

Session 3A: Prof. Dr. Hirohito Kuse

Presentation entitled: Logistics Planning for Disaster Prevention

Biographic Data of Speaker



Hirohito Kuse
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Profession or occupation:

- Dr., of Eng... (Ph.D. Degree in Civil Engineering)
- Professor of the Dept. of Logistics & Information Eng.

Academic background:

Mar. 1973 B.S. in Civil Engineering, Waseda University
 Mar. 1975 Master in Construction Engineering, Waseda University
 Mar. 1981 Dr. in Engineering, Waseda University

Employment Record:

Name of Employers	Period	Post Held
Japan Development and Construction	Apr. 1981- Mar. 1986	Researcher in the field of Urban Planning
Tokyo University of Mercantile Marine	Apr. 1986 – Sept. 1994 Oct. 1994 – .Sept.2003	Associate Professor Professor (Dept. of Information Engineering and Logistics, Faculty of Mercantile Marine)
Tokyo University of Marine Science and Technology <u>(renamed)</u>	Oct.2003 – present	Professor, (Dept. of Logistics & Information Engineering, Faculty of Marine Technology)
as above	Apr. 2009 - present	Executive Director and Vice-President (for Education & Student)

*University of the Philippines	Oct. 1994 – Oct. 1995	Visiting Professor at College of Engineering, University of the Philippines
* the University of Tokyo Graduate School of Medicine and Faculty of Medicine)	Jun. 2004 – May. 2009	Visiting Professor at Hospital Logistics Lab. 22 nd Century Medical and Research Center Graduate School of Medicine

LOGISTICS PLANNING FOR DISASTER PREVENTION

The East-Japan Great Earthquake (EJGE) occurred on 11, Mar. 2011. Thank you very much for a lot of assistance from many countries, especially the assistance from Thailand.

Disaster can be divided into two types. One is the natural disaster such as flood, rain, earthquake, tsunami, tornado, volcanic eruption, etc. Another is the artificial disaster such as traffic accident, terrorism, war, etc.

Owing to the EJGE, the road and railway system, ports and airports were destroyed. Water supply, electronic supply and telecommunication system were not functioned. Therefore, it was an important issue to transport survival foods and goods to the suffered area. That transport system had three stages. First stage was from the outside of suffered areas such as Tokyo to the stock points in each suffered prefecture. Second stage was from the stock points to the depots in city-regions. Third stage was from the depots to the shelters (around 2000 shelters) in cities and towns.

Nobody was killed from hunger, but the transport system was in trouble. There were 5(five) reasons.

- 1) Foods and goods in stock at the warehouses and houses were washed away by tsunami,
- 2) Data and information system were destroyed,
- 3) Factories and warehouses located in far area such as Tokyo were also damaged, 4) Lack of professional skills and specialists in logistics,
- 5) Lack of fuel, trucks and drivers.

For the prevention against the future disaster, it is necessary to organize the emergency transport system. There are 5(five) ways.

- 1) Establishing the Push-type Emergency Logistics instead of pull-type logistics.
- 2) Setting the goods and making packs to transport foods and goods without sorting and allotting in the suffered area.
- 3) Planning the distribution points outside and inside of the suffered area.
- 4) Introducing the Triage System to deliver suitable foods and goods for each personnel group,
- 5) Introducing the Signal System to guide suitable actions adapted to the alert or the triage.

In this paper, troubles related to transport foods and goods to the suffered area are clarified, and the emergency transport system is proposed.

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Logistics Planning for Disaster Prevention

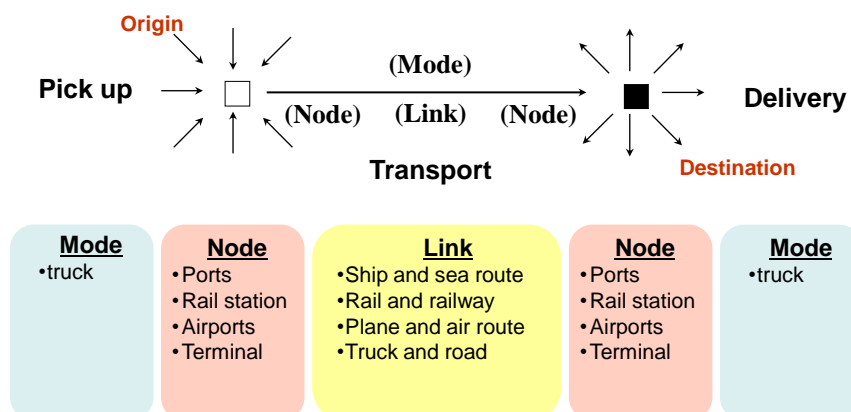
1. Transport System and Logistics
2. Role of Modern Logistics
3. The East-Japan Great Earthquake
4. Logistics for Disaster prevention
5. Harmonization for Advanced Logistics

