Freight demand Analysis & Data Collections in Korea

October 23, 2008

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Contents

1 Introduction on KTDB Center

2 What is KTDB ?

3 Overview on KTDB Freight Projects

4 Freight Survey

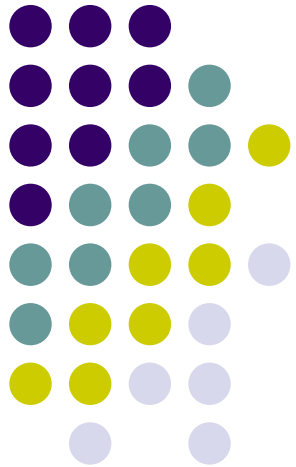
5 Freight Demand Analysis & Results

6 Future Research Plans

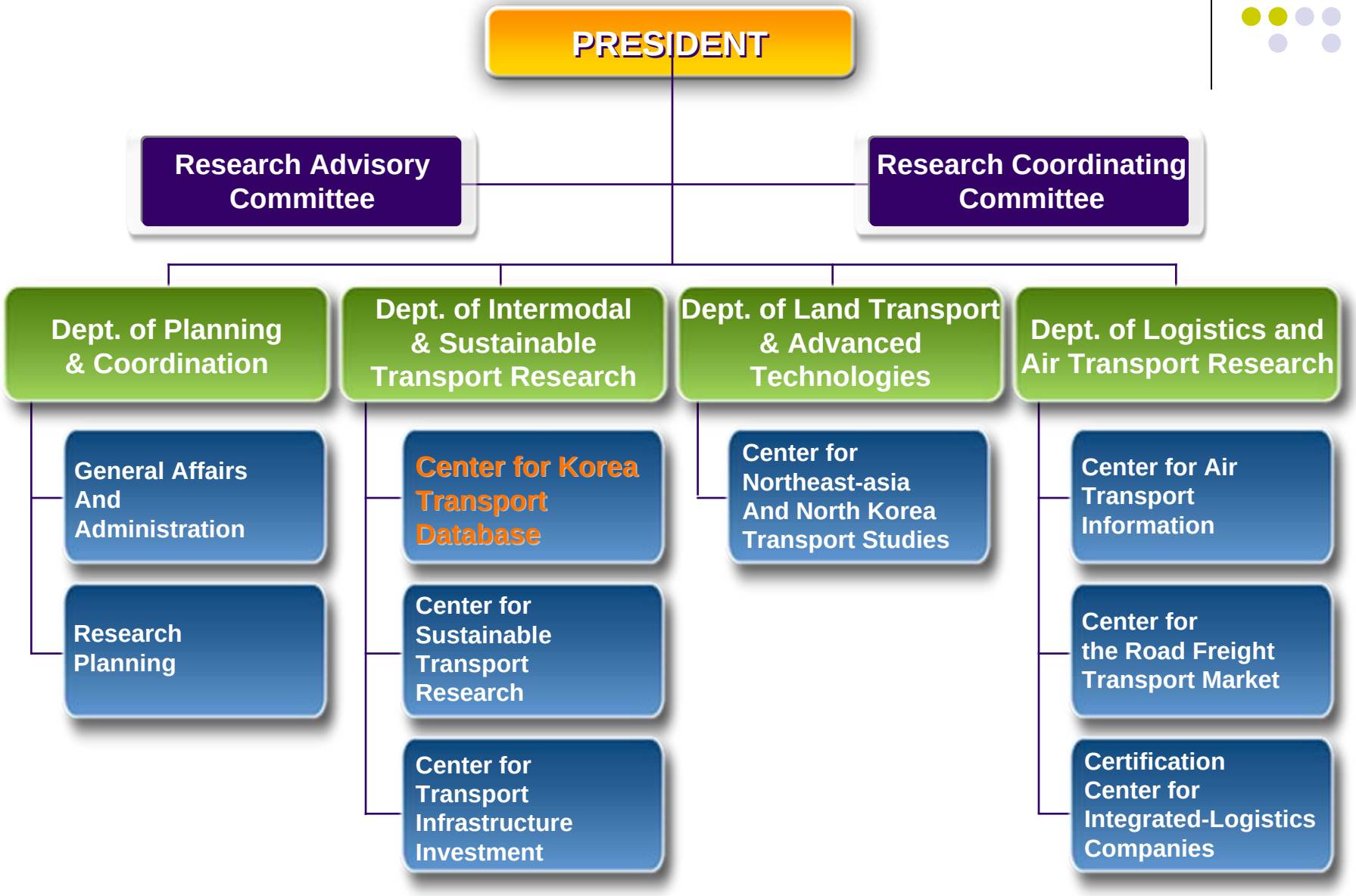
7 How to share our experiences

Part. 1

