Future of transport – from inter- to hypermodal

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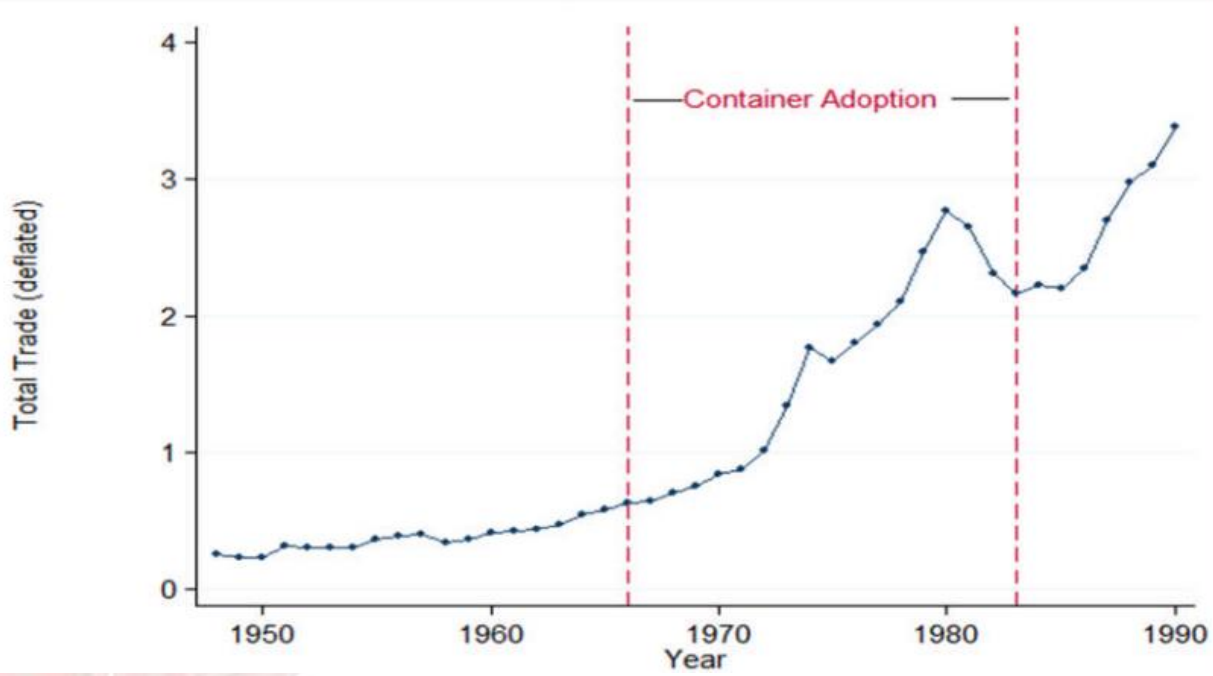
Containerization increased global trade volume … and growth

In the 1950s, Harvard University economist Benjamin Chinitz predicted that containerization would benefit New York by allowing it to ship its industrial goods more cheaply to the Southern United States than other areas, but ***he did not anticipate that containerization might make it cheaper to import such goods from abroad****.*

Most economic studies of containerization merely assumed that shipping companies would begin to replace older forms of transportation with containerization, but ***did not predict that the process of containerization itself would have a more direct influence on the choice of producers and increase the total volume of trade****.*

Source: https://www.nottingham.ac.uk/gep/documents/papers/2013/2013-02.pdf

Figure 1: The growth of world trade (deflated): 1948-1990



Source: https://www.nottingham.ac.uk/gep/documents/papers/2013/2013-02.pdf

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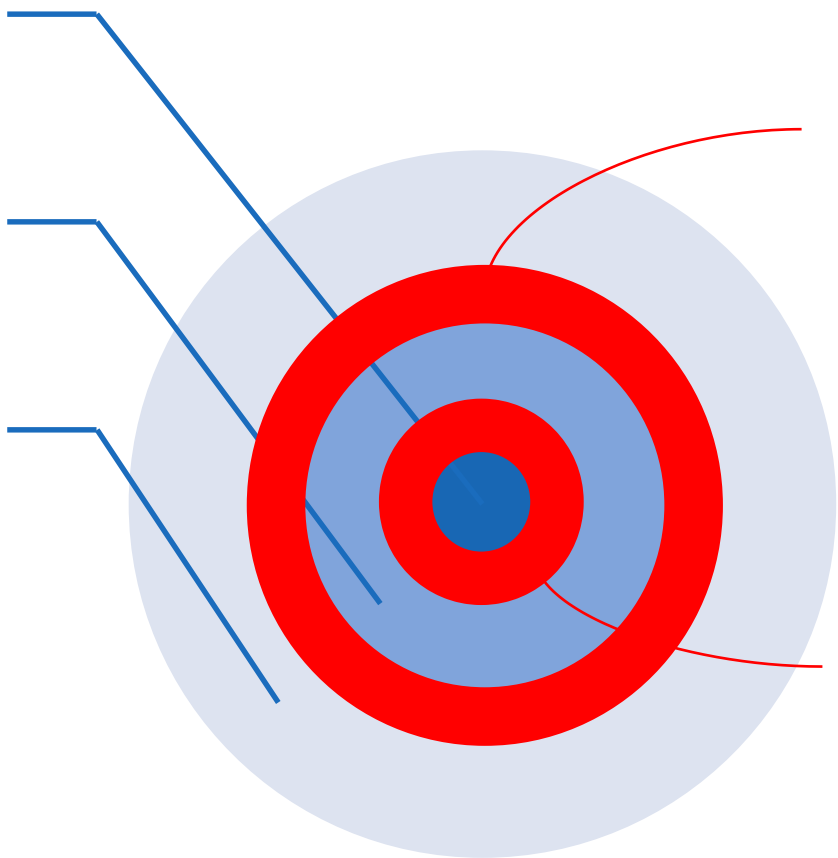
Transit modes compete within domains of distance