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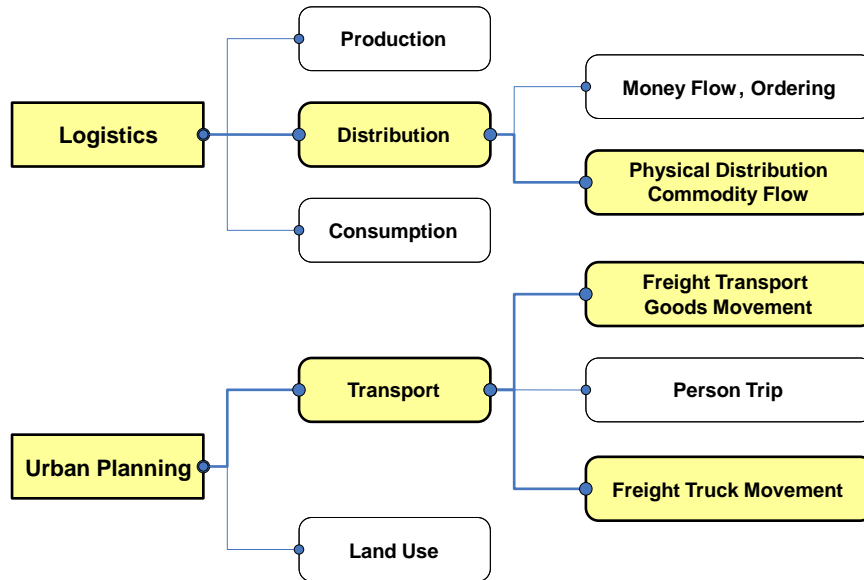
1. Transport System and Logistics

► Tree Types of Transportation



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➤ Physical Distribution and Freight Transport



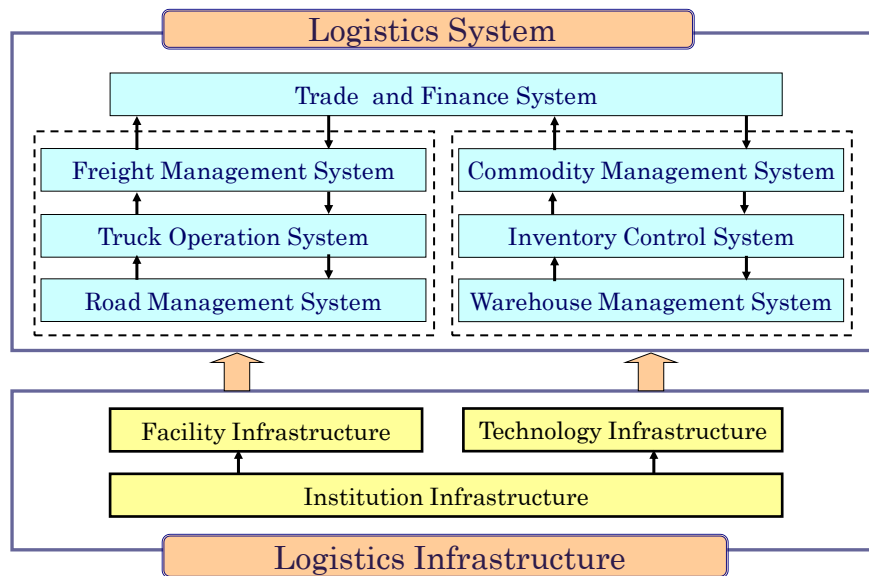
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➤ Logistics Functions

