



Emerging Technologies in Transportation & Logistics

Contents

New Technologies

1. 3D printing
2. Big Data
3. Drone

New Trends in Logistics

1. Green Logistics
2. Smart Logistics
3. Airport Security

FIRST SESSION

New Technologies

1. 3D printing

2. Big Data

3. Drone

Emerging Technologies in Transportation & Logistics

FIRST SESSION

New Technologies

1. 3D printing

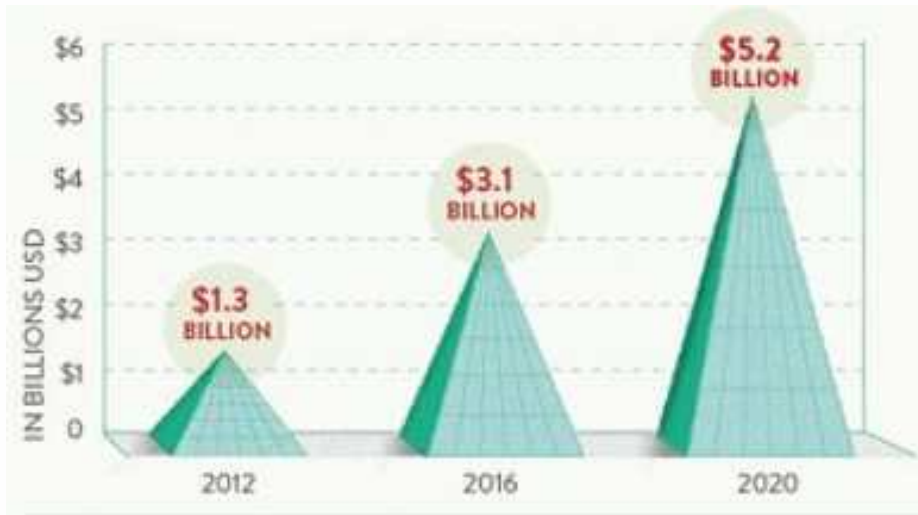
2. Big Data

3. Drone

Emerging Technologies in Transportation & Logistics

3D Printing

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics



<The growth of the 3D printing industry>

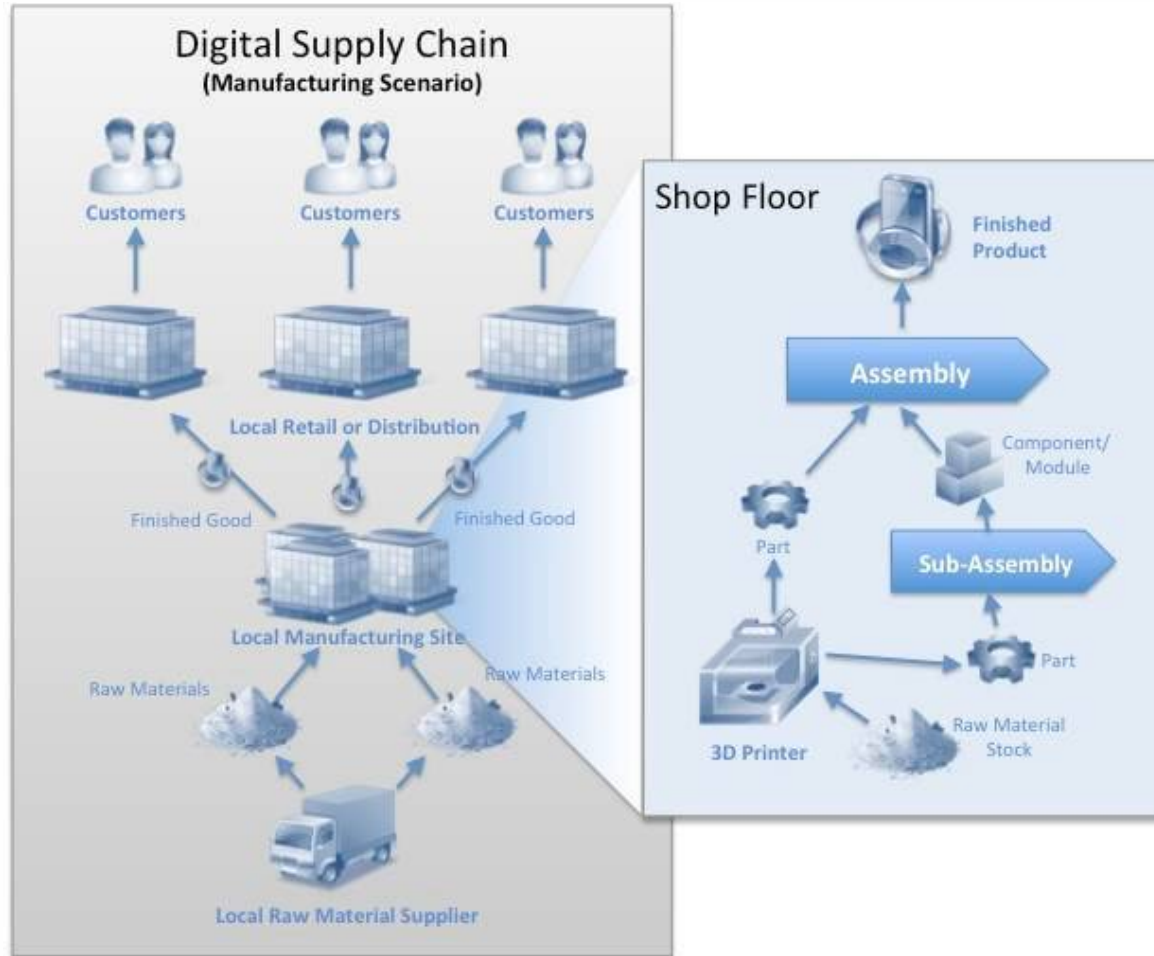


<What is 3D printing?!>

- 3D printing is a process of making a three-dimensional solid object of virtually any shape from digital model.
- 3D printing is achieved using an additive process, where successive layers of material are laid down in different shape.
- The 3D printing industry is expected to change nearly every industry it touches, completely disrupting the traditional manufacturing process.