Local/urban: Bikes, cars, buses, trams, helicopters

Regional/intercity: Trains, high-speed rail, general aviation and commercial propeller aircraft, small and mid-sized jets

International/continental: Freight trains, large commercial jets, container ships



Intermodal bridged these two

Hypermodal bridges all three

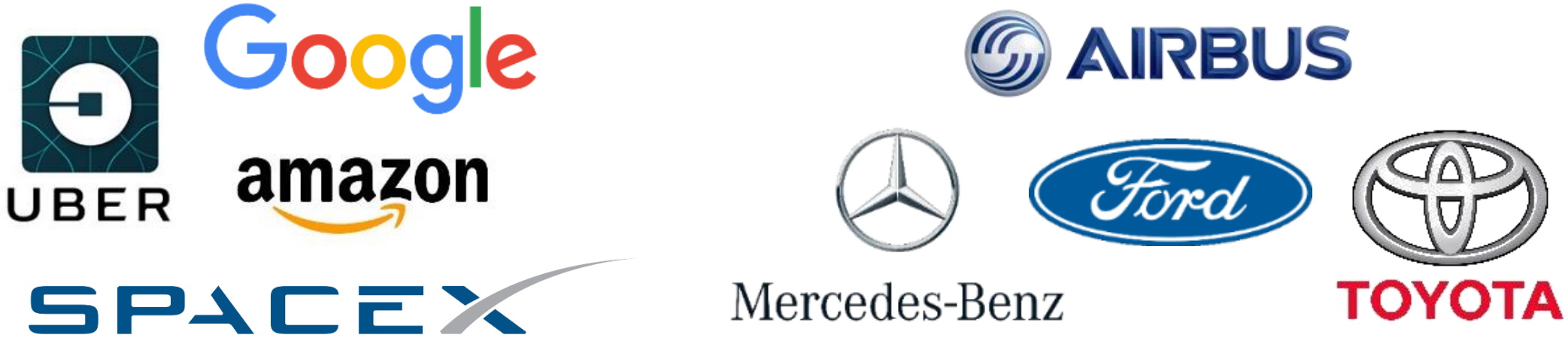
Three technologies are changing transportation again – from intermodal to hypermodal

Intermodal +

1. Big Data
2. Artificial intelligence
3. Novel modes

Key question: where is rail in all of this?

What do these very different companies have in common?