FUNCTION	CONTENTS
TRANSPORT	
Transport	long trip, line haul, traffic function, one to one
Pick-Up	short trip, area, access function, many to one
Delivery	short trip, area, ingress function, one to many
STORAGE AND DEPOSIT	
Storage	long time inventory
Deposit	short time inventory
ASSEMBLING	
Handling	check, sorting, stock, picking, allotment
Processing	construction, slice, cutting, measurement
Assembling	price tagging, unitization, packing
PACKAGING, WRAPPING	
Packaging	for transport and inventory
Wrapping	for marketing
CARGO HANDLING	
Loading	from facility to transport mode
Unloading	from transportation mode to facility
Handling	replacement, reshipment, material handling
INFORMATION	
Physical Distribution	quantity control : cargo tracing, inventory control quality control : temperature, humidity handling management : sorting machine, picking system
Commercial Trade	placing and receiving order : POS, EOS, VAN, EDI financing : banking on-line system, EDI

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➤ Logistics System and Logistics Infrastructure

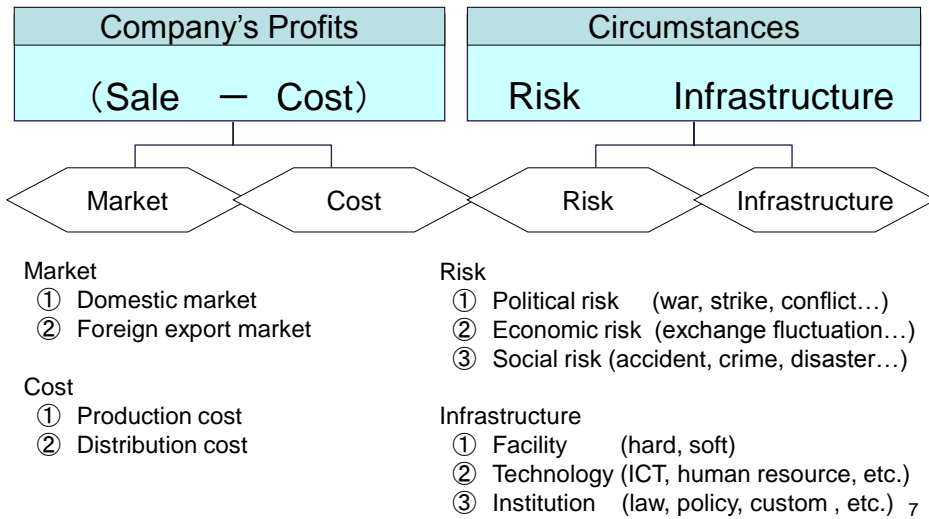


➤ Logistics Infrastructure

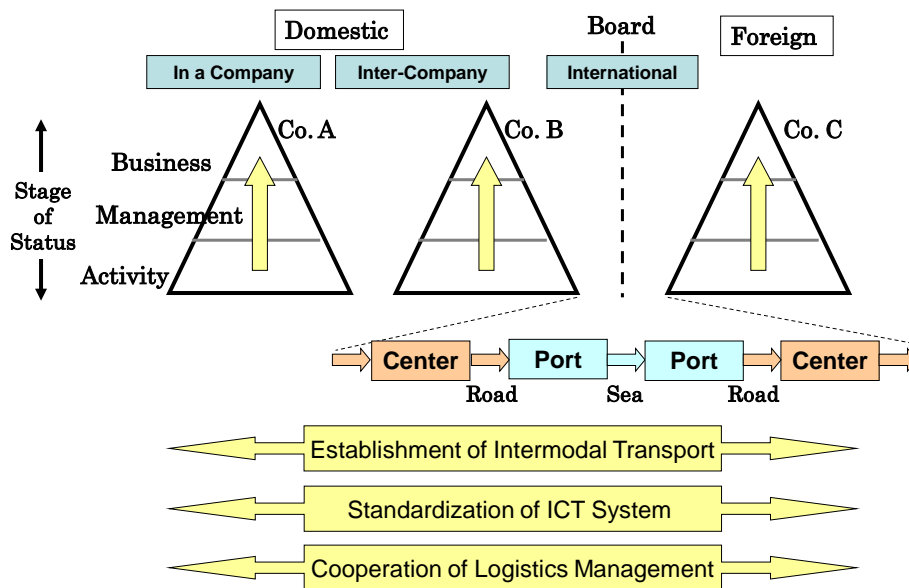
- 1) Facility Infrastructure :
 - Hard (Port, Road, Railway, Warehouse, Yard)
 - Soft (Traffic Control, TDM)
- 2) Technology Infrastructure :
 - ICT (Information Network, Information Platform
EDI System, Cargo Tracing System)
 - Human Resource (Labor Skills, Education,
National Characteristics, Language, Religion)
 - Industrial Resource
(Electric Power, Water Supply)
 - Logistics Technology
(Unit load system, Multi-modal transport,
Specialization, Cold-chain system)
- 3) Institution Infrastructure :
 - Law, Policy, Custom, Finance, Subsidy, Tax, Insurance,
Social Awareness

