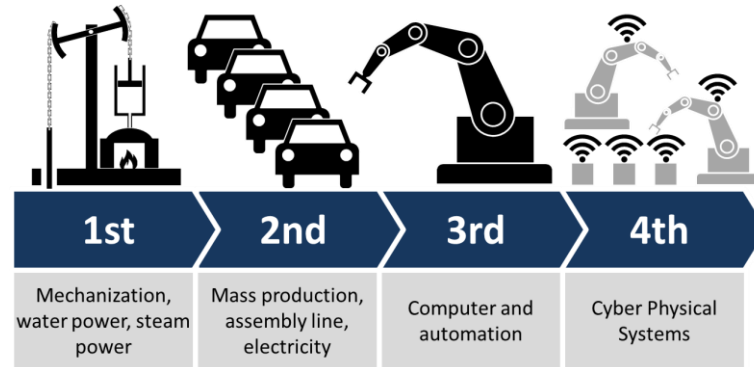


LEHIGH
UNIVERSITY



University
of San Diego

Industry 4.0 and SCM

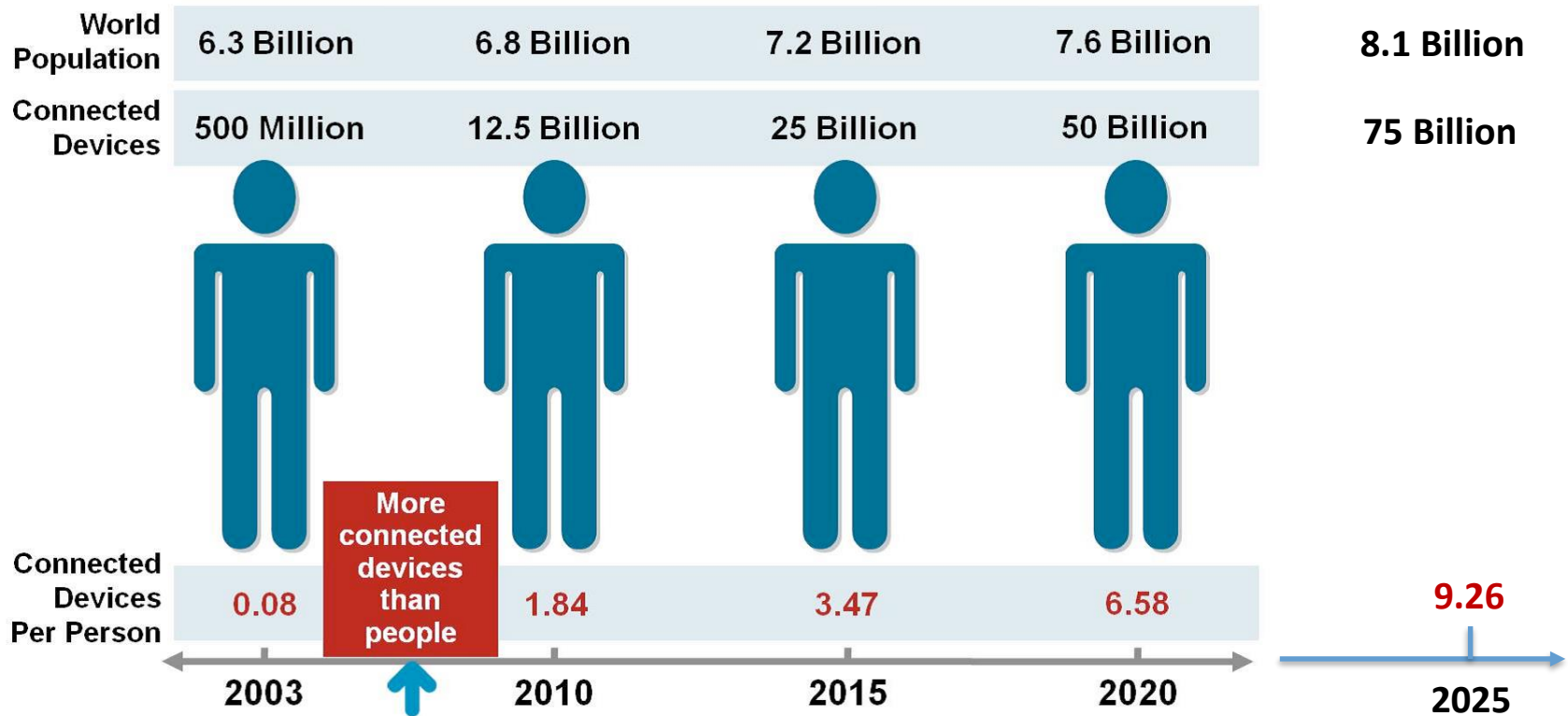


Source: Christoph Roser AllAboutLean.com

VISION

With the confluence of social and business trends of **Industry 4.0**, and the emerging technologies (e.g., Internet of Things, Artificial Intelligence, Big Data, Cloud Computing, 3D-Printing, Autonomous Robots, Sensors, Mobile Smart Devices), ***the supply chain will become fully digital and globally integrated - from suppliers, to factories, to customers.***