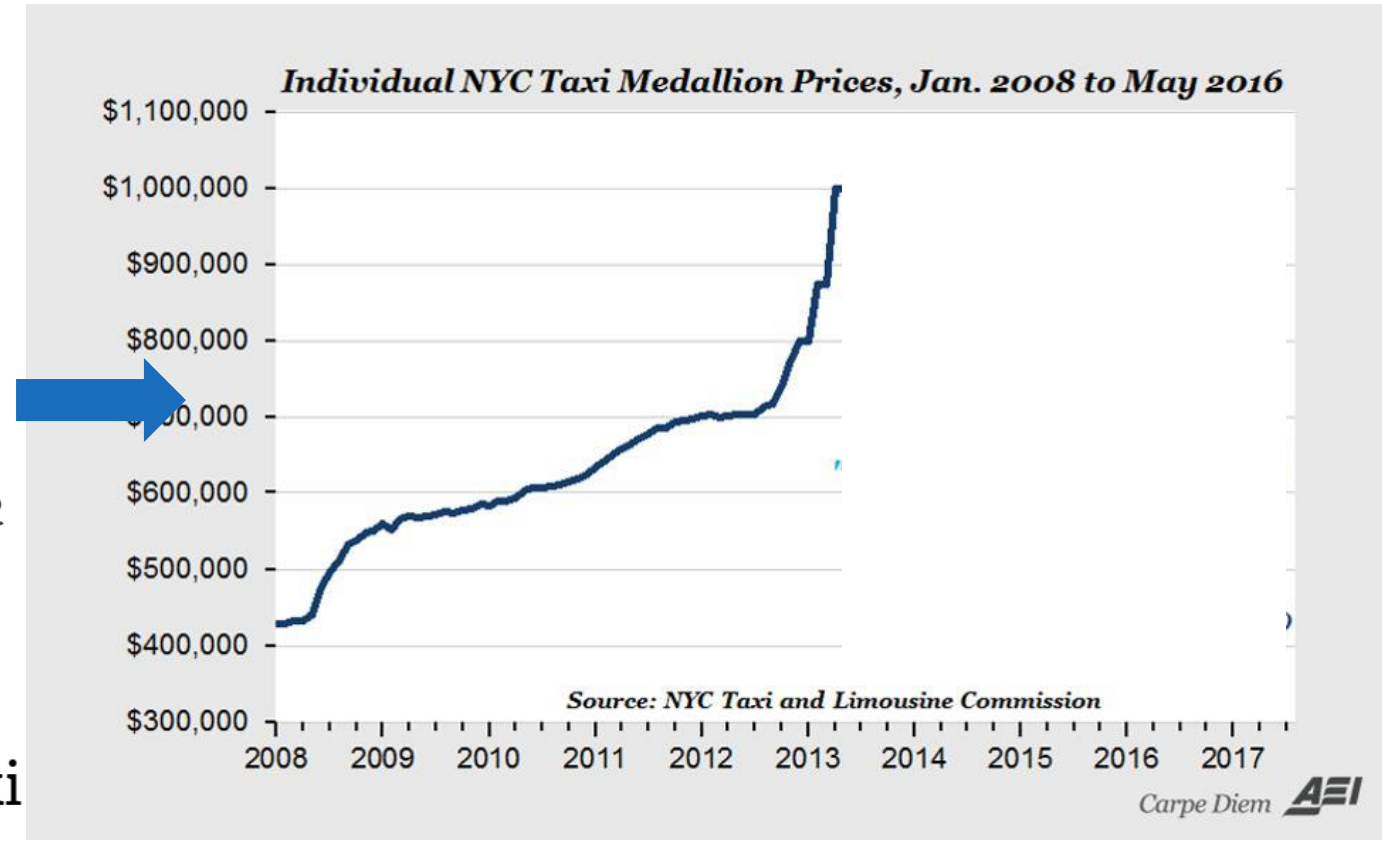


Their strategies are converging – and competing – on transportation and logistics

“We’re contending with a $50 billion corporation that’s quickly building a driverless car that within a decade could wipe out all of us in the industry.” - Bhairavi Desai, founder of NY Taxi Workers Alliance

Bloomberg’s “Taxi of Tomorrow”

UBER



NYC Mayor Bloomberg reportedly threatens to 'fucking destroy' the taxi industry

By Carl Franzen on May 24, 2013 05:18 pm Email @carlfranzen

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“We do not plan to become the Foxconn of Apple”
‚Daimler CEO, Sept 2015

“In 2007 I pledged that – by 2010 – Nissan would mass market a zero-emission vehicle. Today, the Nissan LEAF is the best-selling electric vehicle in history.

***Now I am committing to be ready to introduce a new ground-breaking technology, Autonomous Drive, by 2020**, and we are on track to realize it.”*

“We have seen what Google did to phone manufacturers, and we don’t want that to happen to us.”

-Nissan CEO Carlos Ghosn

*“The improvement can be such that we can make cars that drive safer than people do… We expect to release the (Google car) technology **in the next five years.**” Google at SAE, Feb 2013*

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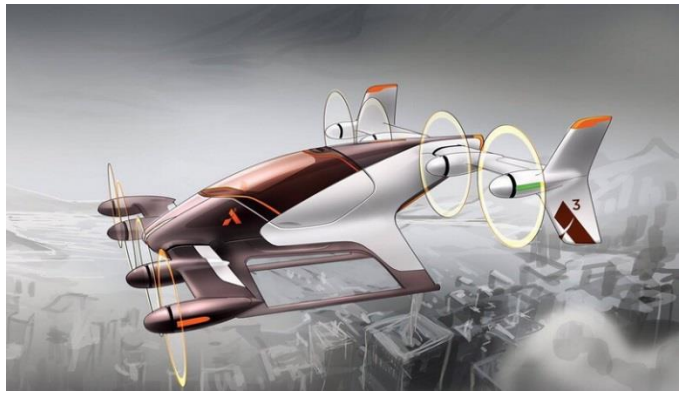
“If anyone does to our aircraft business what SpaceX did to our launch business, we’re dead.” Airbus CEO

AIRBUS

SpaceX rocket nails its landing

- Projects
- Partnerships
- Venture Investing

“Our job at A³ is very simple: we seek to disrupt Airbus Group (and the competition) before anyone else can. And in the process, we are setting out to build the future of flight.” (A³ CEO)



“Imagine traveling from San Francisco’s Marina to work in downtown San Jose—a drive that would normally occupy the better part of two hours—in only 15 minutes. ” Uber’s Elevate initiative, Oct 2016

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In reaction, Daimler and Ford are adding UAVs and platforms as a delivery vehicle accessory

Ford + DJI

"Rapidly deployable surveying system for use by the United Nations in emergency zones; future applications could include agriculture, forestry, construction, bridge inspection and other work …part of **Ford Smart Mobility**, the plan to take Ford to the next level in connectivity, mobility, autonomous vehicles, the customer experience, and data and analytics"

Daimler + Matternet

"…intelligent control software calculates the route planning for the vehicle and the assignment of the packages to the racks. The system then defines the launch and landing points for the drones, schedules the stops for the vehicle accordingly and plans the respective flight routes on the basis of up-to-the-minute map data…

