THE DIGITAL SUPPLY CHAIN – FACT VERSUS FICTION

KLU Alumni Discussion
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Kuehne Logistics University
AGENDA

- Introductions
- Digital implications for transport and logistics operations
  - Automation
  - Autonomy
  - Information
  - The “Cloud”
  - Collaboration
- A potential future? A “Physical Internet”
- Your challenge – what should you do?
- Summary and questions
THE PACE OF TECHNOLOGICAL CHANGE IS ACCELERATING

Technology adoption curves for a range of modern innovations. Victorian Government.
THIS CAN CLEARLY BE SEEN IN THE EXPLOSION OF “UNICORN” STARTUPS FOCUSED ON DIGITAL TECHNOLOGIES
THE TRANSPORT AND LOGISTICS INDUSTRY HAS NOT ESCAPED THE INCREASED PACE OF DIGITALIZATION

THE SUPPLY CHAIN & LOGISTICS TECH MARKET MAP

E-COMMERCE LOGISTICS

WAREHOUSING

TRUCKING

ENTERPRISE RESOURCE PLANNING

SENSORS / ASSET TAGGING

FREIGHT & SUPPLY CHAIN VISIBILITY

LAST-MILE DELIVERY

INVENTORY MANAGEMENT

CB INSIGHTS
THESE NEW TECHNOLOGIES PROMISE TO REVOLUTIONIZE HOW THE INDUSTRY OPERATES...

Technological and consumer megatrends plus the regulatory environment will pave the way for new players and business models.

- **Next-generation commercial transport and logistics**
  - Set of features enabling the partial or complete automation of driving functions
  - Set of services and features enabling communication and data transfer of vehicles with drivers, other vehicles, and infrastructure
  - Future technologies with potential to complement today's technologies
  - Solutions reducing emissions of trucks/LCVs (especially electrification)
  - Consumer demands becoming more sophisticated, increasing required service levels for the logistics industry
  - New players and new business models entering the logistics industry

**Compound effect**

**SOURCE:** McKinsey
... AND THESE TRENDS ARE LEADING TO A HIGHLY CONNECTED WORLD
TODAY WE WILL HAVE THE OPPORTUNITY TO BEGIN A DISCUSSION ON DIGITALIZATION AND ITS IMPACT ON LOGISTICS OPERATIONS
Before we start the discussion, however, what do you see as the main challenges that “digitalization” has/is/will bring to your business?

Digital Supply Chains

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TECHNOLOGICAL ADVANCES ARE DRIVING SIGNIFICANT CHANGE IN THE TRANSPORT AND LOGISTICS INDUSTRY

T&L Trends

Automation

- Aging populations, unattractive work, cost pressures, velocity requirements, volumes all are driving a push to logistics automation

Autonomy

- Smart infrastructures, scarce labor, regulations, costs, asset utilization, etc. are driving the development of autonomous logistics tools

Information

- IoT devices, instrumented infrastructures, M2M/V2V communications, cloud computing, etc. are driving predictive and prescriptive analytics

The “Cloud”

- Scale and scope economies, standards, regulation, environmental requirements are all driving logistics operators to integrate activities

Collaboration

- Regulations, integration, information, autonomy and automation are costly and will require industry players to collaborate in their operations and business models
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THE NEED TO INCREASE VELOCITY, LOWER UNIT COSTS, AND ADDRESS WORKFORCE SCARCITY IS DRIVING NEW FORMS OF AUTOMATION

- Automated Guided Vehicles – while not the newest form of automation, AGVs are gaining in popularity as software improves and new applications are developed
  - Warehouse operations (work to worker systems)
  - Ports (automated container handling)
  - Production (intra-logistics operations)
  - Healthcare (inter-facility logistics)
  - Chemicals (automated filling and tanker movement)
  - Etc.
ROBOTICS IS ONE OF THE FASTEST GROWING AREAS OF INNOVATION IN LOGISTICS OPERATIONS

- Robots are used in many applications in logistics
  - Palletization
  - Unloading
  - Layer picking
  - Goods picking
  - Goods carriage
  - Packing
- Robots increase productivity, reduce injuries and improve quality
- Robots today are more flexible than humans and far easier to “program”
- Note: 3D printing or, “additive production,” is nothing but distributed robotic production
OTHER AREAS OF LOGISTICS ARE SEEING INCREASING INTEREST IN AUTOMATION

- Material handling
- Storage and retrieval
- Packaging
- Conveying
- Sorting
- Loading/Unloading
FACILITATING THE ADVANCE OF AUTOMATION HAS BEEN THE EVOLUTION OF STANDARDS AND SOFTWARE

- Modular packaging
- Graphical configuration of software
- Standard automation interfaces
- Process oriented control software
- Standardized containers
- PLC interfaces
- The Robot Operating System (ROS)
- Etc.
THE INTERNET OF THINGS PROMISES TO FURTHER INCREASE THE POTENTIAL OF AUTOMATION IN LOGISTICS

Intelligent Systems for a More Connected World

WHAT ARE INTELLIGENT SYSTEMS?