IoT Market Size*

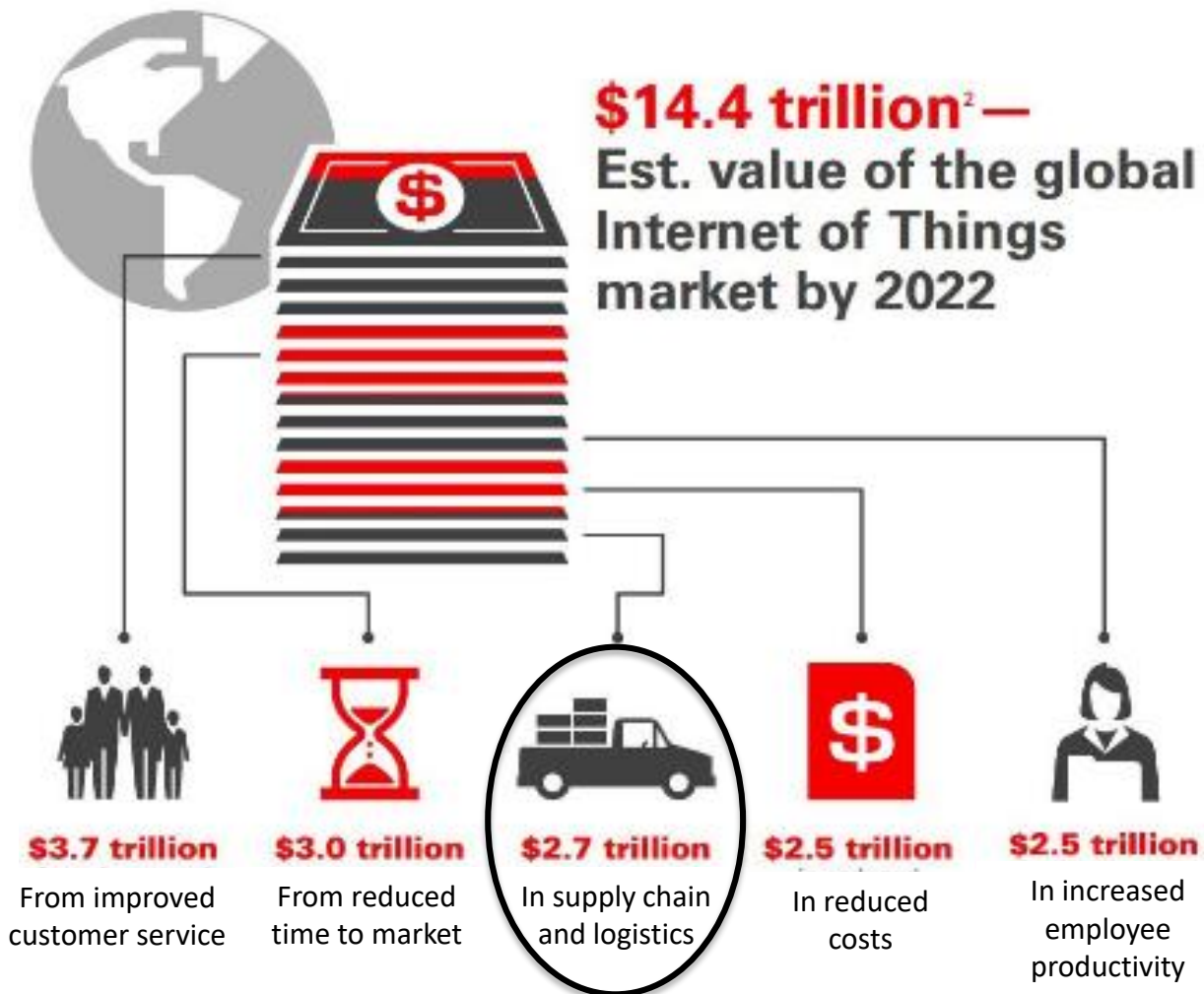


Source: Cisco, 2015

Source: IHS, 2017

*May be conservative with Gartner, Intel, and others predicting even higher numbers.

\$14.4 Trillion in Value Creation

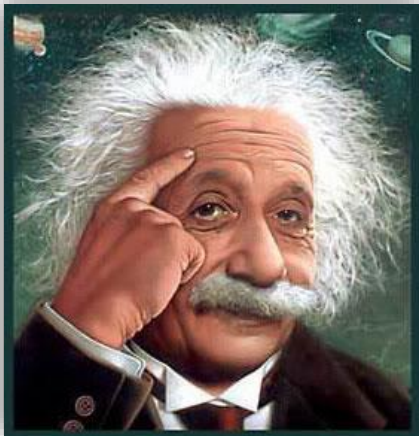


Source: Cisco, 2015

Supply Chain Innovation