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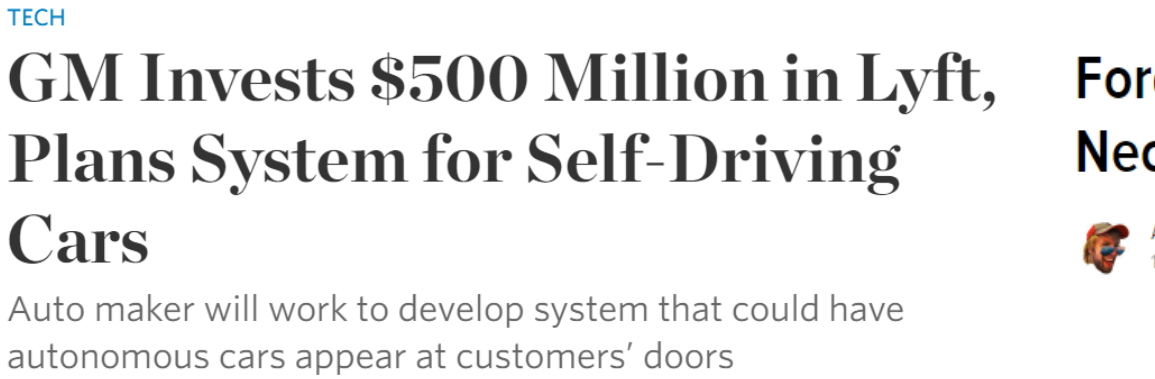
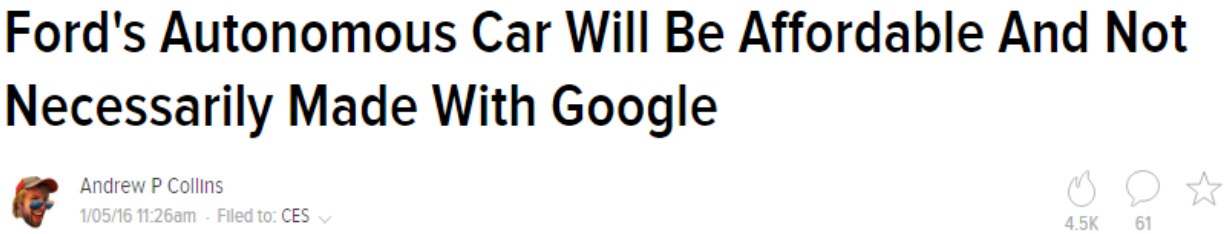
Carmakers have seen the threat and are responding… as if their lives depended on it


TECH

GM Invests $500 Million in Lyft, Plans System for Self-Driving Cars

Auto maker will work to develop system that could have autonomous cars appear at customers' doors


Ford's Autonomous Car Will Be Affordable And Not Necessarily Made With Google

Andrew P Collins
1/05/16 11:26am · Filed to: CES

4.5K 61

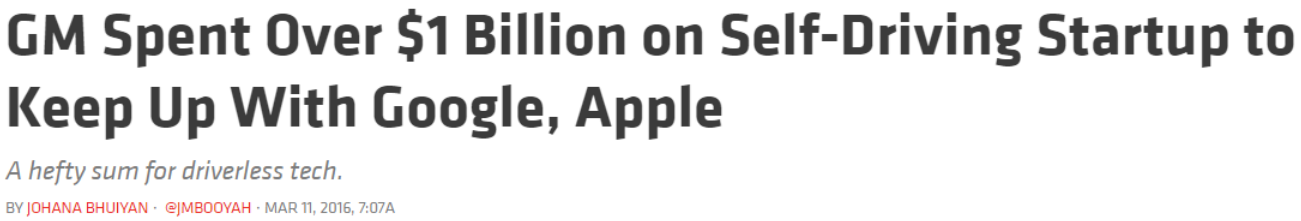

APPS TECH TRANSPORTATION AUDI BREAKING

Nokia sells Here maps unit to Audi, BMW, and Mercedes for $3 billion

By Sam Byford on August 3, 2015 01:45 am Email @345triangle


Volvo's parent company now owns a flying car startup

Geely wants to bring Terrafugia's flying car tech to market.


GM Spent Over $1 Billion on Self-Driving Startup to Keep Up With Google, Apple

A hefty sum for driverless tech.

BY JOHANA BHUIYAN · @JMBOOYAH · MAR 11, 2016, 7:07A

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Who’s developing self-driving trucks? Daimler, Volvo/Scania, Uber/Otto…

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Autonomy could decimate the auto industry, reshape cities, and save millions of lives

"If autonomous vehicles can drive 500% more densely in platoons, and park away from main roads, **maybe we never need to widen roads again, build out parking spaces, or invest in rail or buses**."

- City planning participant in Lux/SRI Intelligent Transportation workshop

Amazon - Reconceiving homes, consumers, and the entire supply chain in a hypermodal world

- Big data, predictive analytics, anticipatory logistics, persuasive technologies, precision nutrition… who decides what I want to buy?
- Bought an airport in Germany
- Streaming consumer demands – subscribe to music and razors, why not food?