Intelligent Systems are devices that transform how we travel, shop, make things and more.

7 Connected Devices per Person

By 2020 each person will own an average of 7 connected devices.1

71% of Shoppers are Multi-Channel...

based on respondents planning their 2011 holiday shopping.2

Managed

Can be remotely monitored, updated and power controlled

Connected

Shares data through Internet and the cloud

Secured

Protects data against malware, theft and tampering

Com munications

#2 Data Breach

Medical data disclosure is the second most breached source of data.3

Retail

23.6M Connected Cars

23.6 million cars will have Internet access by 2016, rising from 8.7 million in 2012.4

Vehicles

30% Annual Growth Rate

Projected increase in connected machine-to-machine devices over the next 5 years.5

Industrial

1 Intel. "The Internet of Things: How the Next Evolution of the Internet is Changing Everything", April 2013
4 2013 Intel Corporation, All rights reserved. Intel and the Intel logo are trademarks of Intel Corporation in the U.S. and other countries. Other names and brands may be claimed as the property of others.
WITH MORE INTELLIGENCE IN SYSTEMS THE CONCEPT OF SELF ORGANIZED LOGISTICS OPERATIONS BECOMES POSSIBLE
HOW DO YOU THINK AUTOMATION IS, OR COULD, BE LEVERAGED IN YOUR BUSINESS?

- Where do you think automation could have the greatest impact in your business?
- What do you think will get in the way of effectively implementing automation in logistics?
- What skills are needed to effectively use automation?
- Do you think automation of operations in the supply chain is a good thing?
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AUTONOMOUS OPERATIONS OF LOGISTICS ASSETS IS BECOMING A REALITY

The Building Blocks of Autonomy

Autonomous Solutions

Processing

Sensors

Connectivity

Mapping

Algorithms

Security/Safety

Development Tools

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THE BENEFITS OF AUTONOMOUS OPERATIONS CAN BE SIGNIFICANT – FOR AUTOMOBILES....

Benefits of Autonomous Car

<table>
<thead>
<tr>
<th>Google’s Aspiration</th>
<th>Potential Annual Benefits (US only)</th>
</tr>
</thead>
</table>
| 90% reduction in ACCIDENTS | 4.95 million fewer accidents  
                            30,000 fewer deaths  
                            2 million fewer injuries  
                            $400 billion saving in cost |
| 90% reduction in WASTED COMMUTING | 4.8 billion fewer commuting hours  
                                    1.9 billion gallons in fuel savings  
                                    $101 billion saved in lost productivity and fuel cost |
| 90% reduction in CARS | Reduce cost per trip-mile by 80%+  
                        Car utilization from 5-10% to 75%+  
                        Better land use. |

Ref: [http://www.carloan4u.co.uk/infographics/the-ultimate-car-of-the-future/](http://www.carloan4u.co.uk/infographics/the-ultimate-car-of-the-future/)  
Google, US NHTSA, AAA, Texas A&M Transportation Institute, Columbia University Earth Institute and Devil’s Advocate Group’s analysis
... AND TRUCKS TOO 😊
TRUCK PLATOONING IS ONE EXAMPLE WHERE AUTONOMOUS OPERATIONS CAN PROVIDE SIGNIFICANT BENEFITS
THESE BENEFITS HAVE BEEN UNDERSTOOD FOR MANY YEARS, BUT ONLY NOW CAN TECHNOLOGY FACILITATE THEIR REALIZATION.

Source: Partners for Advanced Transit and Highway Program (1992)
AUTONOMOUS SHIPS ARE ALSO BEING EXAMINED...
...AS ARE AUTONOMOUS AIRCRAFT
OPERATION OF AUTONOMOUS VEHICLES REQUIRES SIGNIFICANT INVESTMENT IN SMART INFRASTRUCTURES...
...BUT REMOVING THE HUMAN ELEMENT FROM VEHICLE OPERATION ALSO PROMISES NUMEROUS BENEFITS
HOW MIGHT AUTONOMOUS VEHICLES HELP YOUR BUSINESS?