Most firms are focusing their IoT efforts on *reducing costs* and *improving efficiencies*.

But the IoT can open new possibilities - be a transformative force.



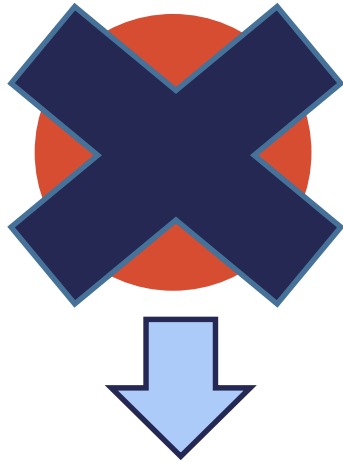
We cannot solve our problems with the same thinking we used when we created them.

A. Einstein

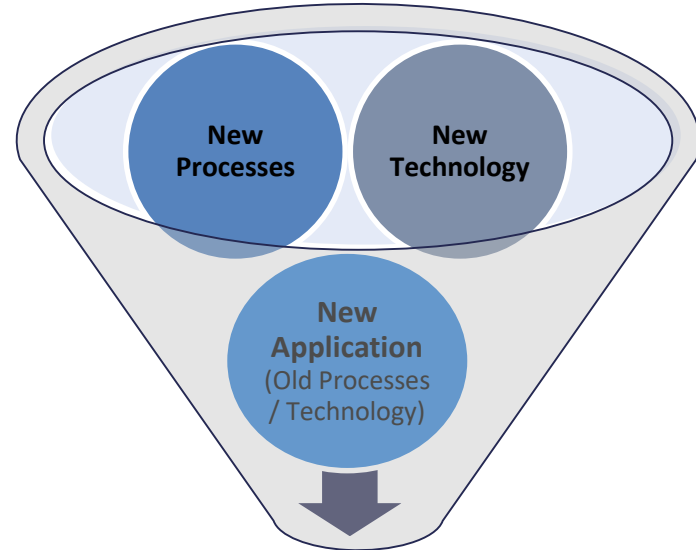
We need to be **innovative** – “think outside the box”.