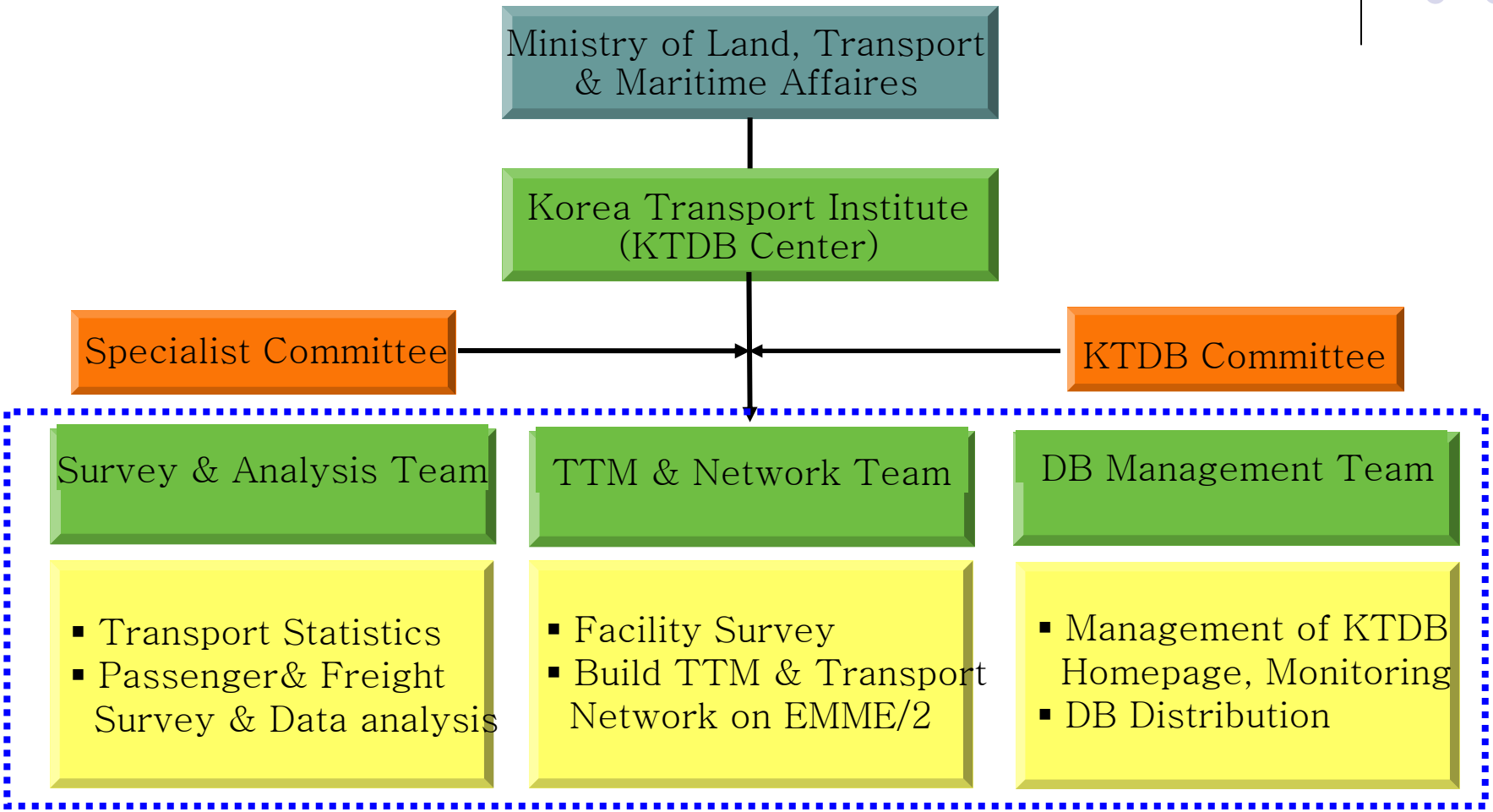
Introduction of KOTI, KTDB



1. Introduction of KTDB center

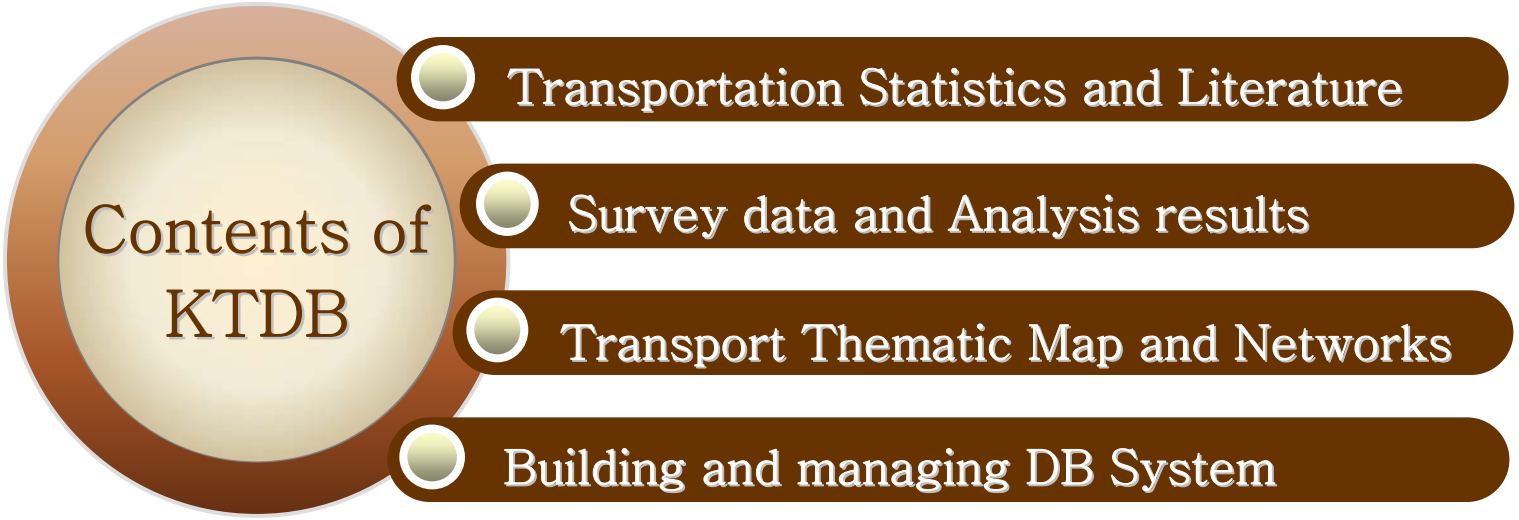


Organization of KTDB Center



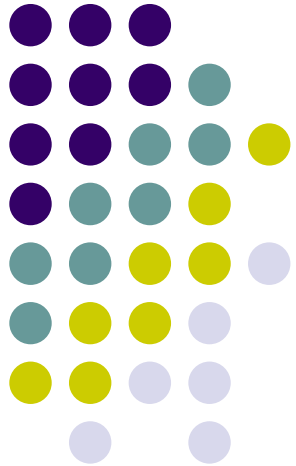
2. What is KTDB?