- Do you currently use, or know of others who use, autonomous vehicles in their operations?
- What kind of benefits do you think would result from employing autonomous transport vehicles in logistics operations?
- What are the downsides of autonomous operations?
- Do you think that autonomy is a good thing?
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THE AMOUNT OF DATA THAT IS BEING STORED IN VARIOUS MEDIA HAS BEEN GROWING EXPONENTIALLY SINCE THE TURN OF THE CENTURY

Global Information Storage Capacity
in optimally compressed bytes

1986
ANALOG
2.6 exabytes

DIGITAL
0.02 exabytes

1993

2000

2007
ANALOG
19 exabytes
- Paper, film, audiotape and vinyl: 6%
- Analog videotapes (VHS, etc.): 94%
- Portable media, flash drives: 2%
- Portable hard disks: 2.4%
- CDs and minidisks: 6.8%

DIGITAL
280 exabytes
- Computer servers and mainframes: 8.9%
- Digital tape: 11.8%
- DVD/Blu-ray: 22.8%
- PC hard disks: 44.5%
- Others: ≤ 1% (incl. chip cards, memory cards, floppy disks, mobile phones, PDAs, cameras/camCORDERS, videogames)

2002:
“beginning of the digital age”
50%

% digital:
1% 3% 25% 94%
IDC projects that the generation of storable data will grow to approximately 40,000 exabytes by the end of this decade.

BIG DATA RESULTS FROM THE INCREASED USE OF THE INTERNET TO BUY, INTERACT WITH, REPORT ON, MONITOR, VISUALIZE AND STORE THINGS

• The majority of data generated today is the result of electronic image creation, video streaming, surveillance images, blogs, email, online catalogues, etc.
• Autonomous data sources (i.e., the Internet of Things), such as autoID tagged items, automobiles, mobile telephones, webcams and sensor networks are also adding to the electronic data that is generated.
• All of these sources of data create vast amounts of unstructured and difficult to process data that form what industry calls “Big Data”
VALUE FROM DATA, WHETHER BIG OR SMALL, ONLY ARISES WHEN IT IS USED TO INFORM DECISION MAKERS

Sectors differ in their ability to use and obtain value from big data analytics

Big data ease of capture
Reflects ability to own or access data and analytics

- Higher
  - Utilities
  - Natural resources
  - Manufacturing
  - Professional services
- Lower
  - Construction
  - Administration, support, and waste management

Competitive intensity to adopt big data
- Highest
- High
- Moderate
- Low

Big data value potential
Reflects value of data and/or competitive advantage achieved

SOURCE: US Bureau of Economic Analysis; McKinsey Global Institute analysis
FOR LOGISTICS OPERATIONS, VALUE FROM DATA ARISES IN FOUR PRIMARY AREAS

Big Data Value Dimensions for Logistics Operations

**Strategic Direction**
- Information on markets, political situations, goods flows, etc. allow companies to anticipate where they should be investing and developing new goods and services

**Operational Improvement**
- Real time information on goods flows, traffic, customer demands, weather, disruptions, etc. can assist in optimizing routes, asset utilization and risk reduction
- Multiple touch points with customers, shippers, suppliers and regulators allow companies to gather data on sentiments and needs creating opportunities to better serve stakeholders

**Improved Customer Service**
- Aggregation of data on goods flows by locale, region, and lane and integrating these data with macroeconomic data, environmental data, etc. allows companies to create new business opportunities

**New Business Opportunities**
- Data Collection and Storage
- Data Analysis and Refinement
- Operational Improvement and New Business
INTEGRATING BOTH OPERATIONAL AND THIRD PARTY DATA CAN PROVIDE MANAGEMENT WITH EXTREMELY POWERFUL PREDICTIVE TOOLS FOR MARKET COMPETITION
Air Cargo Weight Analytics Study 1/2

**Background and Motivation**
- Air freight constitutes a primary channel for shipping perishable and expensive goods
- Improved management of air transport significantly reduces cost and carbon emissions
- Key issues hampering supply chain efficiency:
  - No Shows / Late Cancellations
  - Hi / Lo Shows, i.e. discrepancy between booking and actual (e.g., weight\volume\#items)