What is Supply Chain Innovation?



Product Innovation
Different than SCI

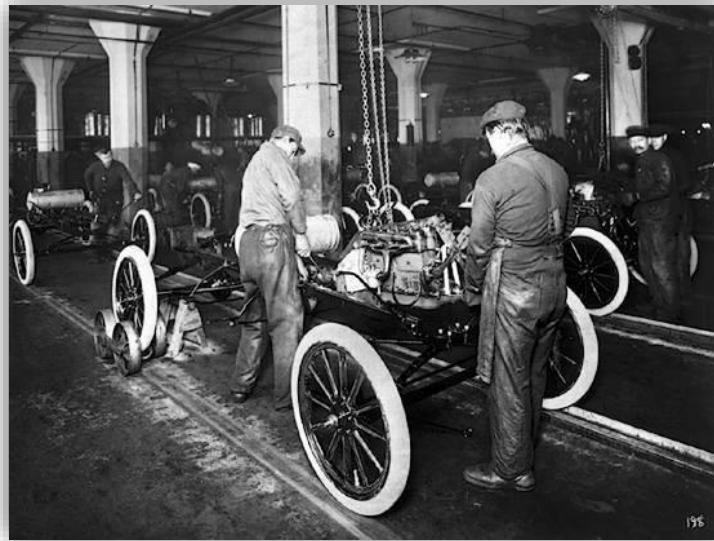


Supply Chain Innovation

Supply Chain Innovation must result in **quantifiable and /or sustainable positive results** in terms of cost savings, revenue improvement, customer service, etc.

The IoT is not an innovation by itself but will serve as an enabler for innovation.

Continuous Flow Production



1913: Ford applies “Continuous Flow” concepts to assembly line processes.

Total time to assemble a single car fell from 12.5 labor hours to 1.5 labor hours – $\sim 1/8$ the previous time and cost.

The Ocean Shipping Container



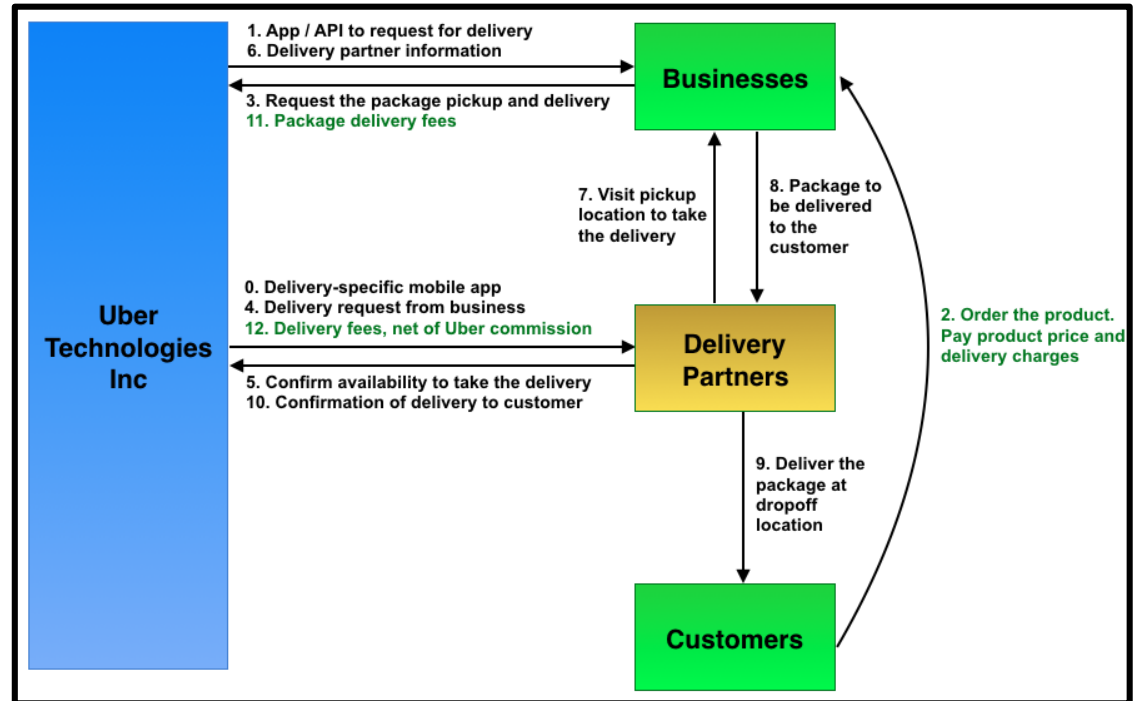
1956: Malcom McLean invented the steel shipping container at the port of New Jersey.