3D Printing

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics



**New trend of
Supply chain management**

3D Printing

<Impact on Global logistics Industry>

- the biggest single disruptive phenomenon to impact global industry
- Globalization has benefited shipping lines, airlines and freight forwarders enormously as vast quantities of consumer goods are moved internationally to Western markets from the Far East.
- Consequently any challenge to globalization must be viewed as a threat to the global transportation industry.

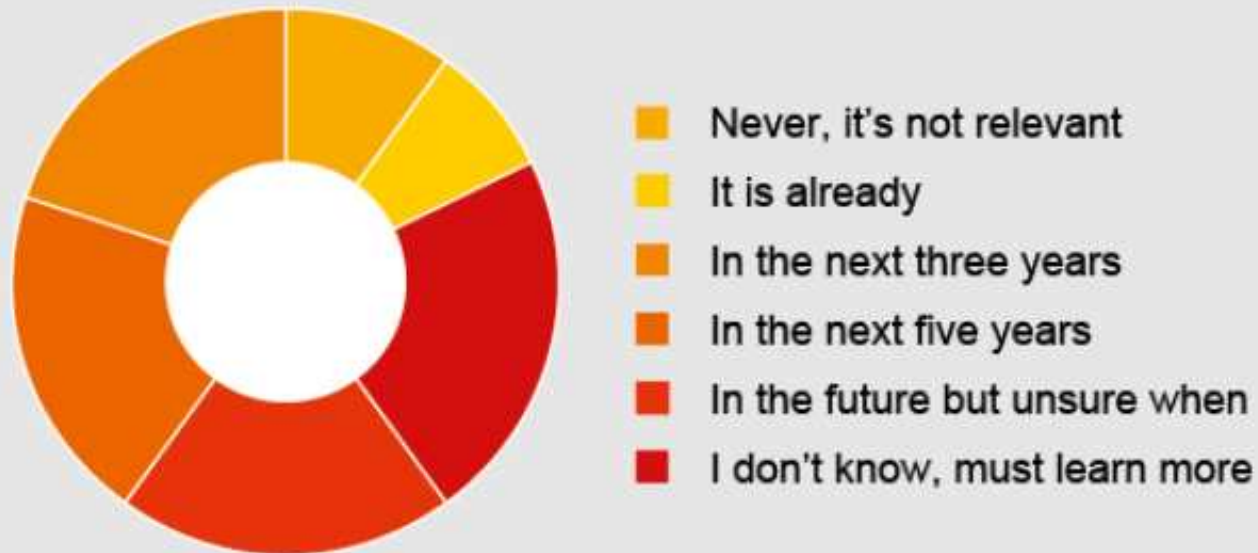


3D Printing

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<Impact on Global logistics Industry>

When do you think 3D printing will play a role in your supply chain?



3D Printing

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<Impact on Global logistics Industry>

- Potentially a proportion of goods which were previously produced in China or other Asia markets could be 'near-sourced' to North America and Europe. This would reduce shipping and air cargo volumes.
- The 'mass customisation' of products would mean that inventory levels fall, as goods are made to order. This would have the effect of reducing warehousing requirements.
- Downstream logistics would also be affected. Build-to-order production strategies could fundamentally impact the manufacturer-wholesaler-retailer relationship.
- A major new sector of the logistics industry would emerge dealing with the storage and movement of the raw materials which 'feed' the 3D Printers. As 3D Printers become more affordable to the general public, the home delivery market of these materials would increase.

3D Printing

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<The logistics company of the Future>

- The changing supply chain dynamics will lead to the evolution of a new type of logistics company resembling a '4PL', or service management company, as much as anything else.
- Their businesses will comprise a mix of software development, delivery services, partner relationship management, contract management and brainpower.
- The Service Parts Logistics industry will be either transformed or decimated by 3D manufacturing - or perhaps both! With small 3D Printing machines available, operations in remote locations.
- The new logistics company will design solutions comprising demand planning, manufacturing, delivery, market monitoring, service parts management and return and recycling services. In essence, they will become Product Life-Cycle Management service providers.

FIRST SESSION

New Technologies

1. 3D printing

2. Big Data

3. Drone

Emerging Technologies in Transportation & Logistics



- Big data is the term for a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools or traditional data processing applications.
- The challenges include capture, curation, storage, search, sharing, transfer, analysis and visualization.

Big data

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<Impact on Global logistics Industry>

- The logistics world, as well as other broader market's business sectors, will recognize what IT-savvy companies already know.
- All companies will need a strategy to handle the increasing wave of data being processed daily.
- Most companies are really in the initiation stage of developing a real strategy for it. It is certainly an advantage to have access to information, but it is even more critical to have a strategy in place for the interpretation and implementation of this data.
- Logistic companies and executives who develop strategies and implement processes on managing this data will ultimately be the organizations which will thrive in this new era of information.

Big data

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<Case of using big data>



- Data-driven decision-making is becoming a more recognized path to success and a sustained competitive advantage for global logistics companies.
- Amazon.com handles millions of back-end operations every day, as well as queries from more than half a million third-party sellers. The core technology that keeps Amazon running is Linux-based and as of 2005, they had the world's three largest Linux databases, with capacities of 7.8 TB, 18.5 TB, and 24.7 TB. As the leader in the information technology world, Amazon is at the forefront of interpreting big data for future strategy and implementation.

Big data

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<Impact on Global logistics Industry>

- In the retail sector, social networks will offer new and progressive avenues to reach or "touch" the consumer.
- Analytics and data will follow closely with these newly formed bonds. With these trends in sight, logistics companies should prepare for the demand, as orders will certainly follow from this relationship.
- With the surge of information, there are definite challenges that present themselves in many forms. One of the largest factors is the internal infrastructure of logistics organizations.
- Positive train control, EOBRs, RF tags, and mobile devices will have an increasing impact on the amount of data that shippers, logistics service providers, and carriers need to process to manage logistics.