**Proactive discrepancy management approach**
- Exact weight cannot be pre-determined by shippers may only be observed upon acceptance at airline
- Discrepancies can be found in ~50% of shipments, inducing high costs or delays
- Prediction model:

  \[
  p^{Hi} := P\left\{ \sum_{r \in R_f} W_r^A > \sum_{r \in R_f} W_r^P + r \left| \{W_r^A\}_{r \in R_f}, \{W_r^P\}_{r \in R_f}, I \right. \right\}
  \]

  - **Significant weight discrepancy**
  - **Everything known so far**

  \[
  W_r^A - \text{Actual weight of RouteMap } r
  \]
  \[
  W_r^P - \text{Planned weight of RouteMap } r
  \]
  \[
  R_f - \text{Route maps scheduled on flight } f
  \]
  \[
  R_f^A - \text{Accepted Route maps scheduled on flight } f
  \]

**Alert:** IF \( p^* > \delta^* \) THEN alert about "*-load"

\(* = \text{Over} / \text{Under}"

SUPPLY DISRUPTIONS CAN BE ANTICIPATED EARLY BY USING BIG DATA AND DATA ANALYTICS TO UNDERSTAND SUPPLIER PROBLEMS AND PROVIDE CUSTOMERS WITH BETTER SERVICE

Real-Time Supply Chain Risks Management

Challenge
- Chemical company with **1000s of suppliers** would like to understand when certain suppliers face challenges and disruptions
- Create short-term transparency against supply disruptions based on Internet chatter

Approach
- Leverage supply chain maps to identify impact of activities of 2nd and 3rd tier suppliers
- Use real-time text mining procedures to tap data-rich Internet news and social media chatter
- Define response scenarios as required
- **Identify trade-off** between true-false and false-true alerts based on pilot performance and criticality of suppliers
CREATIVE USE OF COMPANY GENERATED BUSINESS DATA, LINKED TO EXTERNAL SOURCES, CAN GENERATE SIGNIFICANT NEW OPPORTUNITIES FOR BUSINESS
ARE YOU LEVERAGING BIG DATA FOR YOUR OPERATIONS?

• Have you started to look into data analytics to improve your operations?
• What opportunities do you think exist for leveraging big data in your operations? For efficiency? For new business? For competitive advantage? For customer service/retention?
• What issues do you see in the use of big data?
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THE DISAGGREGATED NATURE OF LOGISTICS OPERATIONS TODAY LEADS TO INEFFICIENT OPERATIONS AND UNNECESSARY EXPENSE

- End-to-end visibility does not exist
- Quality of shipping process is not controllable
- Assurance of deliveries is problematic
- Costs are not transparent
- Border crossings are problematic
- Vendor quality, reliability, capability, etc. is difficult to ascertain
- Risk management is not uniform
- Information sharing is difficult
- Collaboration does not exist
NEW TECHNOLOGIES, SUCH AS CLOUD COMPUTING AND LOGISTICS AS A SERVICE, ARE MAKING IT EASIER FOR COMPANIES TO OPERATE “ON DEMAND” LOGISTICS

**Conduct all Business Activities via FlSpace**
(Integrated seamless Business Collaboration)

- Single point of access
- Personalized End-User Cockpits
- Social Networking & Collab. for Bus. Partners & Communities
- Access anywhere via any device

- Use On-Demand Solutions for business tasks & collaboration
- Combine & configure for individual business needs
- Re-use for rapid development of new Services & Apps

- Continue using existing IT systems for in-house purposes
- Import / export relevant information for collaboration
- Handle heterogeneous data
- Connect external systems (e.g.: IoT syst., 3rd-party & public services)
THE “INTERNET OF THINGS” IS ALSO HELPING TO FACILITATE AN “ON DEMAND” MODE OF OPERATIONS AND...
Defining Blockchain
A distributed ledger technology

Blockchain is a cryptographic, or encoded ledger—a database of transactions in the form of blocks arranged in a chain. These are validated by multiple users through consensus mechanisms (such as proof-of-work in Bitcoin mining) shared across a public or private network.

Potential benefits of Blockchain technology for the financial services industry

- Reduce costs of overall transactions and IT infrastructure
- Irrevocable and tamper-resistant transactions
- Consensus in a variety of transactions
- Ability to store and define ownership of any tangible or intangible asset
- Increased accuracy of trade data and reduced settlement risk
- Near-instantaneous clearing and settlement
- Improved security and efficiency of transactions
- Enabling effective monitoring and auditing by participants, supervisors, and regulators

Blockchain technology could cut banks’ infrastructure costs for cross-border payments, securities trading, and regulatory compliance.