- Comprehensive Transport DB : integrating transport statistics, Passenger & Freight survey data and transport network data.
- Policy oriented Transport DB : tool for the evaluation of SOC projects such as Highway, Rail road on national level



Part. 2

Freight Demand analysis, Data Collections in Korea



1. Overview on KTDB Freight Projects

❑ Freight Survey

Survey Approach	Data Application
• Nationwide Commodity Flow Survey	• Development of commodity flow/truck travel model • Analysis of movements of goods/trucks • Providing information and data for transportation policy • Forecasting commodity flows • Assessing the impact of change in freight system
• Metropolitan Area Commodity Flow Survey	
• Water Commodity Flow Survey	
• Maritime Import-Export commodity Flow Survey	
• Freight trip generation rate survey	• Providing generation rates in development sites • Improvement of the level of accuracy of trip generation models
• Distribution Channel Survey	• Release of bottleneck in distribution channel

❑ Freight Analysis

Projects	Contents
• Nationwide Freight OD Estimation and Forecasting	• constructing freight model • Providing basic data for case studies • Providing information for Policy analysis • Forecasting commodity flows • Assessing the impact of change in freight system
• Metropolitan Area Freight OD Estimation and Forecasting	
• Water Freight OD Estimation and Forecasting	
• Import-export Freight OD Estimation and Forecasting	

❑ Historical Projects

		1998	1999	2000	2001	2002 - 2003
Survey	Region	Nationwide	5 Metropolitan Areas	-	Nationwide	-
	Contents	Freight travel pattern survey, travel volume survey	Freight travel pattern survey, travel volume survey	-	**Commodity flow survey, Maritime import-export freight survey**	-
	Amount of samples	1,001 areas	286 areas/ 111,710 Households	-	275 areas/ 11,018 samples	-
Analysis		-	Basic analysis In 5 Metropolitan areas	Basic analysis In 5 Metropolitan areas	Basic analysis on national logistics status	Estimation of Inter-regional, and 5 Metropolitan areas O/D

❑ Historical Projects (Cont.)