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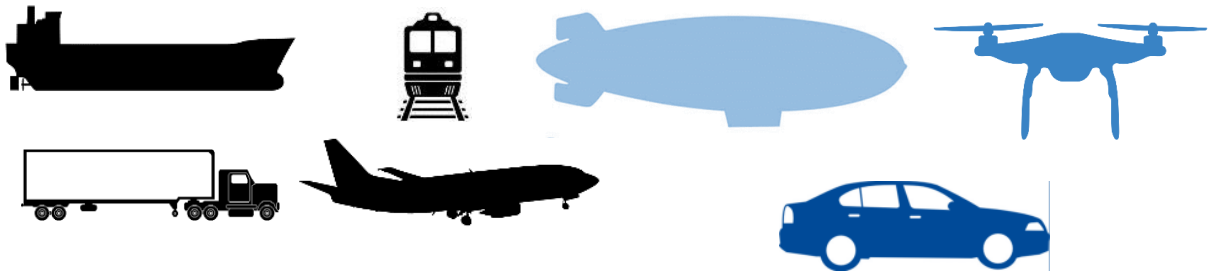
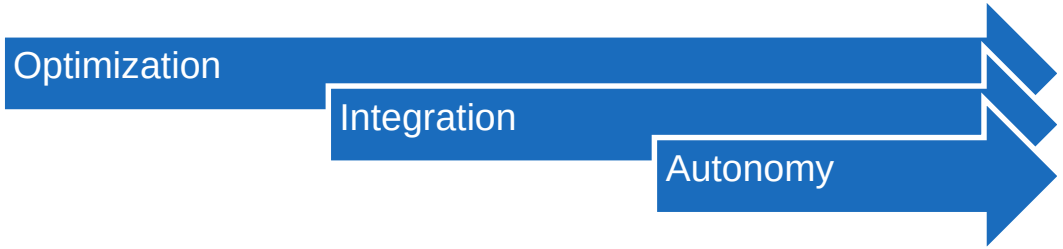
Intermodal + intelligent = hypermodal transport

Intermodal transportation



Intelligent transportation



Intermodal + Intelligent = Hypermodal

Hypermodal transportation and logistics

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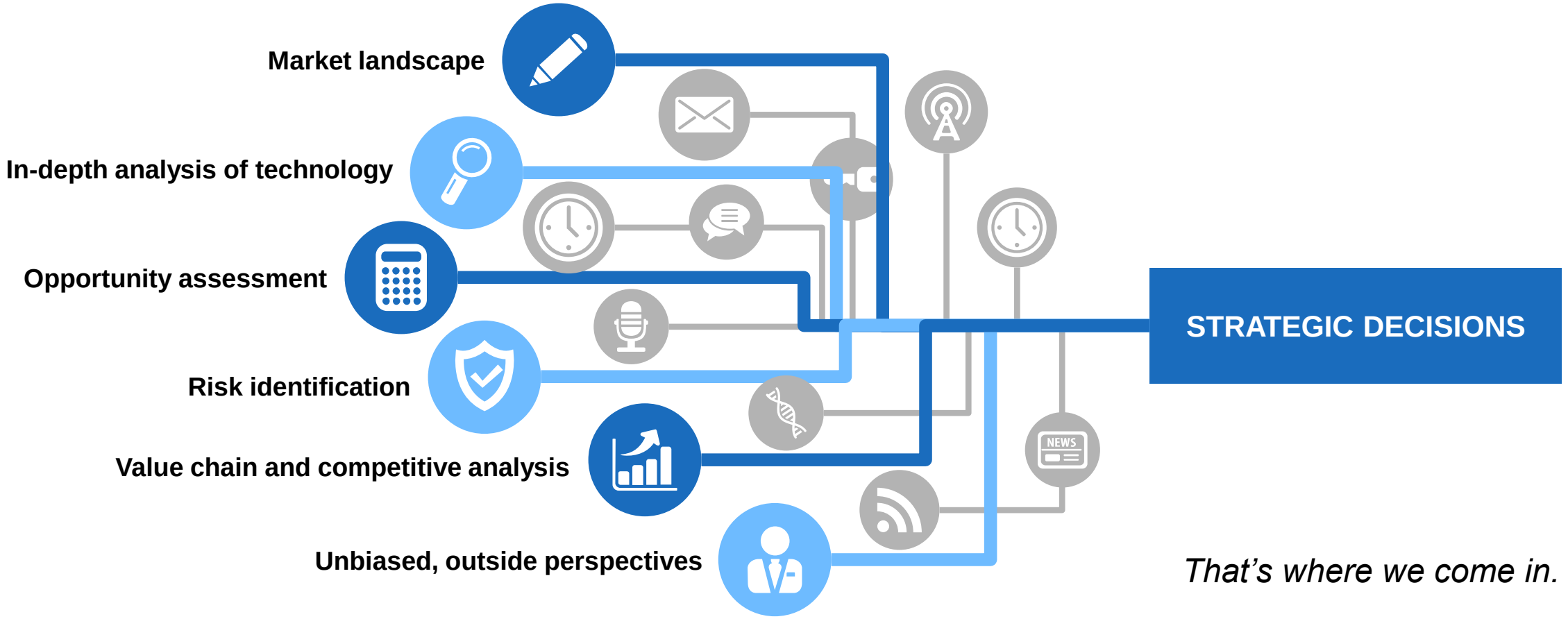
Making decisions about tech innovation is complicated

An informed decision requires an understanding of:



That's where we come in.