2009-2012
Foundation days
- Emergence of Bitcoin based on a paper by Satoshi Nakamoto
- On January 3, 2009, the Genesis block was mined
- Experimental and limited to cryptographic community
- Blockchain as the backbone of Bitcoin

2012-2014
Moving beyond the cryptographers
- Rise of Bitcoin exchanges
- Mixed response to Bitcoin as it struggles with money laundering and criminal activity, but also gains acceptance across some online retail stores among others
- Rise of Bitcoin-based startups
- Bitcoin price surged to US$26,000
- Blockchain gains attention of financial services firms (begins internal trials)

2014-2015
Blockchain buzz years
- Blockchain, the underlying technology behind Bitcoin, gets serious attention and investment from financial services firms, regulators, and VCs
- Explosion of use cases within BFSI
- Announcement of consortiums to accelerate adoption, innovation, and common standards
- Banks experiment with their versions of cryptocurrencies
- Global service providers and technology companies put their weight behind Blockchain

2016-2017
Crossing the chasm
- The next two years are critical for Blockchain technology to demonstrate sustainable value and show adoption beyond proofs of concept by FS firms
- Startups backed by VC funding and consortiums need to show results to justify large sums of funding and/or investment of time and resources
- Scalability and throughput issues need to be solved for the Blockchain technology to cross the chasm to mainstream adoption

2018-2020
Adoption movement
- Consortiums will be instrumental in defining protocols and common standards to facilitate widespread adoption
- Regulatory bodies likely to play a key role in facilitating adoption while ensuring compliance
- Explosion of use cases beyond BFSI
- IT service providers likely to accelerate investments to build capabilities around Blockchain technology implementation
- Rise of IPOs and unicorns in the Blockchain startup ecosystem

Accelerated adoption
- Blockchain will gain adoption within and beyond BFSI, leading to new business models at the intersection of advanced analytics, IoT, and Blockchain based smart contracts
- Blockchain is referenced in two major shifts expected to occur in the near future, according to a report by World Economic Forum: The first tax collected by government using the Blockchain technology by 2023. The second one is storing more than 50% of global gross domestic product in Blockchains by 2027
- Banks’ infrastructure costs for cross-border payments, securities trading, and regulatory compliance reduced by US$15-20 billion a year from 2022, according to a recent report by Spanish bank Santander

Everest Group Blockchain in BFSI – Looking Beyond the Hype
THERE ARE CONSIDERABLE BENEFITS TO THINKING OF LOGISTICS OPERATIONS AS SHARED ACTIVITIES BETWEEN VIRTUAL PARTNERS
THE BENEFITS ENABLED BY THE CLOUD WILL HELP THE SECTOR ADDRESS ITS CONTINUING PROBLEMS WITH EFFICIENCY AND SUSTAINABILITY

CO₂ EMISSIONS FROM TRANSPORT

Source: Stern Review, and Baseline for World Resources Institute Climate Analysis Indicators Tool (CAIT) online database version 3.0
HOW MIGHT CLOUD BASED APPROACHES TO LOGISTICS HELP YOUR OPERATIONS?

• Do you currently use any cloud based logistics services?
• What benefits/costs might a cloud based logistics operations model have for your business?
• What are the pros and cons of “Logistics as a Service” in your mind?
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ALL OF THE WORLD’S TRENDS LEAD TO BUSINESS MODELS THAT DIFFER FROM TODAY’S COMPETITIVE INDUSTRY STRUCTURE
ASSET SHARING IS ONE OF THE FASTEST OF THESE GROWING BUSINESS MODELS

Exhibit 2: Sharing Economy allows the transaction of underused assets among people via online platforms

Source: DHL
HOWEVER, THE CURRENT FOCUS HAS BEEN ON HOW INDUSTRY IMPROVES ITS CURRENT OPERATIONS, NOT ON WHETHER IT NEEDS AN ENTIRELY DIFFERENT APPROACH
WHAT ACTUALLY IS NEEDED IS SOMETHING ENTIRELY DIFFERENT FROM THE CURRENT APPROACH

YOU CAN’T DRIVE TO THE FUTURE USING REAR VIEW MIRRORS!
ARE YOU ASSUMING THAT TOMORROW’S LOGISTICS WILL LOOK LIKE AN AUTOMATED VERSION OF TODAY’S LOGISTICS?

