# Big Data: Challenges and Opportunities for Transportation, Logistics and Travel Industries

Mohan Sawhney
Robert R. McCormick Tribune Foundation Clinical Professor of Technology
Kellogg School of Management
mohans@kellogg.northwestern.edu

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# Agenda

Understanding Big Data

Big Data and Business Advantage

Big Data in Transportation, Logistics & Travel

Putting Big Data to Work for you

# Big Data is a hot topic

Forbes.com

*"Big Data has arrived at Seton Health Care Family, fortunately* ***accompanied by an analytics tool that will help deal with the complexity of more than two million patient contacts a year…"***

The New York Times

*"At the World Economic Forum last month in Davos, Switzerland, Big Data was a marquee topic. A report by the forum, "Big Data, Big Impact," declared* ***data a new class of economic asset, like currency or gold.***

FT FINANCIAL TIMES World business newspaper

***"Increasingly, businesses are applying analytics to social media such as Facebook and Twitter,*** *as well as to product review websites, to try to "understand where customers are, what makes them tick and what they want", says Deepak Advani, who heads IBM's predictive analytics group."*

THE WALL STREET JOURNAL.

***"Companies are being inundated with data****—from information on customer-buying habits to supply-chain efficiency. But many managers struggle to make sense of the numbers."*

Forbes.com

*"…now* ***Watson is being put to work digesting millions of pages of research,*** *incorporating the best clinical practices and monitoring the outcomes to assist physicians in treating cancer patients."*

Los Angeles Times

*The Oscar Senti-meter — a tool developed by the L.A. Times, IBM and the USC Annenberg Innovation Lab —* ***analyzes opinions about the Academy Awards race shared in millions of public messages on Twitter."***

CNBC

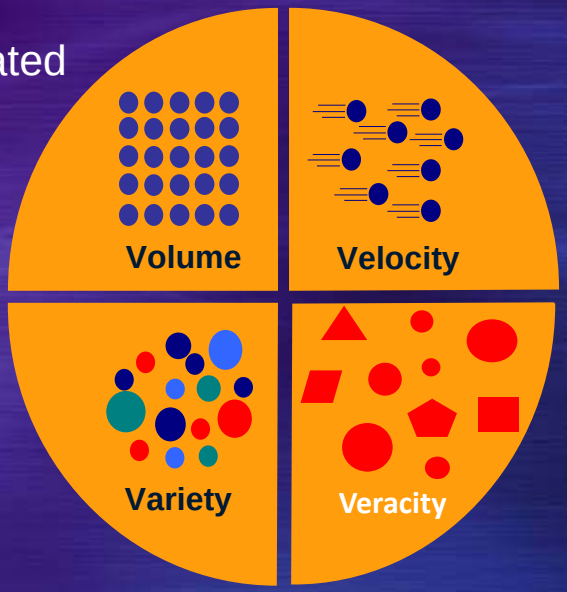
***…is the new oil."***

*Clive Humby*

# The Data Deluge

**35** zettabytes

Data created in 2020




**5** million

trade events per second

**80%**

Of enterprise data is unstructured (text, video, images)

Only **1 in 3**

Decision makers trust their information

"We have for the first time an economy based on a key resource [Information] that is not only renewable, but self-generating.

Running out of it is not a problem, *but drowning in it is*."

– John Naisbitt

# New types of Data: $S^3$

- Sensor Data:
  - Location, Power, Temperature, Pressure, Speed, …
  - GPS and Mobile Devices, RFID
- System Data:
  - Log files, Device records, SNMP MIBs
- Service Data:
  - Usage log files, transactions, Internet, other
- Industries & Applications:
  - Energy, Mining, Transportation, Manufacturing, Logistics, etc.
  - Performance, Security, Compliance, and Fraud Monitoring
  - Error and Service Level Monitoring
  - Usage, Metering and SCADA

# Example: New Data Sources in Logistics

| Source | Opportunity |
|---|---|
| Weblogs | Insights into the customer shopping patterns (quote requests, types of loads, origin-destination pairs), going beyond confirmed bookings |
| Trailer tags | Insights into container transit times and dwell times, temperature, integrity of loads |
| Pallet/Case/SKU tags | Insights into transit and dwell times from source to destination — on the road, in the yard, at a warehouse |
| EOBRs | Insights into travel times, load/unload times, and driver hours |
| Mobile devices | Insights into mobile application usage by customers, partners, and employees |
| Social platforms | Customer insight —who "likes" your products, who has advocated your products, who has issues, and what their issues are |