Innovation reduced shipping cost by a factor of 100.



Delivery Services

- In 2014, UBER entered the delivery business.
 - **UberRush**: Business door-to-door delivery service
 - **UberEats**: Restaurant to consumer food delivery service
 - **Uber Freight (5/17)**: Matches trucks/loads




“Uberization” of the logistics industry occurring at a rapid pace – connecting shippers, carriers, customers.

Evolution of Supply Chain Management



The Birth of Supply Chain Management



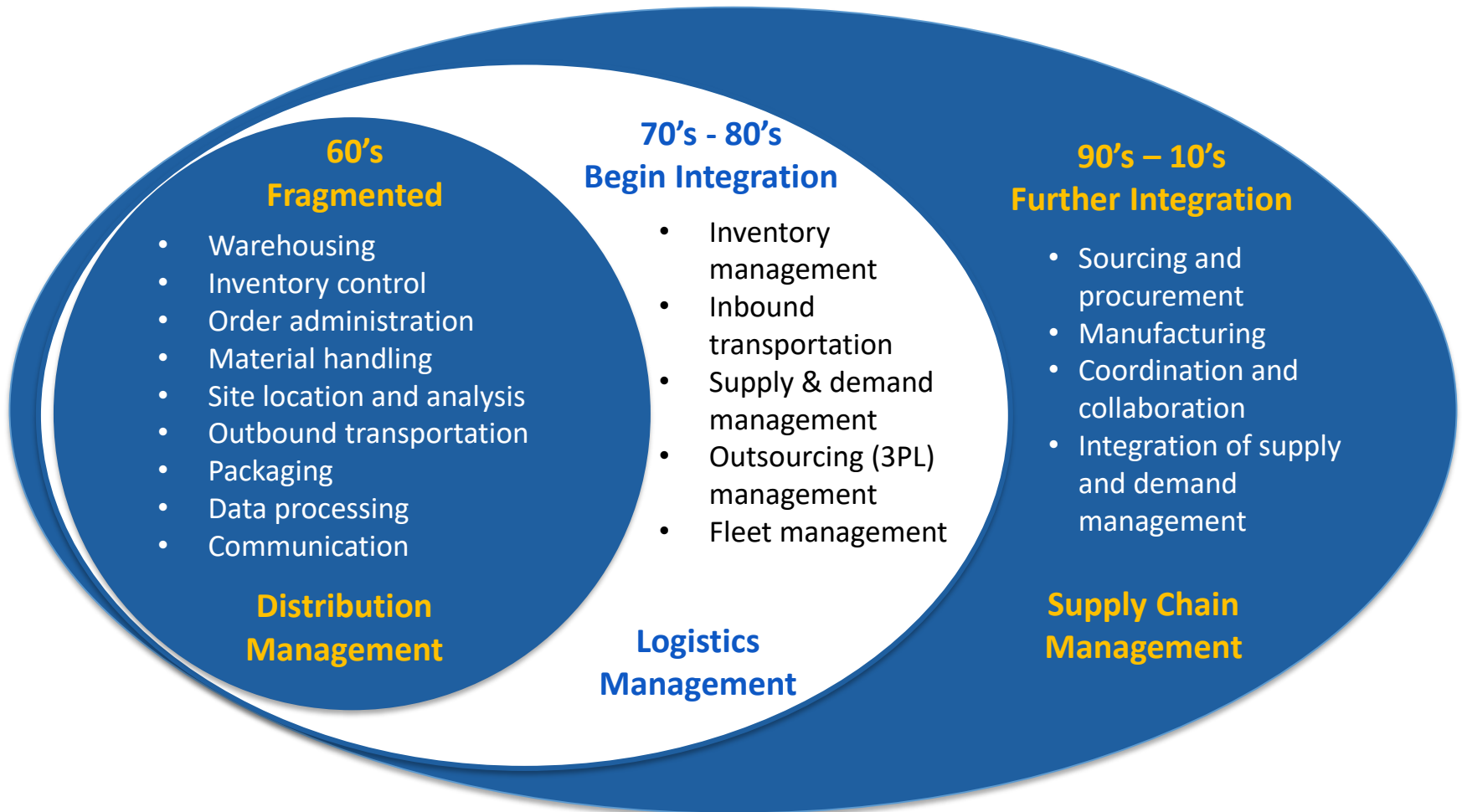
On June 4, 1982, the *Financial Times* ran an article by Arnold Kransdorff on “Booz Allen’s rather grandly titled supply chain management concept.”