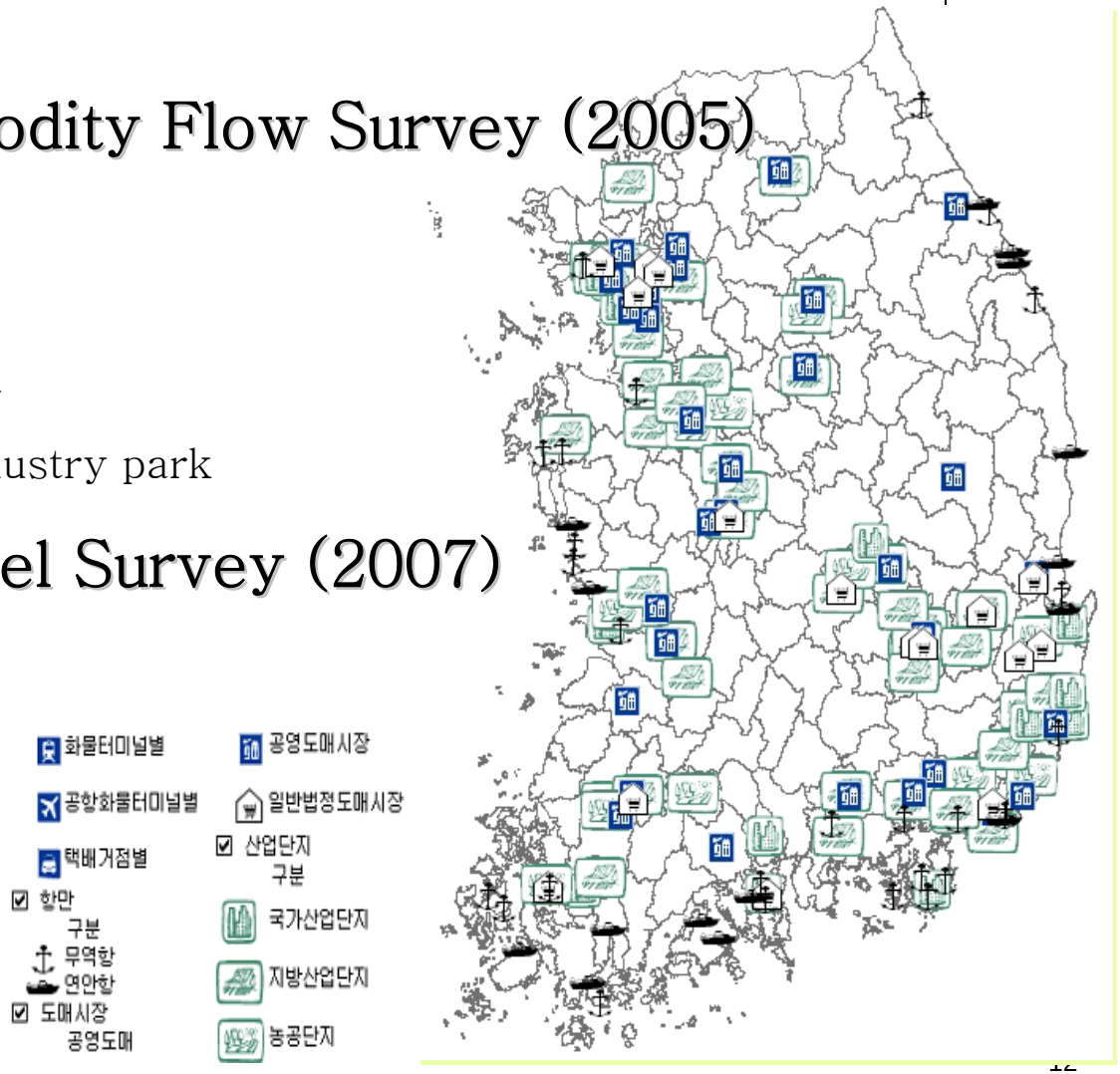
		2004	2005	2006	2007
Survey	Region	Seoul Metropolitan area	Nationwide	Nationwide	Nationwide
	Contents	Preliminary survey for commodity flow survey In 2005	**Commodity flow survey, Maritime import-export freight survey**	Supplementary survey for the estimation of inter-regional freight O/D	**Distribution channel survey**
	Amount of samples	21 hubs/29 areas/ 918 Samples	-	-	-
Analysis		Inter-regional and 5 Metropolitan areas O/D update (2003) and future freight OD prediction	Inter-regional O/D update (2004) and future freight OD prediction	Estimation of inter-regional O/D (2005) and prediction of future freight OD	Inter-regional O/D update (2006) and future OD prediction

2. Freight Survey

❑ Nationwide Commodity Flow Survey (2005)

- Freight state survey
- Truck diary survey
- Multimodal terminal survey
- Traffic counting around industry park

❑ Distribution Channel Survey (2007)



❑ Nationwide Commodity Flow Survey (2005)

◆ Freight state Survey

- **Sample size: 13,000 companies**

- **Survey items**
  - **: Amount and value of yearly, monthly and 3days shipment by commodity and mode**
  - **: Departure and arrival places of freight**

- **Application**
  - **: Estimation of inter-regional freight OD**

구분	압하품목	압하품목
품목번호		
압하량	톤	
톤당 제품단가	천원/톤	
주압하지역 (송하인주소)	시 구 동 도 시/군 동/읍/면	시 구 도 시/군 동
이용운송수단 (2개이상 체크가능)	1. 자가용화물차 2. 영업용화물차 3. 철도 4. 해운 5. 항공 6. 기타	1. 자가용화물차 2. 영업용화물차 3. 철도 4. 해운 5. 항공 6. 기타
주운송수단 (1개만 기재)		
화물차를 이용한 경우 해당되는 톤급	1. 1톤이하	1. 1톤이하
	2. 1톤초과 3톤미만	2. 1톤초과 3톤미만
	3. 3톤이상 8톤미만	3. 3톤이상 8톤미만
	4. 8톤이상 12톤미만	4. 8톤이상 12톤미만
	5. 12톤이상	5. 12톤이상
2개이상 운송수단 이용시 주요 중계지명	터미널명: ( )	터미널명: (
	철도역명: ( )	철도역명: (
	항만명: ( )	항만명: (
	공항명: ( )	공항명: (
압하빈도	1. 매일	1. 매일
	2. 주2회 이상	2. 주2회 이상
	3. 주1회 이상	3. 주1회 이상
	4. 월2회 이상	4. 월2회 이상
	5. 월1회 이상	5. 월1회 이상
	6. 월1회 미만	6. 월1회 미만