# What Big Data can do for you

## Big Data Sources

Transactional / Application Data

Machine Data

Social Media Data

Content

## Business Outcome

Gain new insights into customer behavior

Run Zero-latency Operations

Innovate new products at Speed and Scale

Instantly detects Fraud and Risk

Exploit Instrumented Assets

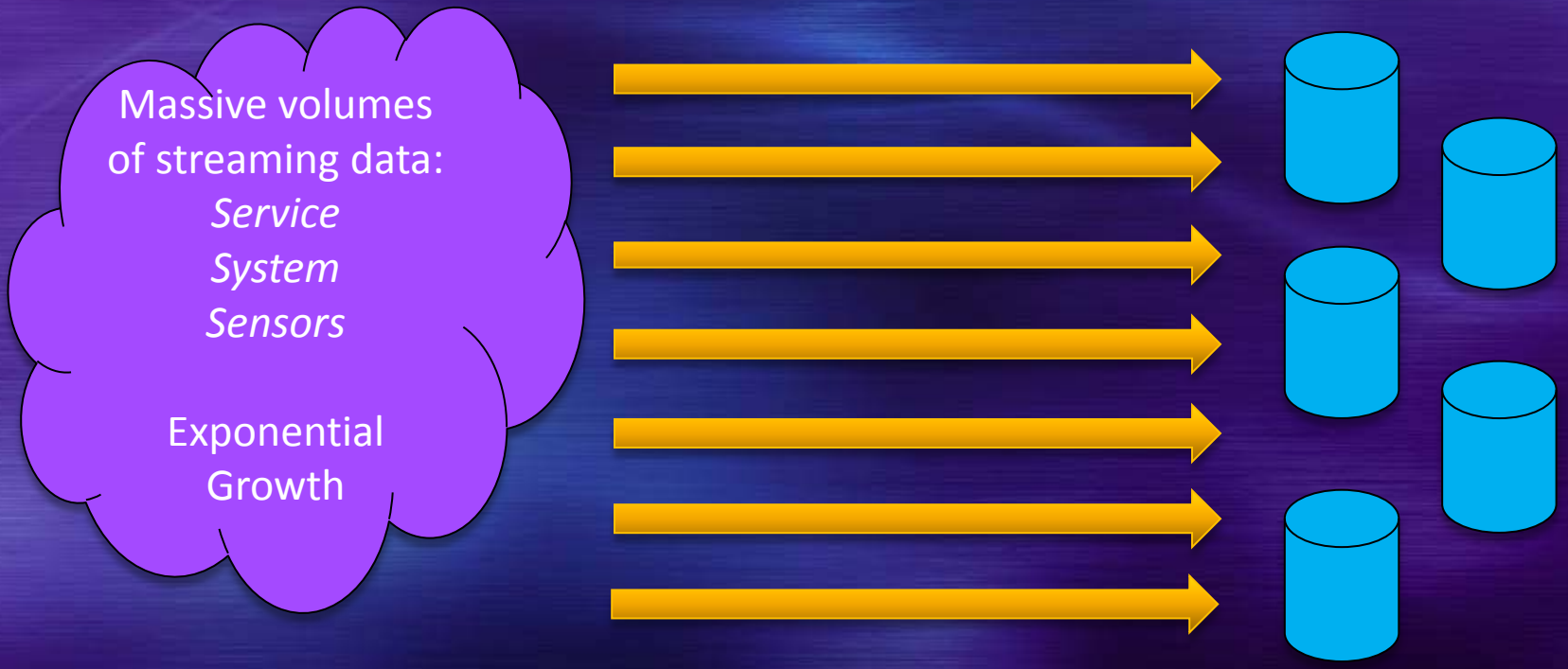
# Big Data and Big Analytics

**Big Data** describes a new generation of technologies and processes designed to economically extract value from very large volumes of a wide variety of data, by enabling high-velocity capture, discovery, and analysis.