Keith Oliver, a Senior Vice President with Booz Allen, had coined the phrase, and this was the first time it was used in the public domain.



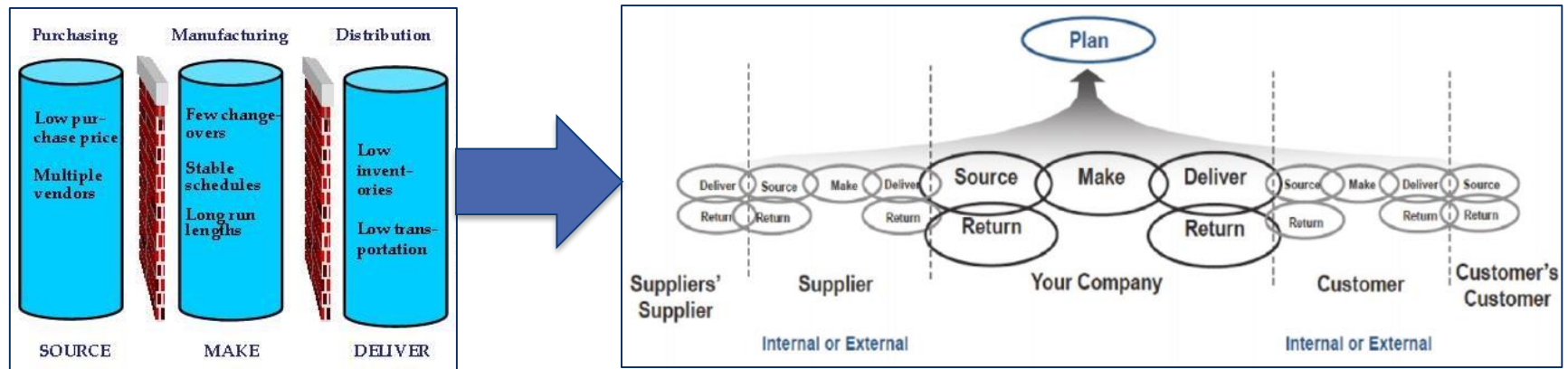
As Board Chair of CLM in 2001-2002, I approved name change to include “Supply Chain” - after one year research to define the term.