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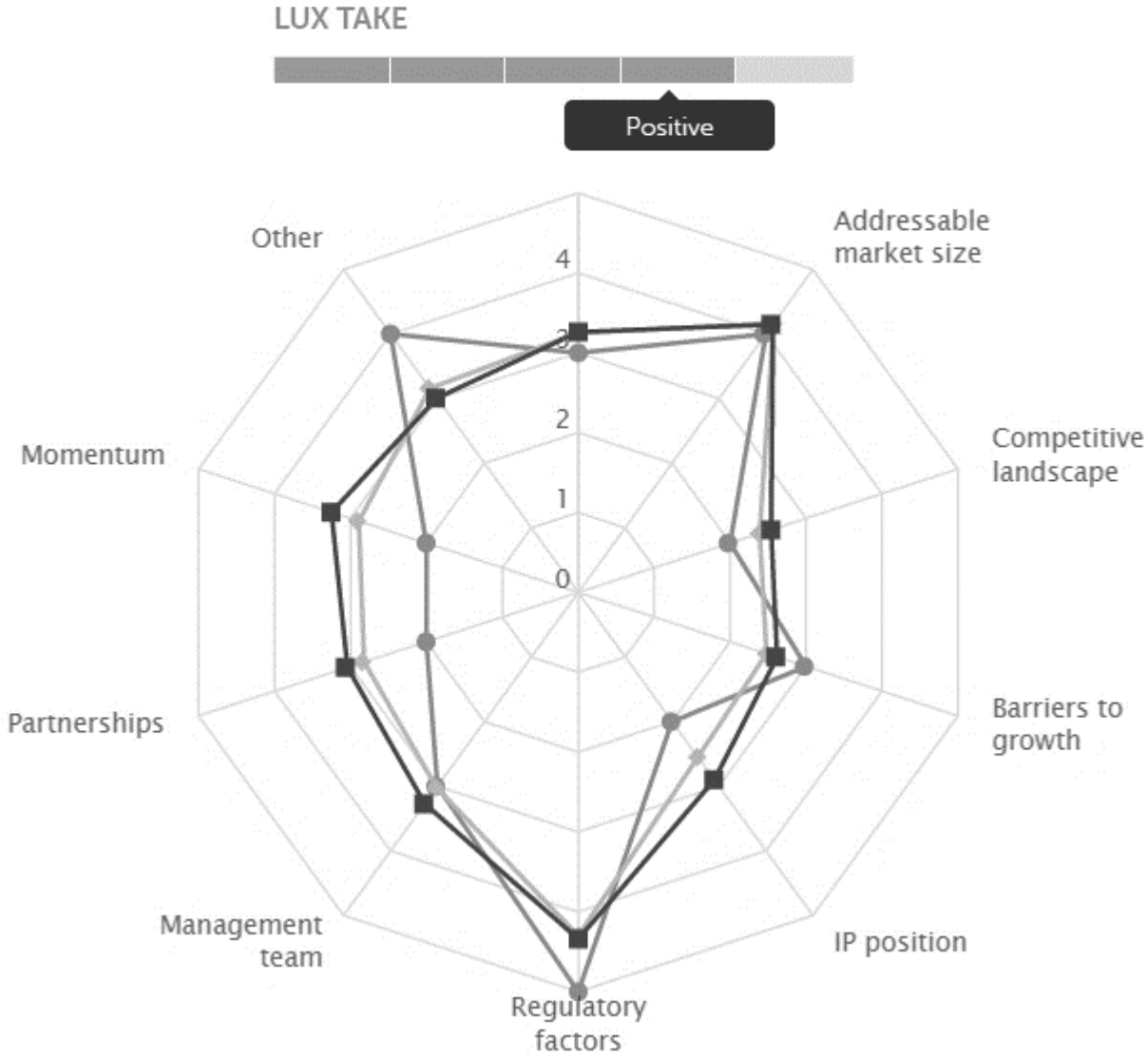
PRIMARY RESEARCH

Expert advice, based on facts

Lux goes beyond repackaged company claims and readily available public records.

- Primary research, including over 5,000 interviews conducted annually with companies, partners, customers, and outside experts
- Analysis of over 30,000 companies within our database

To identify, evaluate, and predict technology trends and market shifts that will impact your business.



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Sample areas of expertise

MATERIALS

- 3D printing (additive manufacturing)
- Carbon nanomaterials
- Bio-based materials & chemicals
- Coatings
- Composites
- Material informatics
- Metamaterials
- Smart materials

DIGITAL

- AR/VR
- Artificial intelligence
- Autonomous cars
- Big data & analytics
- IIoT
- Machine learning
- Robotics
- Sensors
- Wearable electronics

ENERGY

- Carbon capture, utilization
- Clean oil and gas
- Decentralized power generation
- Energy mix optimization
- Energy mobility solutions
- Innovative water infrastructure
- Power grids
- Smart metering

HEALTH & WELLNESS

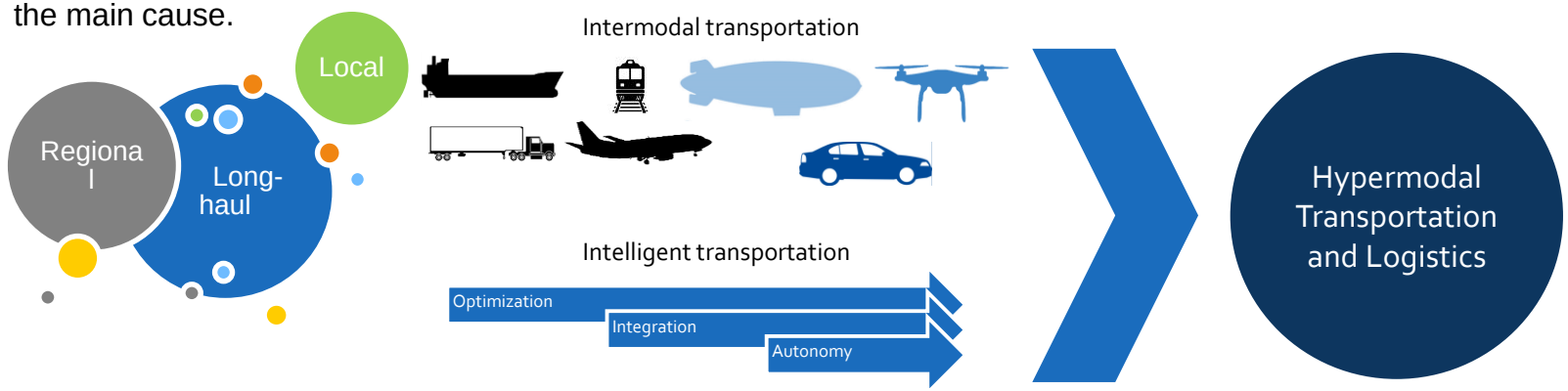
- Digital disease management
- Food ingredients and formulations
- Microbiome
- Precision agriculture
- Seeds, pesticides, fertilizers
- Wearable health tracking