FIRST SESSION

New Technologies

1. 3D printing

2. Big Data

3. Drone

Emerging Technologies in Transportation & Logistics

Drone Logistics

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<Drone(UAV)>



- A drone — also known as an unmanned aerial vehicle (UAV) — is an aircraft without a human pilot on board. Its flight is controlled either autonomously by computers, or under the remote control of a pilot on the ground.
- The latest commercial models can carry lightweight packages such as medical supplies, books and food, straight to the waiting hands of the end-user.

Drone Logistics

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<Impact on Global logistics>

- This could significantly cut delivery times, and mean a transfer of skills across the supply chain network, as traditional drivers become 'drone engineers'.
- **Drones are much cheaper than other aircraft**
 - Logisticians are also likely to see significant savings with the use of drones, especially through reduced air shipping costs.
- **Drones are flown remotely and reduce safety and infrastructure issues**
 - Delivering packages to remote, often under-developed regions can be tricky – both for driver safety and accessibility.
 - Delivery by drone is quicker and simpler than relying on poor transportation infrastructure.

Drone Logistics

NEW TECHNOLOGIES
3D Printing
Big Data
Drone Logistics

<Examples of using Drone in logistics>



Domino Pizza

Food giant Domino's Pizza recently performed a marketing stunt that demonstrates the possible future of pizza delivery.

SECOND SESSION

New Trends

- 1. Green Logistics**
- 2. Smart Logistics**
- 3. Airport Security**

Emerging Technologies in Transportation & Logistics

SECOND SESSION

New Trends

1.Green Logistics

2. Smart Logistics

3. Airport Security

Emerging Technologies in Transportation & Logistics

Green Logistics

<Definition of green logistics>

- Green logistics is a form of logistics which is calculated to be environmentally and often socially friendly in addition to economically functional.



- Many modern companies pride themselves on their environmentally friendly policies and practices, and companies which are interested in adopting green logistics can utilize the services of logistics consultants who specialize in helping companies convert, reform, and streamline their existing logistics systems.

The effect of logistics to environment

- Among OECD nations, Korea is one of countries which the amount of emission of green-house gases is rapidly increasing; twice as much the average of OECD nations.
 - The average rate of increase of emission of green-house gases by logistics in 1990 and 2005 is 1.3 however Korea's rate has shown 2.50

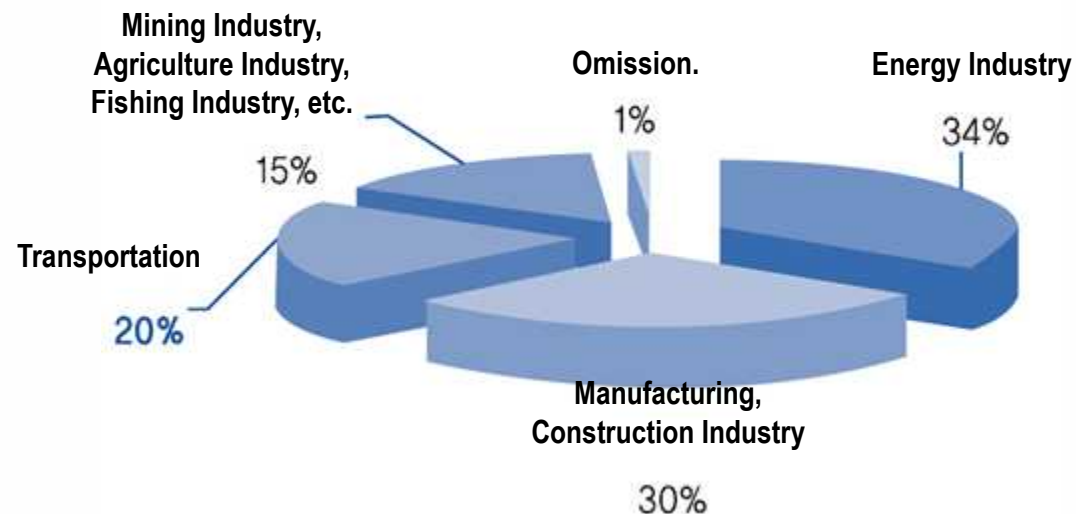
(Unit:100M tCO2)

Country	1990(A)	2005(B)	Increment(MtCO2)	Rate of Increase (B/A)
Korea	49.34	125.73	76.40	2.50
U.S.A.	1,553.78	1,947.50	393.70	1.30
Japan	241.11	289.50	48.40	1.20
France	132.18	160.43	28.30	1.20
Germany	182.09	186.84	4.80	1.00
Italy	111.52	141.19	29.70	1.30
Spain	79.09	145.36	66.30	1.80
England	143.84	172.62	8.80	1.20
OECD	3,118.22	4,066.56	948.30	1.30

The effect of logistics to environment

- The amount of CO2 emission for Korea is about 5.6 ton which is 1.7% of total emission of global rate. This ranks 10th around the world, and 6th among OECD nations. This leads to inevitable need of CO2 reduction plan
- Picture shows the CO2 emission for Korea's industries; transportation / logistics takes 20% of whole emission

<Emission of green house gas from industries>



Case of Green Harbor (Rotterdam Harbor in Netherlands)

- Rotterdam Harbor, the largest terminal in Europe, has planned to reduce the CO2 emission rate to 50% until 2025 compare to 1990
- Carbon footprint, land transport power device are among activities to reduce the emission
- Carbon footprint –Carbon footprint in harbor is system that marks the amount of CO2 emission during handling of 1TEU of container, which allows to trace the amount of CO2 emission stationary
- Land transport power device –Supplying energy to ship from the land while ship is in harbor