- What do you think logistics in the future will look like?
- Do you think that operations will be similar to what you know?
- What are you doing today with respect to collaboration with your “competitors?”
- How will society and governments challenge the approach to logistics in the future?
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OUR CURRENT APPROACH TO SUPPLY CHAIN OPERATIONS IS MOST LIKELY NOT SUSTAINABLE

• We ship mostly air and packaging in our non-bulk shipping operations
• Empty travel of vehicles is the norm, not the exception
• Human resources for logistics services (trucking, warehousing, stevedoring, etc.) are becoming scarce
• Products sit idle most of the time, positioned or stored where not needed and unavailable to those who need them
• Much of what is sold ends up simply being scraped or not used
• City logistics is becoming increasingly problematic
• Product movements due to repositioning and demand changes provide for product tourism and unnecessary shipping issues
• Integrated inter-modal shipments are not possible due to a lack of common systems, planning approaches, transfer operations, etc.
• Networks are fragile and insecure
• Automation is costly and difficult to implement
• Innovation is limited
OUR GOAL AS LOGISTICIANS SHOULD BE TO ASSIST IN CREATING A SUSTAINABLE WORLD

Why do we need to change?

Logistics inefficiency and unsustainability

**ECONOMIC**

Logistics: 5-15% burden on GDP of most countries

Worldwide logistics costs grow faster than world trade

**ENVIRONMENT**

One of the heaviest greenhouse gas generators, energy consumers, polluters and materials wasters

Growing negative contribution while nations’ goals aims for heavy reductions

**SOCIAL**

Lack of fast, reliable and affordable accessibility and mobility of physical objects for the vast majority of the world’s population

Too often precarious logistic work conditions

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ONE POTENTIAL “SOLUTION” MIGHT BE TO USE THE DIGITAL INTERNET AS AN EXAMPLE TO CREATE A PHYSICAL INTERNET
THIS ANALOGY BETWEEN THE INTERNET AND LOGISTICS OPERATIONS SEEMS TO BE SOMETHING THAT WE SHOULD EXPLORE
HOWEVER, WE NEED TO BE CAREFUL THAT THE VARIOUS FORCES DRIVE THE INDUSTRY DON’T ACT IN AN UNGUIDED MANNER
A PHYSICAL INTERNET, BASED ON STANDARDS, COULD CONCEIVABLY BE IN PLACE BEFORE THE MIDDLE OF CENTURY
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SO WHERE DO YOU GO FROM HERE?

If you don’t know where you want to go, well then, any direction will do 😊
WE ARE STILL A LONG WAY FROM REALIZING THE VISION OF THE PHYSICAL INTERNET
THE ADVANCES BEING MADE IN THE WORLD OF LOGISTICS TECHNOLOGY ARE PROVIDING HOPE FOR THE ULTIMATE DEVELOPMENT OF A PHYSICAL INTERNET
WHAT IS STILL NEEDED IS THAT SET OF VISIONARIES WHO, LIKE VINT CERF AND ROBERT KAHN, HAVE THE VISION AND DETERMINATION TO CREATE A DIFFERENT FUTURE FOR LOGISTICS.

Vint Cerf And Bob Kahn

- Vint Cerf
- Co creators of the TCP/IP protocol
- Cerf is now vice-president of Google while Khan is now chairman CEO and president of the Corporation for National Research Initiatives
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THE WORLD IS GETTING MORE AND MORE COMPLEX CREATING A PERFECT STORM FOR LOGISTICS MANAGERS
THE CHANGES OCCURRING IN OUR WORLD ENSURE THAT NO MATTER WHAT WE ARE DOING TODAY, OPERATIONS TOMORROW WILL CERTAINLY BE DIFFERENT

- Technological change is an important topic for all of us
- Global operations and changing market pressures are challenging current “taken for granted” models
- New thoughts and ideas are needed to allow industry to move beyond where it is today
- If we do not take action ourselves governments and non-traditional competitors will make decisions for us
- Creative new approaches, e.g., the Physical Internet, will be required to achieve the goals needed
- It is truly time to “go where no one has gone before”
Thank you for your attention!
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As long as I live, I'll hear waterfalls and birds and winds sing. I'll interpret the rocks, learn the language of flood, storm, and the avalanche. I'll acquaint myself with the glaciers and wild gardens, and get as near the heart of the world as I can.

John Muir