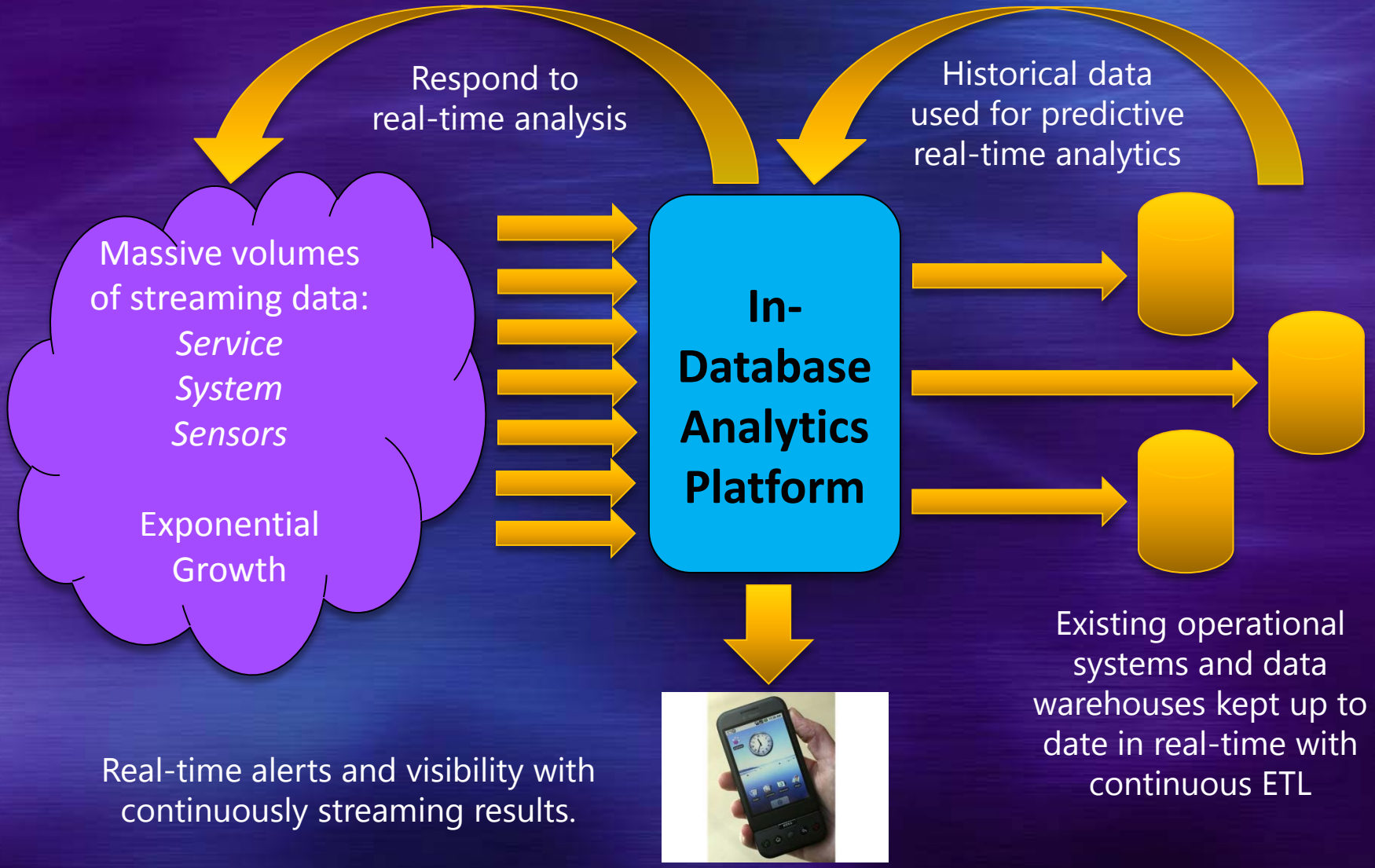
**Big Analytics** is the application of Big Data technologies to customer actions and business operations to develop new insights.

# Legacy "Store and Analyze" Operational Platforms

Poorly integrated operational platforms based on traditional store and process technology



# Real-time streaming and analysis



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# Big Analytics Advantage: **Smarter**

- Smarter decision making comes from the ability to combine new sources of data to enhance existing analytics and predictive models in operational systems and data warehouses.
- New insights emerge from synthesis of multi-structured data from sensors, system and web logs, social computing web sites, text documents, etc. that are difficult to process using traditional analytical processing technologies.

# Big Data Advantage: **Faster**

- Faster decisions are enabled because big data solutions support the rapid analysis of high volumes of detailed data.
- Analysis at this scale is  been difficult to date because it takes too long or is too costly
- Traditionally, enterprises have had to aggregate or sample the detailed data before it can be analyzed, which adds to data latency and reduces value of the results.

# Big Data Advantage: Time to Value

- Faster time to value is possible because organizations can now process and analyze data that is outside of the enterprise data warehouse.
- Enterprises can to integrate large volumes of machine-generated data from sensors and system and web logs into the enterprise data warehouse for analysis.