Green Logistics

NEW Trends
Green Logistics
Smart Logistics
Airport Security

<Present and Subject of Domestic Green Logistic>

Present of Domestic Green Logistic

- 'Through the enactment of "Sustainability Transportation and Logistics Development Act", the green logistics system must be built and the reason to built must be settled
 - Mistry of Land, Transport and Maritime Affairs is being conducting specific policies for proliferation of green logistics
 - Advanced enterprises are working on green logistics activities (Homeplus, LG Electronics, Hanjin, etc.)
-
- Grand design for green logistics doesn't exist
 - Realizing transport as main reason for CO2 emission
 - Only partially corresponding
 - Neglecting the issue of indoor environments

Subject of Domestic Green Logistic

- Building Green Port: transition to Port-hinterland transport system, energy-standing port
 - Modal shift consider as environmentally friendly means : shippers, cooperation by the shipping company for railway, expanding the use of coastal shipping
 - Developing the collaboration of delivery and storage
 - Enterprise support policy such as green logistics certification system
 - Developing green logistics facilities / equipment and utilization
 - Support global logistics market
-
- Establishing vision of the green logistics
 - Quantify the performance of green logistics activities
 - Standardization of related-technology
 - Establishing Closed-loop SCM system
 - Establishing indoor environmental measures

Green Logistics

NEW Trends
Green Logistics
Smart Logistics
Airport Security

<Example of Green Logistics>

- Energy Efficient Ship
 - NYK Line released the initial exploratory design for its NYK Super Eco Ship 2030, an energy-efficient ship expected to emit almost 70% less CO₂ emissions than current vessels



	Conventional Vessel	NYK Super Eco Ship 2030
Length Overall	338 meters	353 meters
Breadth	45.8 meters	54.6 meters
Draft	13.0 meters	11.5 meters
Main power (Fuel)	Diesel Engine (C heavy oil) 64 megawatts	Fuel Cell (LNG) 40 megawatts
Natural power	None	Solar: 1–2 megawatts Wind: 1–3 megawatts
CO ₂ emissions*	195 g/TEU-miles	62 g/TEU-miles

*TEU-mile: Unit for the carriage of one TEU a distance of one mile

SECOND SESSION

New Trends

1. Green Logistics

2. Smart Logistics

3. Airport Security

Emerging Technologies in Transportation & Logistics

<Technology Market Analysis for Logistics Technology Innovation>

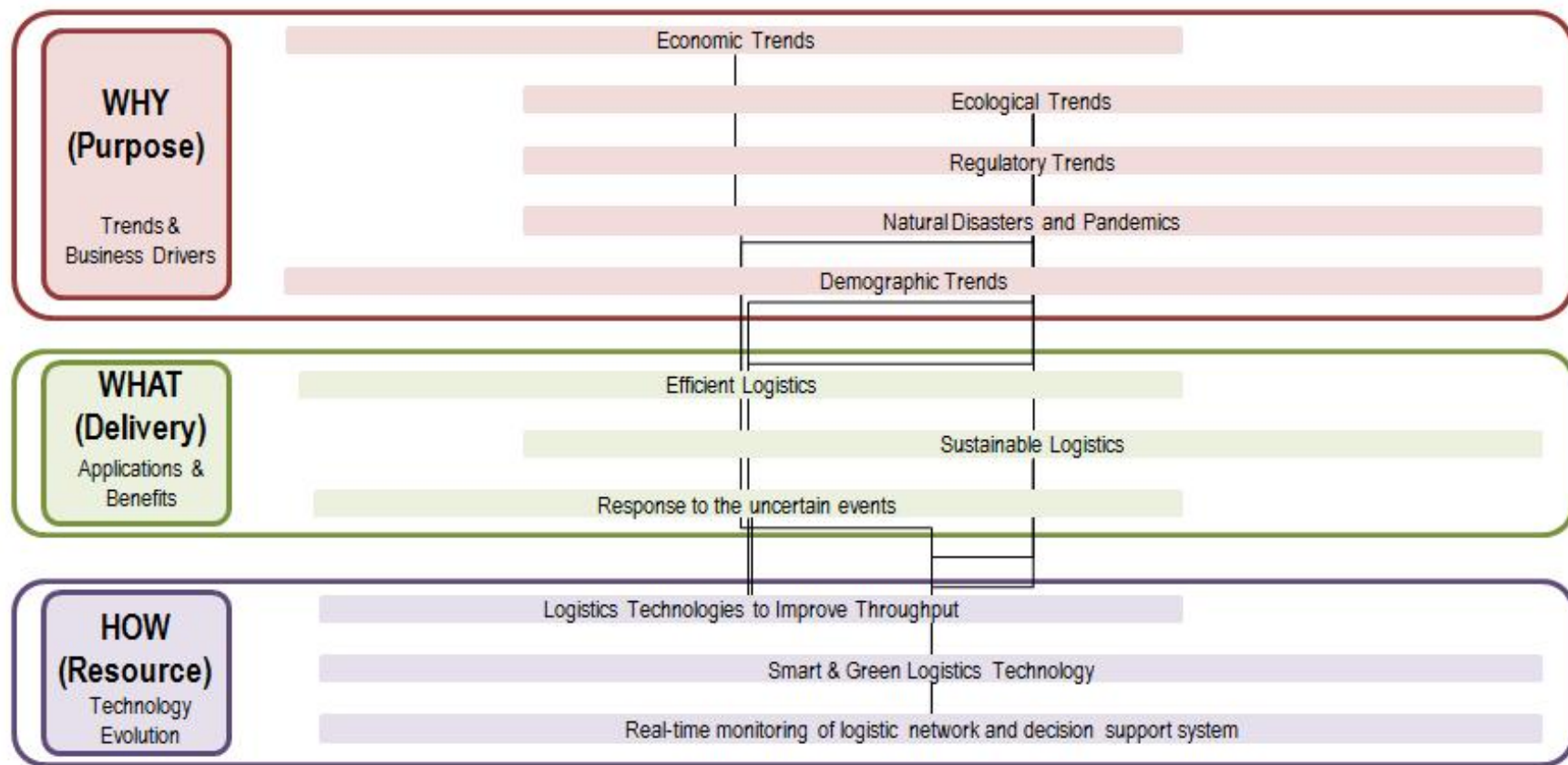
- Technology Market Analysis is the first step of the Technology Innovation
 - Successful Technology Innovation requires timely and relevant market information
 - Technology Market Analysis will give a company the data that a company need to identify a target logistics technology
 - However, a company could not decide a target logistics technology because there wasn't enough data of logistics technology market
- **Logistics Technology Market Analysis is required for Logistics Technology Innovation!!**