Evolution of Logistics to Supply Chain



Evolution of Logistics to Supply Chain

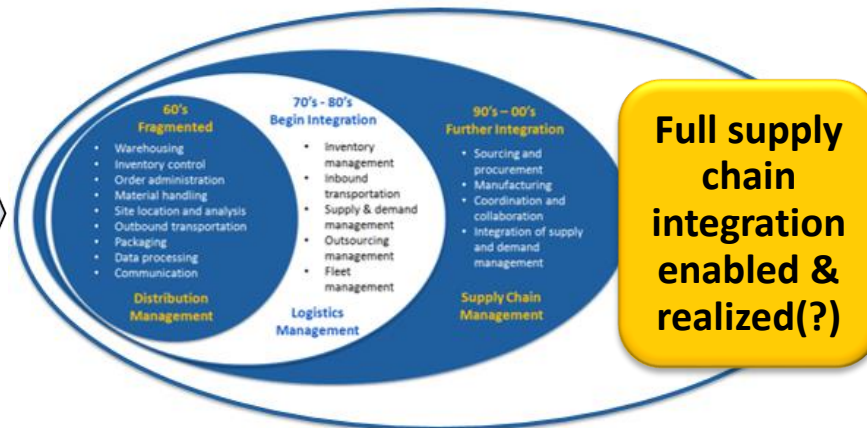
Integrated logistics was not yet a reality (in most companies) yet, as a profession, we embraced the concept of an *integrated supply chain* – infinitely more complex!



Breakthrough to Integrated SC?

Driving Forces

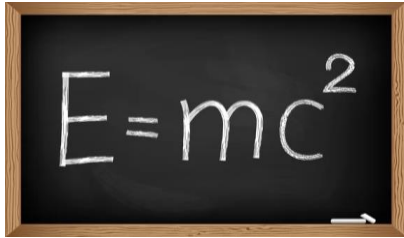
- Reduce costs
- Faster service
- Less inventory
- Competitive advantage
- Globalization
- Customer demands
- Greater profitability



4.0 Enablers

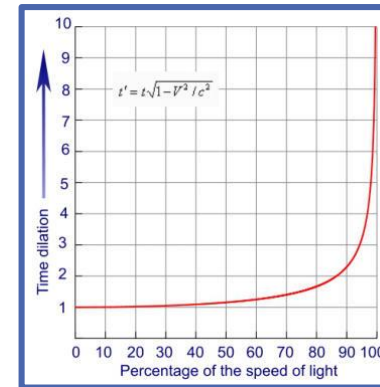
- IoT connectivity
- Integrating technologies / "Blockchain"
- AI
- Sensors
- Big data
- Cloud
- Visibility

$E = mc^2$ and Integrated SCM



Einstein's Theory of Special Relativity

As the speed of an object approaches the speed of light, its mass becomes infinite, and so does the energy required to move it.



Industry 4.0 will enable us to “manage” a greater portion of the supply chain but achieving 100% integration will not be possible.

Requirements for Greater SC Integration

With Industry 4.0, there is finally an opportunity to digitally connect *all* partners within a supply chain.

The real challenge will be getting *key partners* on board.

- Trust
- Commitment
- Collaboration
- Risk-sharing
- SC Leader - owner

Industry 4.0 and *Reshoring*

- Reshoring is about bringing manufacturing jobs back to the United States (Europe has similar initiatives).
- 31% of companies with >\$1 billion revenue will add production capacity in the U.S. within 5 years.
- Number of companies actively reshoring production to the U.S. has increased 250% since 2012.
- Manufacturing jobs should be: high value-add; technology supported; require demanding skills; and be labor light.

Industry 4.0 and emerging technologies (e.g., IoT, robotics, AI, 3D-printing) will be a driving force to justify reshoring.



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

Questions?

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