# Big Data Applications by Industry

- Insurance : Individualize auto-insurance policies based on vehicle telemetry data.
  - More accurate assessments of risks
  - Individualized pricing based on actual individual customer driving habits;
  - Influence and motivate individual customers to improve their driving habits
- Travel: Optimize buying experience through web log and social media analysis
  - Gain insight into customer preferences and desires;
  - Up-sell by correlating current sales with subsequent browsing behavior Increase browse-to-buy conversions via customized offers and packages
  - Personalized travel recommendations based on social media data
- Gaming: Collect gaming data to optimize spend within and across games
  - Gain insight into likes, dislikes and relationships of its users
  - Enhance games to drive customer spend within games
  - Recommend content based on analysis of player connections and similar “likes”

# The rise of predictive analytics

- Predictive Analytics helps your organization anticipate change so that you can uncover patterns and associations and develop models to guide front-line interactions.
- With these unique insights you can prevent high-value customers from leaving, develop successful products and product offers, identify and minimize fraud and risk, fight crime, etc.
- Predictive Analytics gives you the knowledge to predict and the power to act.

# Predictive analytics domains

## Predictive Customer Analytics

Acquire
Grow
Retain

- Up-sell/cross-sell
- Market basket analysis
- Churn prevention
- Customer segmentation
- Brand Monitoring

## Predictive Operational Analytics

Manage
Maintain
Maximize

- Predictive maintenance
- Assortment planning
- Reverse logistics
- Resource management
- Quality assurance

## Predictive Threat & Risk Analytics

Monitor
Detect
Control

- Claims fraud
- Credit-card fraud
- Insider threat
- Signals analysis
- Cyber security

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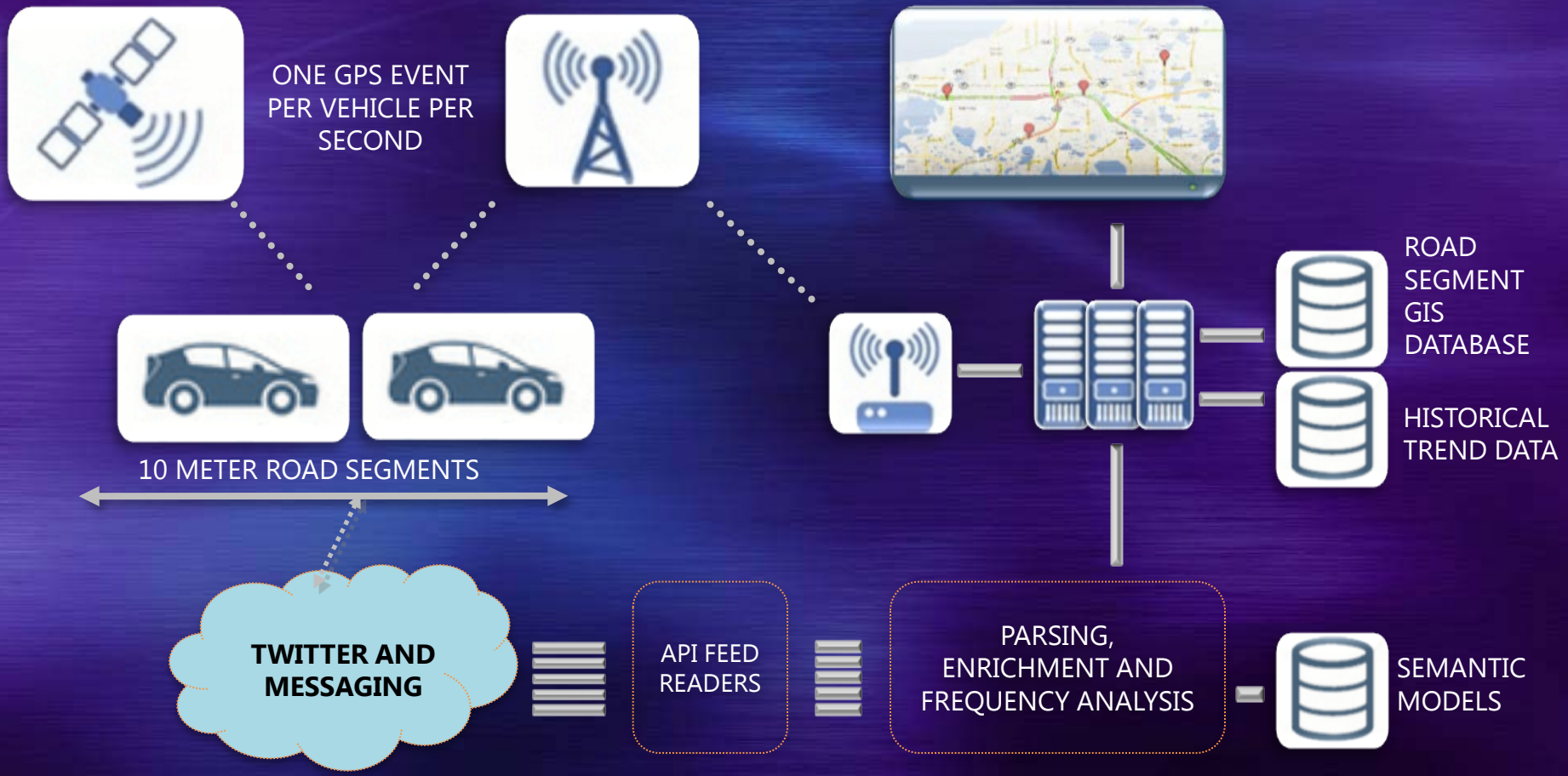
# Big Data use cases in transportation