Smart Logistics

NEW Trends
Green Logistics
Smart Logistics
Airport Security

< Technology Roadmapping for Logistics Technology Innovation >

Future Logistics Technology Roadmap

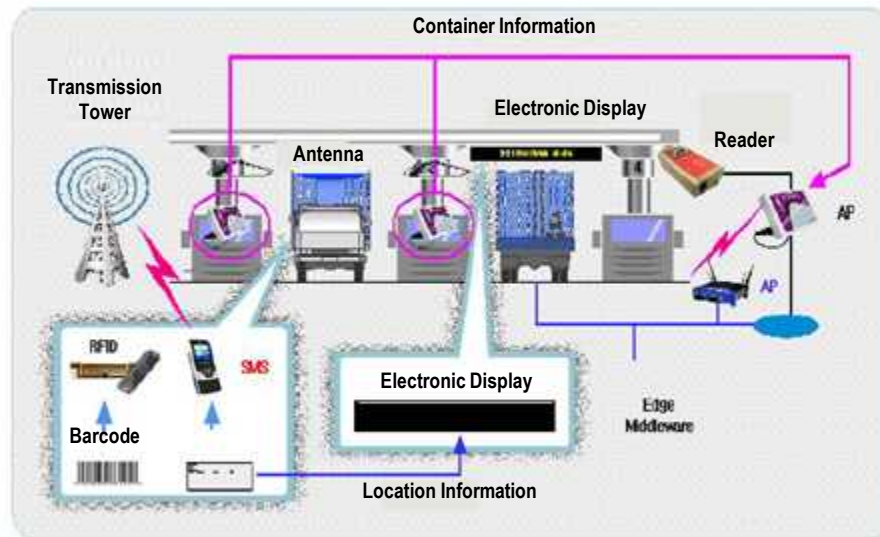


Smart Logistics

NEW Trends
Green Logistics
Smart Logistics
Airport Security

<Improving Port Throughput by using RFID Technology >

<Gate Access control>



[RFID Gate – Export component diagram]



[RFID Gate – Export equipment installed]

<Smart Port (Netherlands Europe Container Terminal)>

- World's first automated container terminals- deployed the yard from the horizontal to the vertical way which is a new concept designed to change terminal
- ECT has developed the container carrying vehicle and yard handling equipment including first automated unmanned cargo handling system
- Complete automated operations – the cascading action of the quay equipment and transport equipment, container transport, cascading action of transfer equipment, yard equipment and yard work load, were all unmanned



Green+Smart Logistics

NEW Trends
Green Logistics
Smart Logistics
Airport Security

<Green IT Technology for Smart & Green Logistics>

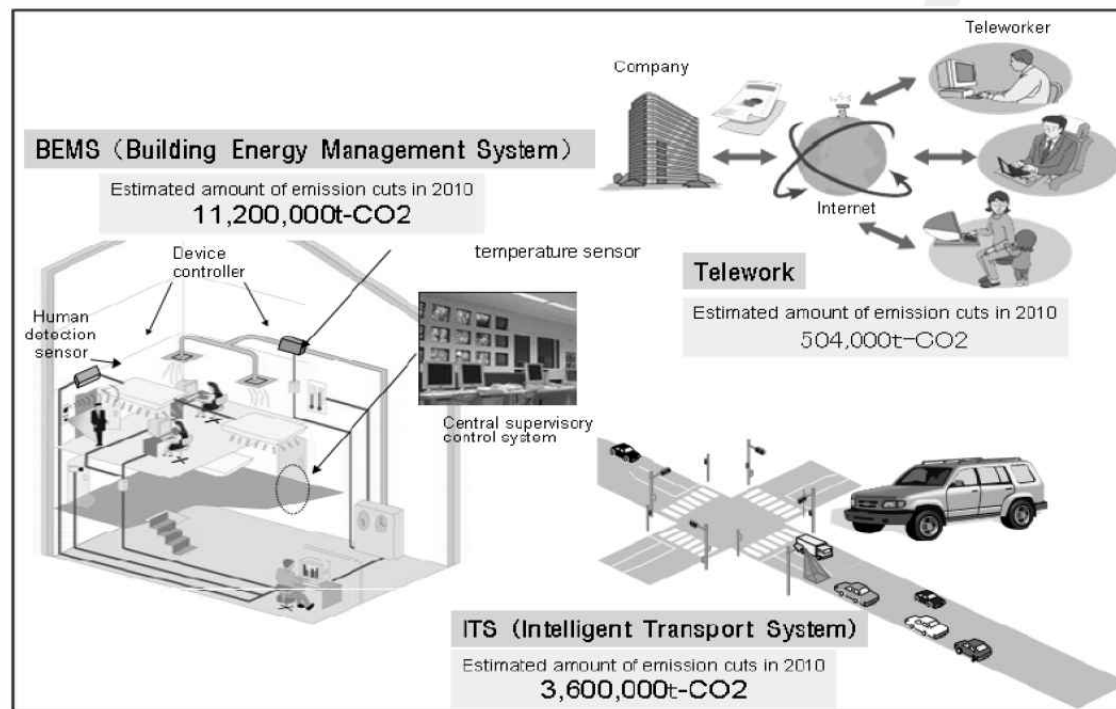
Optimized transport network design support software allows Eco-driving, Optimal transport lane decision simulation technology, Software to minimize the emission of pollutant during driving