2. Role of Modern Logistics

➤ Factors affecting global location strategy



➤ Seamless Infrastructure System



➤ **What is a Major Issue in Modern Logistics ?**

Logistics System (5 Rights for Logistics)

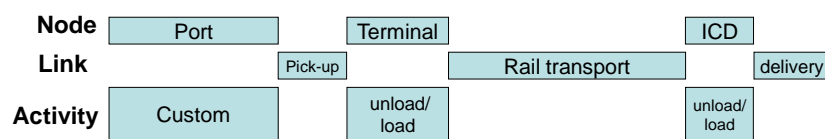
Time	How to keep the lead time ? (Work control, Production control)
Cost	How to reduce the cost ? (Supply control, Production Control, Inventory control)
Place	How to trace the cargo ? (Integrated Information system with EDI, ITS, RFID)
Quantity	How to apply the demand ? (Demand forecasting, Production & Inventory control)
Quality	How to keep the quality ? (Package system, Loading system, Container system)

Logistics Infrastructure System

Facility	Hard (Road, Warehouse, etc.), Soft (Traffic Control, TDM)
Technology	ICT, Human Resource, Industrial Resource, Logistics Technology
Institution	Law, Policy, Custom, Finance, etc.

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➤ **Examples of Major Issues in Inter-Modal transport**



5 Rights for Logistics

Time	Scheduling	Time Schedule
Cost	Port EDI	Loading Ratio / Fare
Place	Vehicle Routing	Cargo Tracing Vehicle Routing
Quantity	Capacity Control Inventory Control	Capacity Control Inventory Control
Quality	Material Handling Package	Damage Control Material Handling

Hard and Soft of Facility Infrastructure

Hard	Port Access road Terminal	Railway / Wagon Depot Road Bridge / Tunnel
Soft	Pick-up order Loading	Schedule / Capacity Unloading Speed Control

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3. The East-Japan Great Earthquake

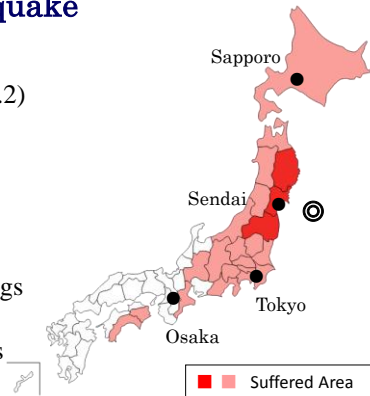
➤ The East-Japan Great Earthquake

Scale : magnitude 9.0 (11, Mar., 2011)
 (Hanshin-Awaji Earthquake : magnitude 7.2)

Personnel damages :
 killed over 15,000
 injured over 5,700
 missing over 4,600 people

Property damages :
 completely collapse over 113,000 buildings
 half collapse over 146,000 buildings
 partially damaged over 521,000 buildings

Infrastructure :
 Old railroad along the seashore was destroyed.
 National Road were restored within one week.
 Highway system was restored within two weeks.
 Shinkansen was fully restored on 29 April (7 weeks)
 (No passenger on Shinkansen was injured or killed)



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➤ Kind of Disaster and Elements for Disaster Prevention

Two kinds of Disaster

- ① Natural Disaster :
 Storm, Flood, Earthquake, Tsunami, Fire, Volcanic Eruption
- ② Artificial Disaster:
 Traffic Accident, Workers' Accident, Terrorism, War