Truck Diary Survey

- **Sample size: 13,000 veh.**

- **Survey items**
  - **: Payload and truckload by commodity**
  - **: Departure and arrival place**

- **Application**
  - **: Conversion commodity to vehicle**
  - **: Calibration of gravity model**

화물자동차 통행실태조사표

회사명				통행일시		적재능력	
작성자명		연락처	( ) -	차량업종	□①비사업용 (자가용, 관용) □②사업용 (일반화물, 개별화물, 용달화물, 택배 등)		

1. 귀하께서 조사일 기준하여 최근 3일 중 하루동안 통행한 내용을 아래의 표에 기록하여 주십시오.(하루초과시 도착시점까지 기록)

통행수	출발특성			도착특성			화물특성		통행거리(km)
	출발지	출발지유형 (보기A참조)	출발시간	도착지	도착지유형 (보기A참조)	도착시간	화물품목번호 (보기B참조)	적재톤수	
1번	시 구 동 도 군 면		시 분	시 구 동 도 군 면		시 분		톤	
2번	1번째 통행의 도착지와 같음	1번째 통행의 도착지유형과 같음	시 분	시 구 동 도 군 면		시 분		톤	
3번	2번째 통행의 도착지와 같음	2번째 통행의 도착지유형과 같음	시 분	시 구 동 도 군 면		시 분		톤	
4번	3번째 통행의 도착지와 같음	3번째 통행의 도착지유형과 같음	시 분	시 구 동 도 군 면		시 분		톤	
5번	4번째 통행의 도착지와 같음	4번째 통행의 도착지유형과 같음	시 분	시 구 동 도 군 면		시 분		톤	

Multimodal terminal Survey

- Sample size: 54 Multimodal Terminals

- Contents
  : Counting the number of trucks coming in and out of multimodal terminals

: Interviews with the experts in multimodal terminals

- Application
  : Travel pattern at multimodal terminals

화물발생중계거점 조사표

조사지점: 구역(No.) 조사일: 조사시간(: ~ :) 날씨:

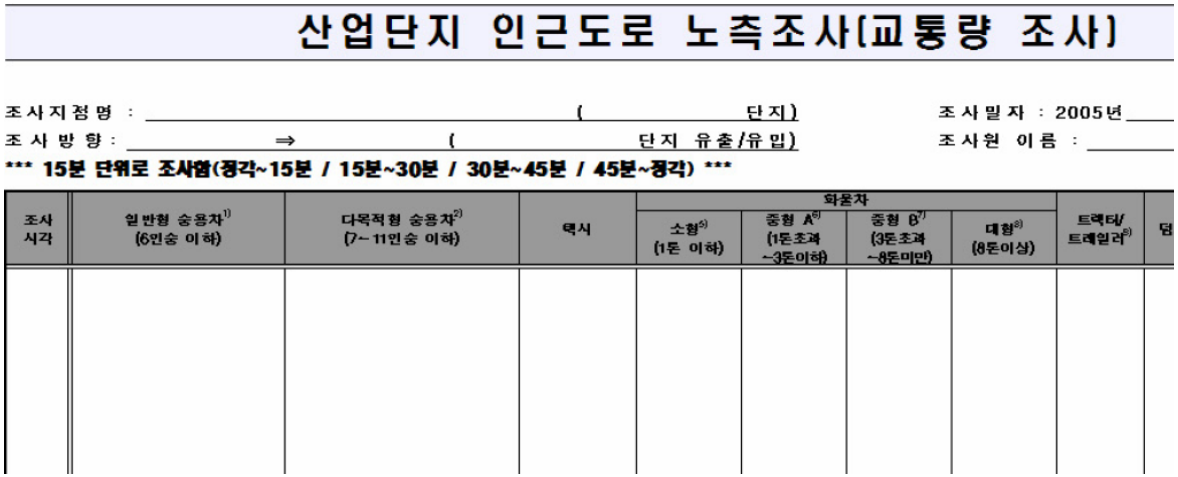
업종	차종	최초 출발지(들어온 차) 및 최종 목적지(나가는 차)				유형		조업 시작 시간	조업 끝난 시간	소요 시간 (분)	운송 거리 (km)	적재 톤수 (톤)	적재 품목	적재 상태	통행 목적
		출발지	시(도)	군(구)	면(읍)	출발지		□ 오전 □ 오후 시 분	□ 오전 □ 오후 시 분						
		목적지	시(도)	군(구)	면(읍)	목적지									
		출발지	시(도)	군(구)	면(읍)	출발지		□ 오전 □ 오후 시	□ 오전 □ 오후 시						

Traffic Counting near Industry park

- Sample size: 110 sites

- Contents
  : Counting # of trucks coming in and out of industry park

- Application
  : Truck trip generation rates for industry park
  : Validation data



산업단지 인근도로 노측조사(교통량 조사)

조사지점명 : _____ (단지)　　조사일자 : 2005년 ____

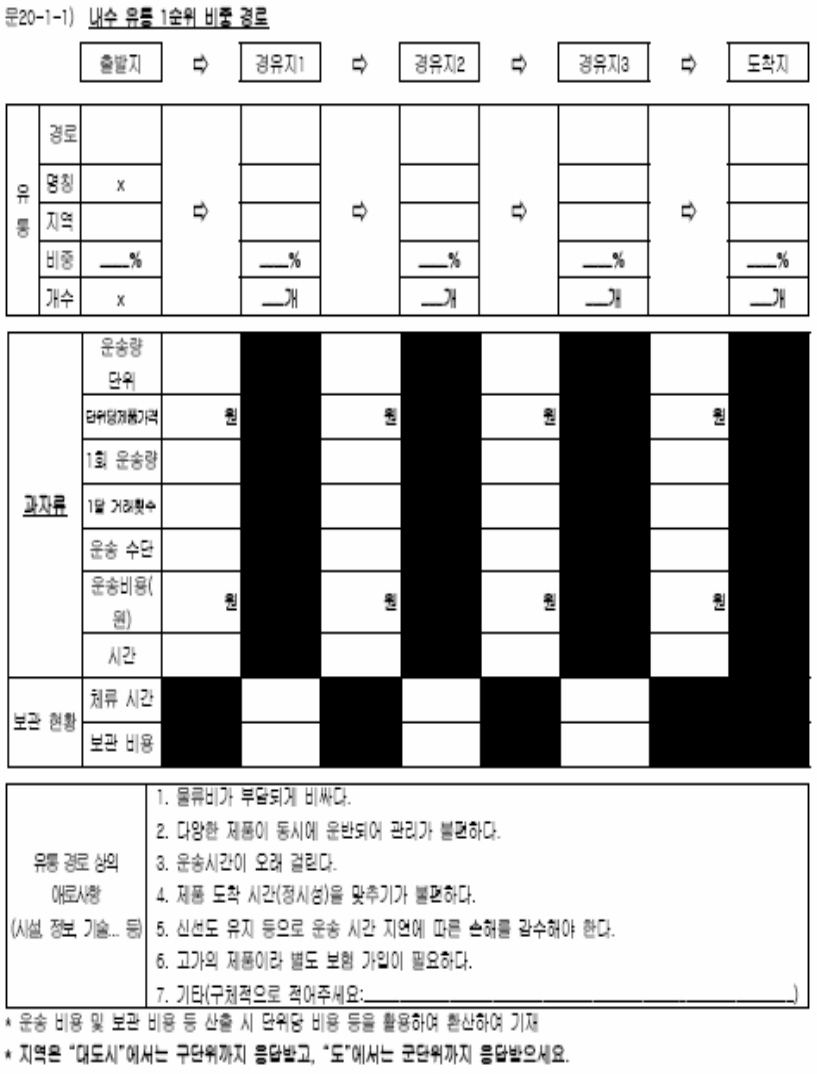
조사방향 : _____ ⇒ _____ (단지 유출/유입)　　조사원 이름 : _____