Hypermodal: Towards Intelligent Intermodal Trade

Big Data and Analytics in Transportation and Logistics

- Managing every industry's flow of goods, **transportation and logistics are a near-literal lifeblood of the global economy.** The number of passengers and packages is soaring in air, ocean, and land-based modes of transit, as well as in warehouses, airports, and other waypoints in the flow.
- However, this secular growth enables companies in the space to ignore profound problems. Today's travel and transportation companies are inefficient (wasting time, energy, labor, and capital), dirty (characterized by both environmental and economic filth) and grotesquely underutilized in terms of capacity, with not 5% but 500% being a typical measure of the excess – and **not millions, but trillions of dollars to lose or win**. Friction within and among long-haul, regional, and local transport is the main cause.
- Addressing these failures, key innovations are starting to capture, compile, and analyze the vast amounts of data that today's dumb systems ignore. Drones and smartphones are adding to the **intermodal** mix, while advanced data management and analytics bring **intelligence** in the forms of optimization, integration, and autonomy. Startups in each area are showing the way.
- Transportation and logistics are ironically slow-changing industries, due to the entrenched economic interests of incumbents. But change from outside can come swiftly, as shown in the past by containerization and eCommerce. In the next decade, **intermodal and intelligent technologies will create a hypermodal system that moves not just goods, but supply, demand, and means of production** – transporting packages as fast as the internet does packets.

Intermodal + Intelligent = Hypermodal



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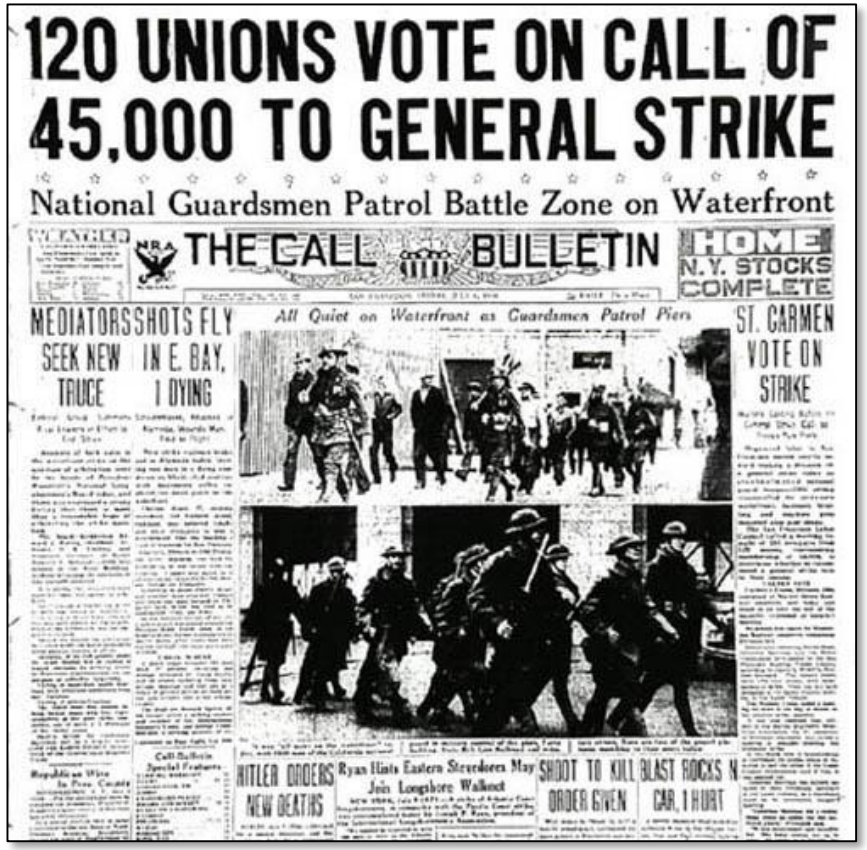

120 UNIONS VOTE ON CALL OF 45,000 TO GENERAL STRIKE

National Guardsmen Patrol Battle Zone on Waterfront

THE CALL BULLETIN

HOME N.Y. STOCKS COMPLETE

MEDIATORS SEEK NEW TRUCE

SHOTS FLY IN E. BAY, 1 DYING

All Quiet on Waterfront as Guardsmen Patrol Piers

ST. CARMEN VOTE ON STRIKE

HITLER ORDERS NEW DEATHS

Ryan Hints Eastern Steamers May Join Longshore Walkout

SHOOT TO KILL ORDER GIVEN

BLAST ROCKS N CAR, 1 HURT

The DISPATCHER

Published by the International Longshoremen's and Warehousemen's Un

Vol. 29, No. 15

July 30,

Strike Enters 5th Week

Container Work Is Main Issue

SAN FRANCISCO—The longshore strike goes into its fifth week as this issue of The Dispatcher goes to press. All West Coast ports are down, the pickets are still walking, with approximately 140 ships idled up and down the coast.