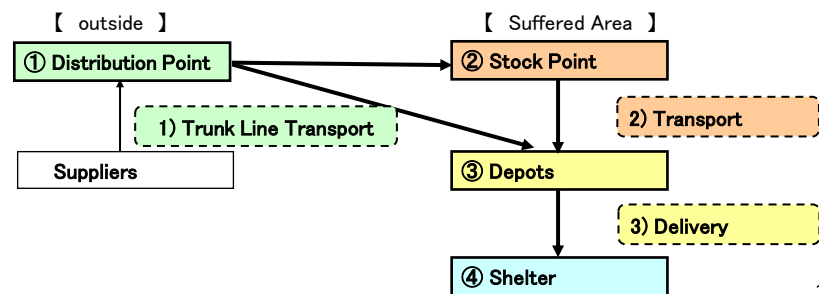
Elements for Disaster Preventions

- ① Medical Treatment : DMAT (Disaster Medical Assistance Team)
- ② Logistics Goods : Medicine, Medical Materials,
 Foods, Clothes, Daily Goods, etc.
 Activity: Procurement, Assembling, Transport, Storage
- ③ Lifeline : Electricity, Gas, Fuel, Water, Waste,
 IT, Communication/Broadcasting
- ④ Facility Hard : Port, Airport, Road, Railway, Warehouse, Yard, etc.
 Soft : Traffic Control System, Entry Control, TDM, etc.

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➤ 3 Stages to Transport Survival Foods and Goods

- 1) Trunk Line Transport
 - From Distribution Point (outside of the suffered area)
 - To Stock points in each prefectures
- 2) Transport
 - From Stock points in each prefectures
 - To Stock points in cities, towns and villages
- 3) Delivery
 - From Stock points in cities, towns and villages
 - To Shelters



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➤ Why Survival Foods and Goods were in Trouble ?

Nobody was killed from hunger, but the transport system was in trouble.

There were 5(five) reasons :

- 1) Foods and goods in store at the warehouse and houses are washed away,
- 2) Data and information system were destroyed,
- 3) Factories and warehouses located in far area such as Tokyo were also damaged
- 4) Lack of professional skill and specialists in logistics,
- 5) Lack of fuel, trucks and drivers.

Two kinds of Assistance :

Public sectors : Japan Self Defense Force, US Force, Government and Assistance from many countries.

Private sectors : Manufactures, Wholesalers, Retailers, and Logistics Companies.

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29, April Sendai City and Natori City

Flooded Area of Sendai City



Collapsed House in Natori City



Sendai Railway Cargo Terminal



Sony Distribution Center in Sendai



30, April Matsushima City and Ishinomaki City

Railway and wagon at Matsushima



Ishinomaki Railways Cargo Terminal



View from Hiyoriyama (Old Castle)



CBD of Ishinomaki



30, April Onagawa City and Minami-Sanriku City

View of Onagawa



CBD of Onagawa (Cars on the top)