Classification	Green S/W	
Commercial Logistics Optimization	Supply Chain Design	• Data Collection/Analysis/Offer • Route Optimization Simulation • Eco-driving • Real time Logistics/Transportation Information
	Intelligent Logistics Management	• GIS, GPS, ITS, FRIID • Traffic Control • Supply Chain Management • Intelligent Delivery Service
Personal Vehicle Route Optimization	Green Vehicle	• Hybrid/Plug-in Hybrid Vehicle, Electric Vehicle
	Personal Vehicle Route Optimization	• Eco-driving • Real time Traffic Information • Route Optimization • Telematics Service

Green+Smart Logistics

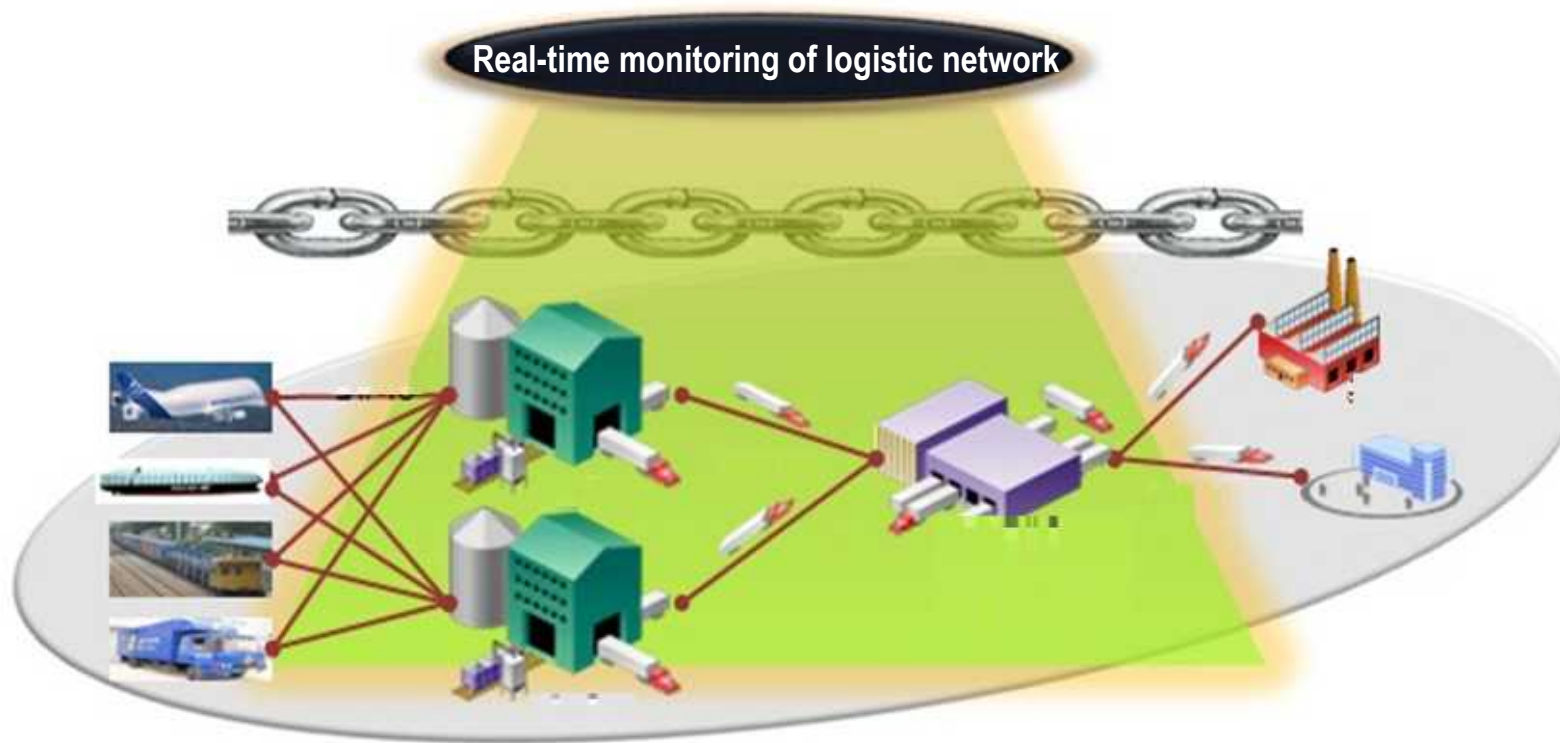
<Reducing CO2 emission using IT technology in Japan>

Economy industry in Japan has goal to reduce 360 million tons of CO2 emission by 2010, through optimizing distribution processing, efficiency improvements, using efficient road by using ITS(Intelligent Transport System)