In an exchange of letters last week between Harry Bridges, chairman of the ILWU Coast Negotiating Committee and PMA president Edmund J. Flynn, Bridges stipulated that "the ILWU is willing to resume negotiations with the Pacific Maritime Association providing that the Container Freight Station Agreement, as it applies on and after June 30, 1971, is continued in full force and effect..."

ON STRIKE

Automated Ports Have Dockworkers in the Netherlands Threatening Strikes

Employees and unions fear that automation at the docks in the coming years will put hundreds out of work.

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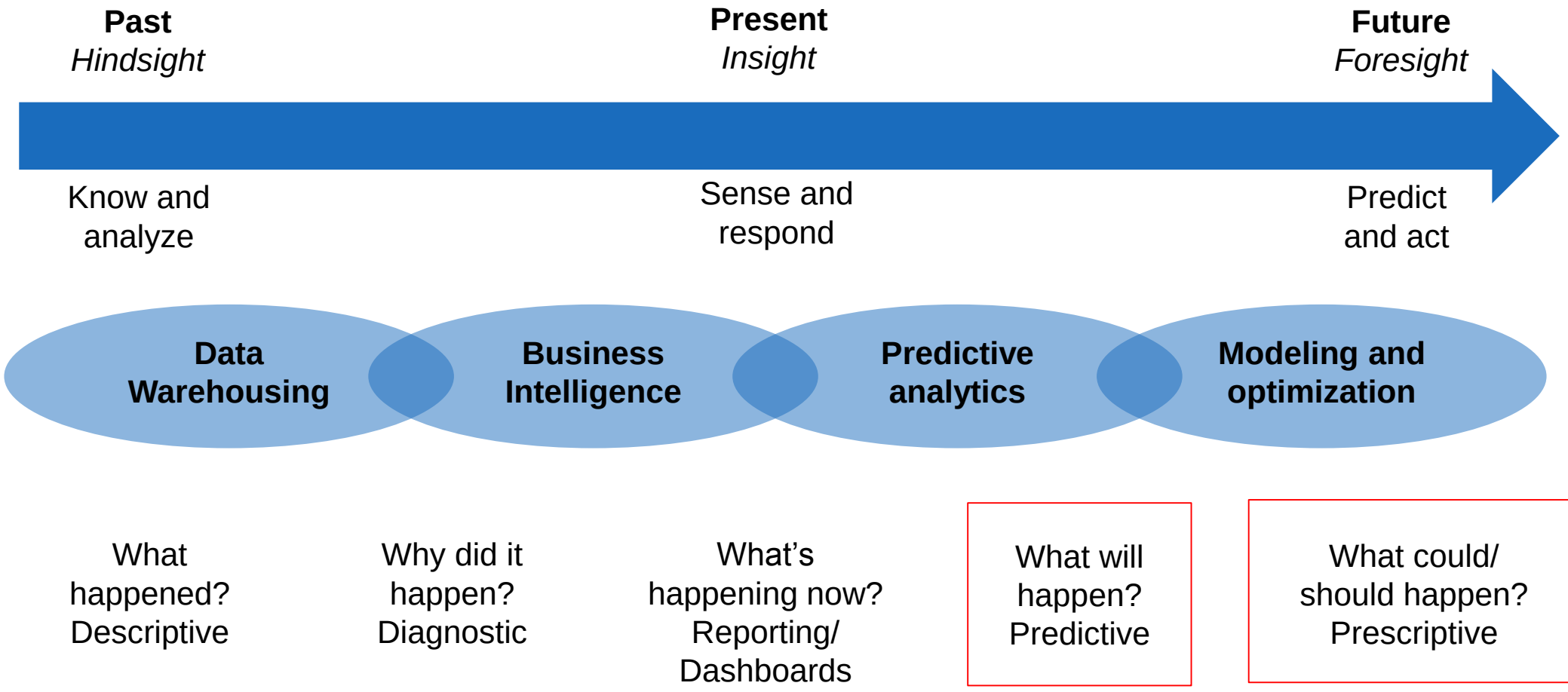
AI – from predictive analytics to prescriptive analytics



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Four emerging transportation modes hope to transform cargo and passenger transit

Hyperloops	Airships	Electric airplanes	Supersonic airplanes
Very high-speed (1000km/h) trains in tubes between city pairs	Blimps and other lighter-than-air (LTA) vessels capable of flying tons of cargo to remote sites	Small (10 passenger) planes that use electric propulsion for regional (<1,000 km) trips	Small (10-45 passenger) planes that travel twice as fast as current commercial jets

H1 freight pod concept with multimodal container

Lockheed Martin LMH-1 Hybrid Airship

Zunum electric airplane concept

Boom supersonic jet concept

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Hypermodal transport

Intermodal	+ New technology	= Hypermodal
Reduce ship/train/truck friction	Data	make every package frictionless
Optimize transport of supply to demand	Artificial intelligence	move demand to meet supply
Increase long-haul efficiency	New transport modes	automate and decarbonize the last mile