View of Minami-Sanriku



Minami-Sanriku City Hall



1, May Kesen-numa City and Ohtani-kaigan Station

Small Town in Kesen-numa



Ohtani-kaigan before the Earthquake



Car and Truck in R.45



Ohtani-kaigan after the Earthquake



1, May Kesen-numa City

Ship on the road



Destroyed pier at Kesen-numa Port



Small car in a drain



Railway Station and the Ship



1, May Rikuzen-takada City and Oh-hunato City

Destroyed Water Gate



Destroyed Bridge



CBD of Oh-hunato



Warehouse in Oh-hunato



4. Logistics for Disaster Prevention

➤ Five Countermeasures for Transporting Survival Goods

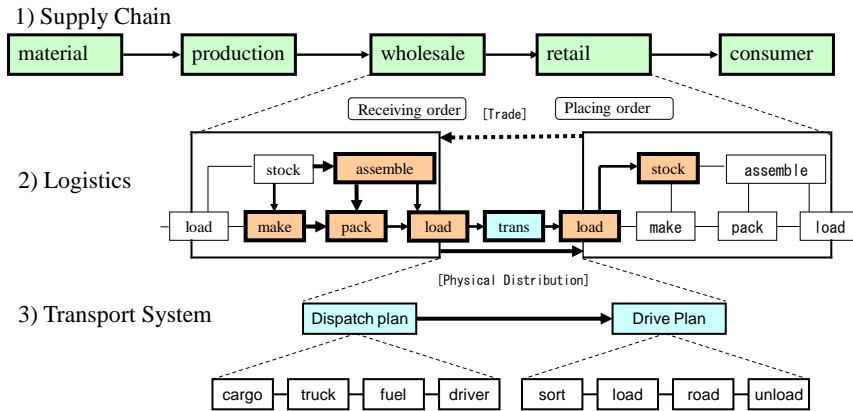
- ① Push Type Emergency Logistics instead of Pull Type
 - × Pull Type : deliver the necessary goods with customers' orders
 - Push Type : deliver the necessary goods without customers' orders, with estimation of goods demand in suffered area (necessary goods for 3 days and 4 nights at mountains in winter)
- ② Setting the goods and making packs, and Convoy Transport
 - × Individual Transport : transport each goods to stock points by each truck
 - Convoy Transport : transport each goods with several trucks as a convoy
 - Making a Set : transport the necessary goods in a set
 - ie. 「drink, emergency provisions, cutleries」
 - 「noodle, disposable dish and cup, cutleries, water, cooking stove, gas」
 - 「blanket, towel, toothbrush, tissue, soap, bucket, ladle」
 - 「set for babies」, 「set for seniors」, 「set for patients」 etc.
- ③ Distribution Facility
 - Distribution Points (outside of suffered areas)
 - : Logistics Management, Making a Set, and Distribution
 - Stock Points and Depots (inside of suffered area)
 - : Picking and Sorting, Inventory Control Delivery

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- ④ Introducing The Triage System
 - to deliver suitable foods and goods for suitable persons in the suffered area
 - Triage : sorting the patients by emergency levels (black, red, yellow, green)
 - Black : hopeless, or incurable
 - Red : serious injury, need prompt treatment
 - Yellow : need not prompt treatment, but it is possibly to be red
 - Green : need not prompt treatment
 - 1) Distribution Levels of emergency goods
 - (give a priority to seniors and person in far area)
 - (give a priority of fuel to emergency vehicle, truck, water wagon, etc.)
 - 2) Vehicle Entry Control to suffered area
 - (emergency vehicle, truck, water wagon, etc.)
- ⑤ Introducing the Signal System (Guide suitable actions adapted to the alerts or triage)
 - ie. Survival foods adapted to the triage
 - Signal 1 : Deliver the Cup-noodle to victims and cock it by themselves.
 - 2 : Deliver Rice-ball and Sandwich without cocking.
 - 3 : Transport Lunch-box with Bottled-water.
 - 4 : Transport many kinds of Foods Set (for a baby, a sick person, a patient)

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➤ How to Keep Supply Chain and Logistics



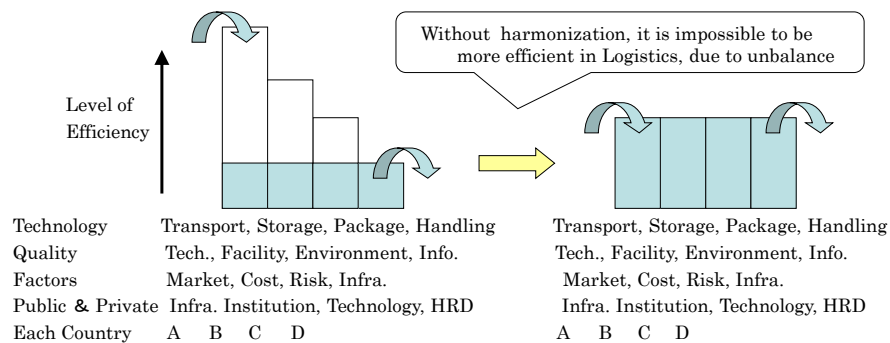
For keeping Supply Chain

- 1) How to continue JIT system without inventory ?
- 2) How to make a balance between automated system and artificial system ?
- 3) How to keep a distribution channel from material to consumer ?

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5. Harmonization for Advanced Logistics

- a) Logistics Infrastructure and Institution System
- b) Logistics Technology System
- c) Safety and Security for Human Life



Thank you very much, H. KUSE 24