- Analysis of real-time traffic data from a variety of sources such as GPS, radar sensors on motorways, congestion charging, weather, etc.
- Outputs
  - Intelligently identify current conditions
  - Estimate travel times from point to point
  - Offer advice on alternative travel routes
- Benefits
  - Decreased congestion and improved traffic flow
  - Improved motorway safety and reduced accidents
  - Reduced emissions

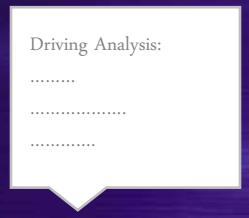
# Real-time congestion detection

OBJECTIVE: ACCURATE AND RELIABLE TRAVEL TIME INFORMATION with dynamic updating of alternative routes, by augmenting existing performance monitoring with perception of 'worse than usual' and reinforcement of incident detection.



# Vehicle Telematics & Driver Monitoring

- Commercial Vehicles
  - Dynamic road tolling
  - Real-time driving log
  - Safety, compliance and alerting
- Young Driver Programs
  - Breaks on insurance for good drivers
  - Journey report for each trip upon arrival
- Vehicle Health Monitoring
  - Health monitoring of key vehicle systems
  - Real-time “panic” alerts
  - Reduce vehicle “walkaway” events


# Big Data use cases in logistics

- Using Radio-Frequency Identification (RFID) data to analyze a product's location at any point in time, leading to better supply chain execution and more efficient delivery.
- Tracking of “Cold chain" movements (temperature-controlled shipments) with sensors on pallets that call home via cellular GPS (global positioning systems) and tell a manufacturer or logistics company exactly where it is sitting and what condition it's in. Big Analytics can analyze this data to ensure that shipments don't become too hot or too cold, or encounter too much vibration in transit.
- “Path analysis" of the supply chain to examine ways to move a product more effectively from manufacturer to consignee by merging sensor data with information from ERP systems, warehouse management systems (WMS), and transportation management systems (TMS) into a common pool for analysis.

# Example: Agile Logistics at Cemex

**Global Digital** enables tracking of orders and payments

**Cement trucks** can deliver orders within a 20 minute window

**Customers**

**Dynamic Synchronization of Operations (DSO)** controls plant production, tracks vehicle movements, and automatically optimizes order fulfillment

**Customers** have the flexibility to change orders

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# Start with business questions

- What are the questions that need to be asked?
- What are the business domains where we need better insights (marketing, operations, finance, logistics)
- How can we tie data to business outcomes?
- Who needs what information at what right time?
- How often should this information be updated, delivered, and shared?

# Building your Big Analytics Team

- Educate:
  - Identify people who are technically adroit and creative.
  - Combine business, analytical and technical expertise
  - Develop the team through training and certifications in Big Data Analytics and Data Science.
- Acquire:
  - Bring in individuals from outside your four walls and outside your industry
  - Diversity ensures complementary skills and the ability to challenge existing mental models
- Empower
  - Challenge the team with creating measurable impact
  - Provide the team with support of senior management.
  - Protect the team when it runs into resistance

# Summary

- Big Data is characterized by volume, variety and velocity
- Big Analytics creates competitive advantage through smarter, faster decisions and faster time to value
- Big Analytics can be applied across operations, marketing, finance and supply chain domains
- Big Analytics strategy must begin with the right business questions and then focus on the right team and technology platform

# Thank You!