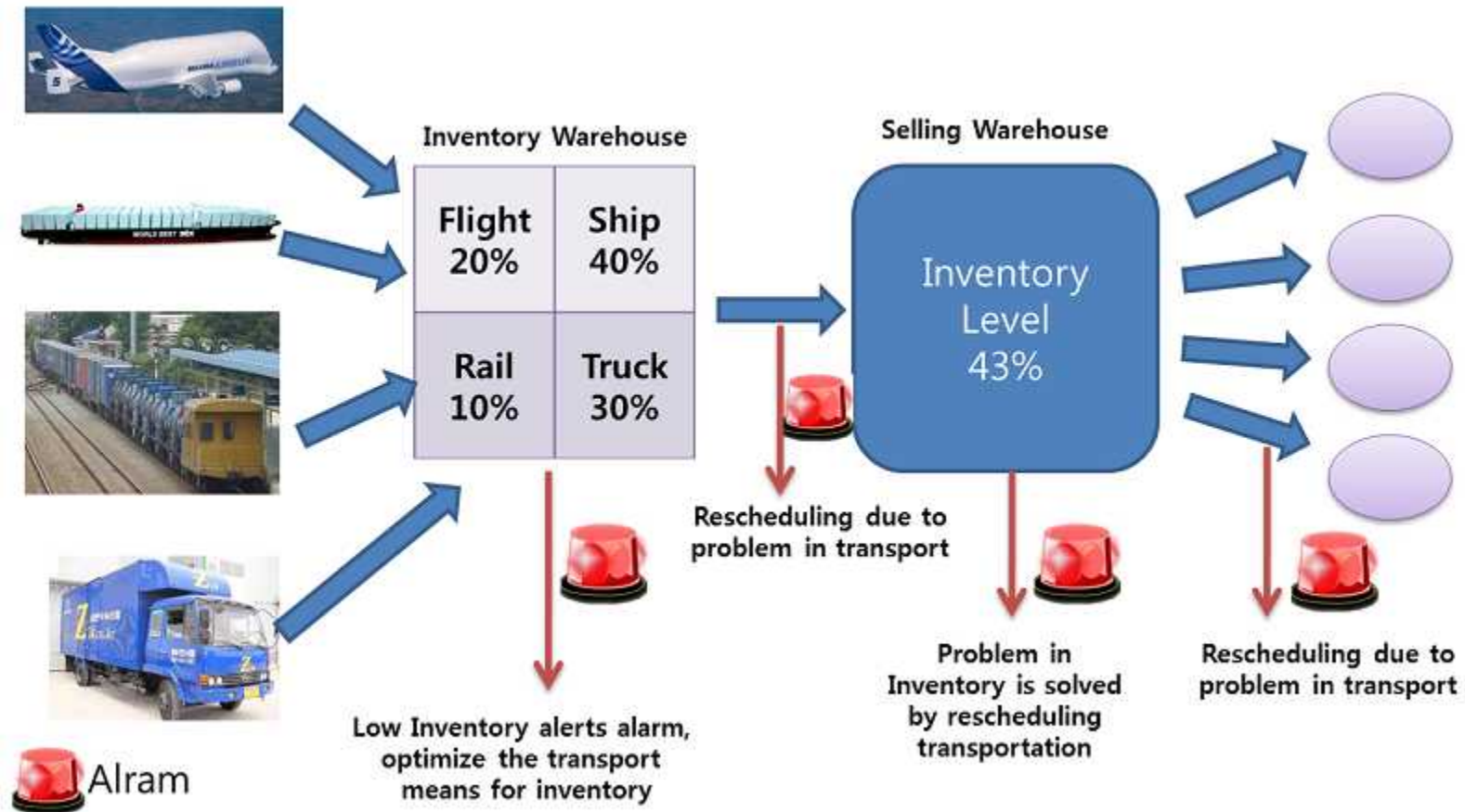
Green+Smart Logistics

<Real time monitoring of logistic network >



Green+Smart Logistics

<Real time monitoring of logistic network >



Green+Smart Logistics

NEW Trends
Green Logistics
Smart Logistics
Airport Security

<Logistic network monitoring/recovery system for Smart & Green Logistics>



A decision support system for effective logistics network management is proposed by developing real-time logistics network monitoring/recovery technologies

SECOND SESSION

New Trends

1. Green Logistics

2. Smart Logistics

3. Airport Security

Emerging Technologies in Transportation & Logistics

Airport Security

<Airport Security Backgrounds>

- The case of a large international airport of the passenger demand is continuously increasing trend.
- According to the increase in passenger, security check was increased due to the departure time.
- Airport security processes became much more complicated and intense after 9.11 terrorists attack.
- Passenger waiting times at security checkpoints significantly increases.
- Average waiting time at airport security is 14.28 minutes for 25 busiest U.S. airports (Max: 31min, Min: 5 min), TSA 2011.



Airport Security

NEW Trends
Green Logistics
Smart Logistics
Airport Security

<Example of Efficient airport security system>

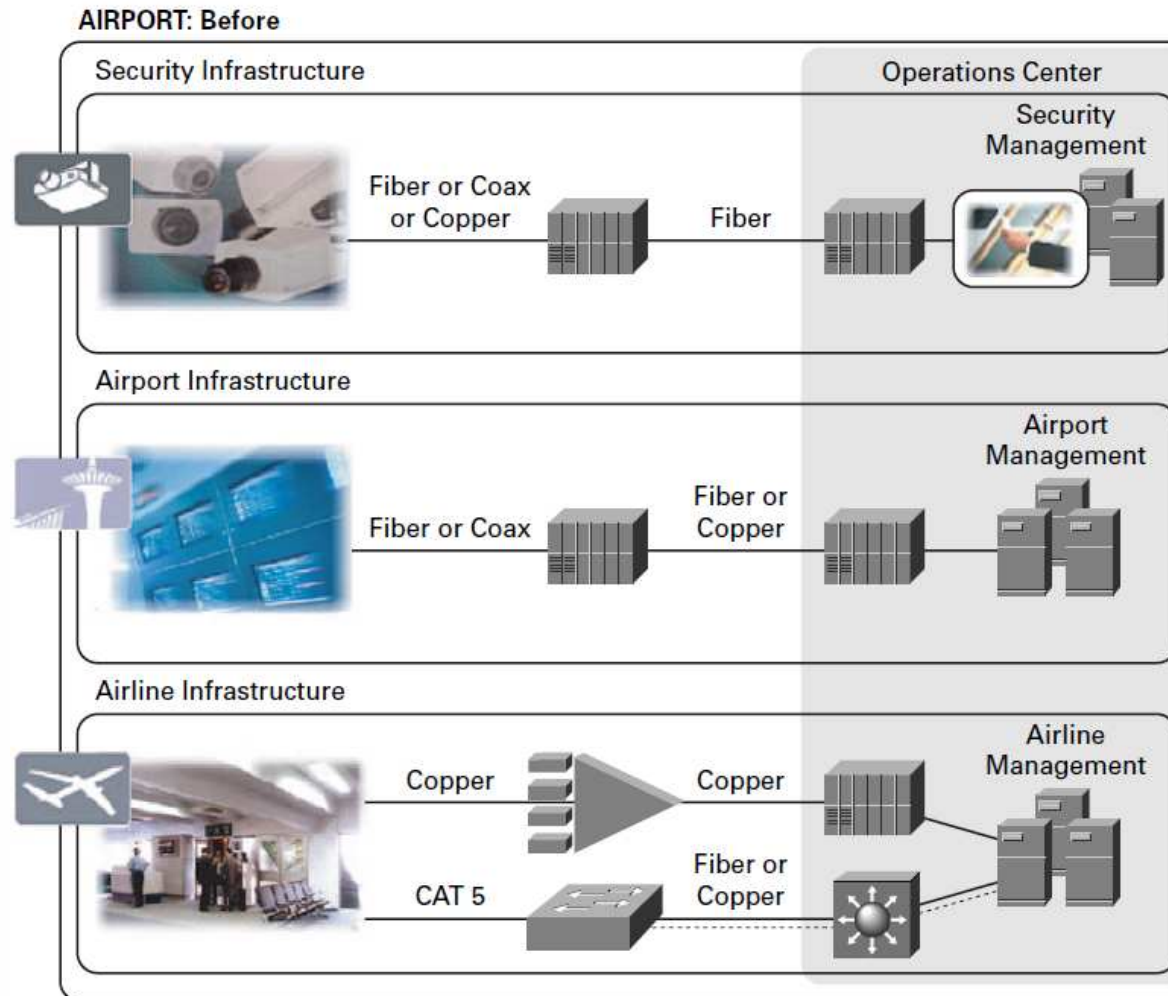
- O'hare's Automated Passport Control technology promises to dramatically reduce wait times for arriving international passengers.
- The program allows eligible U.S. citizens and legal residents to scan their passports and answer basic security questions at automatic kiosks in the international arrivals hall before speaking to a CBP officer.



Source : www.eturbonews.com, "Chicago Airport hailed for efficient entry system"

Airport Security

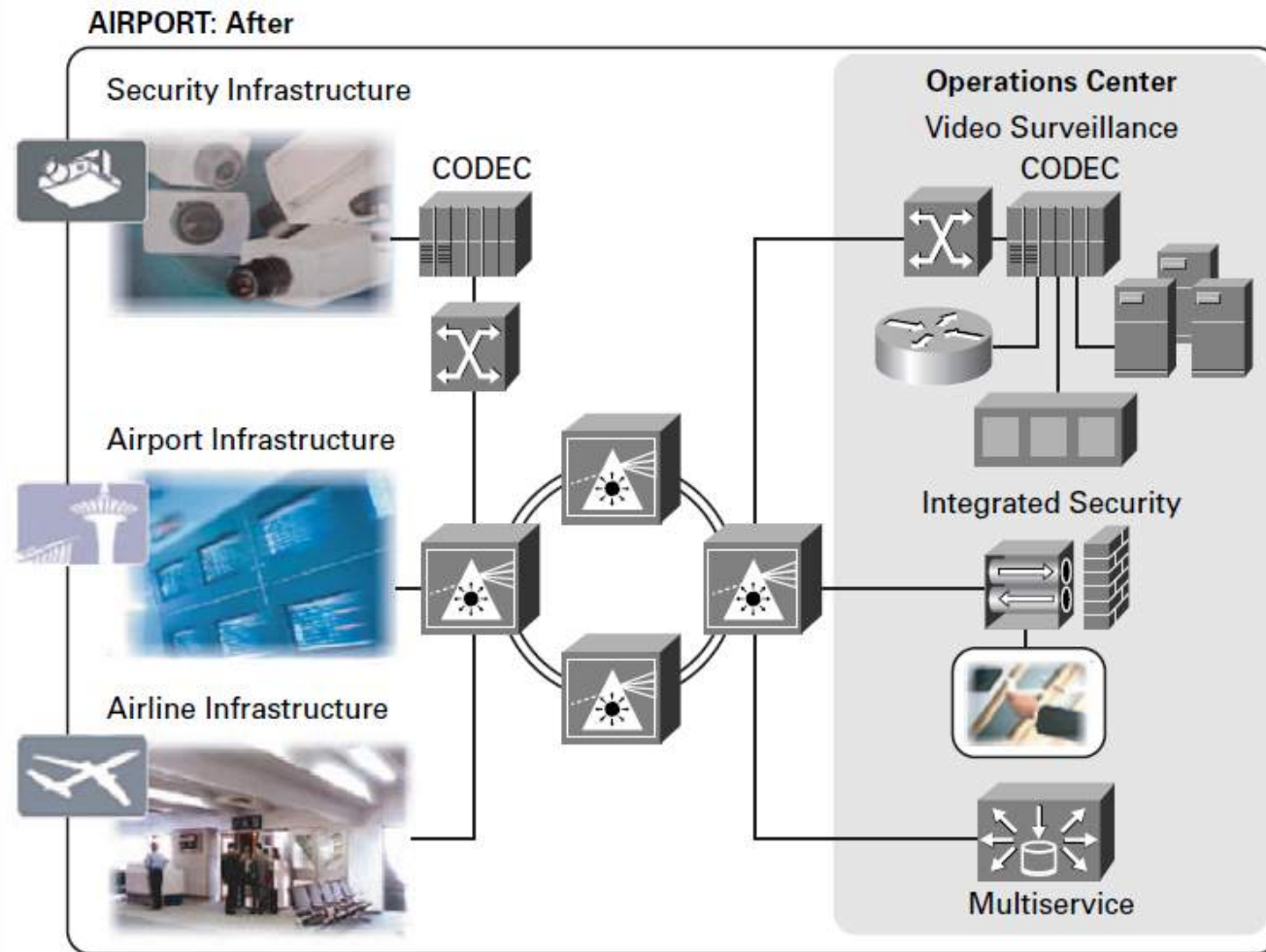
<Airport : Before>



Source : Cisco, "Architecting for security and Efficiency in the Airport"

Airport Security

<Airport : After>



QUESTIONS?

**Emerging Technologies
in Transportation & Logistics**