*** 15분 단위로 조사함(정각~15분 / 15분~30분 / 30분~45분 / 45분~정각) ***

조사 시각	일반형 승용차[1] (6인승 이하)	다목적형 승용차[2] (7~11인승 이하)	택시	화물차				트랙터/ 트레일러[5]	덤
				소형[3] (1톤 이하)	중형 A[4] (1톤초과 ~3톤이하)	중형 B[7] (3톤초과 ~8톤미만)	대형[8] (8톤이상)		

❑ Distribution Channel Survey (2007)

- **Sample size: 980 companies**
- **Survey cost: $110,000**
- **Survey items**
  - **: steel, food, aggregate, cement, electronic & electrical, etc**
  - **: Logistics Management Status, distribution channels Status**
- **Application**
  - **: Identify the main distribution channel of the items**



문20-1-1) 내수 유통 1순위 비중 경로

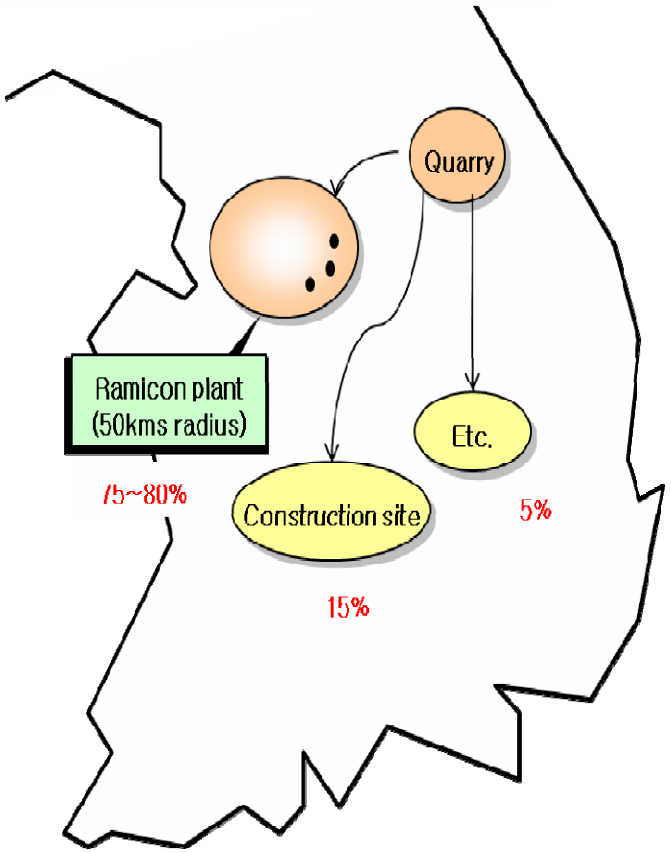
		출발지	⇨	경유지1	⇨	경유지2	⇨	경유지3	⇨	도착지
유통	경로		⇨		⇨		⇨		⇨	
	명칭	x								
	지역									
	비중	___%		___%		___%		___%		___%
	개수	x		___개		___개		___개		___개

과자류	운송량 단위								
	단위당제품가격	원		원		원		원	
	1회 운송량								
	1달 거래횟수								
	운송 수단								
	운송비용(원)	원		원		원		원	
	시간								
보관 현황	체류 시간								
	보관 비용								

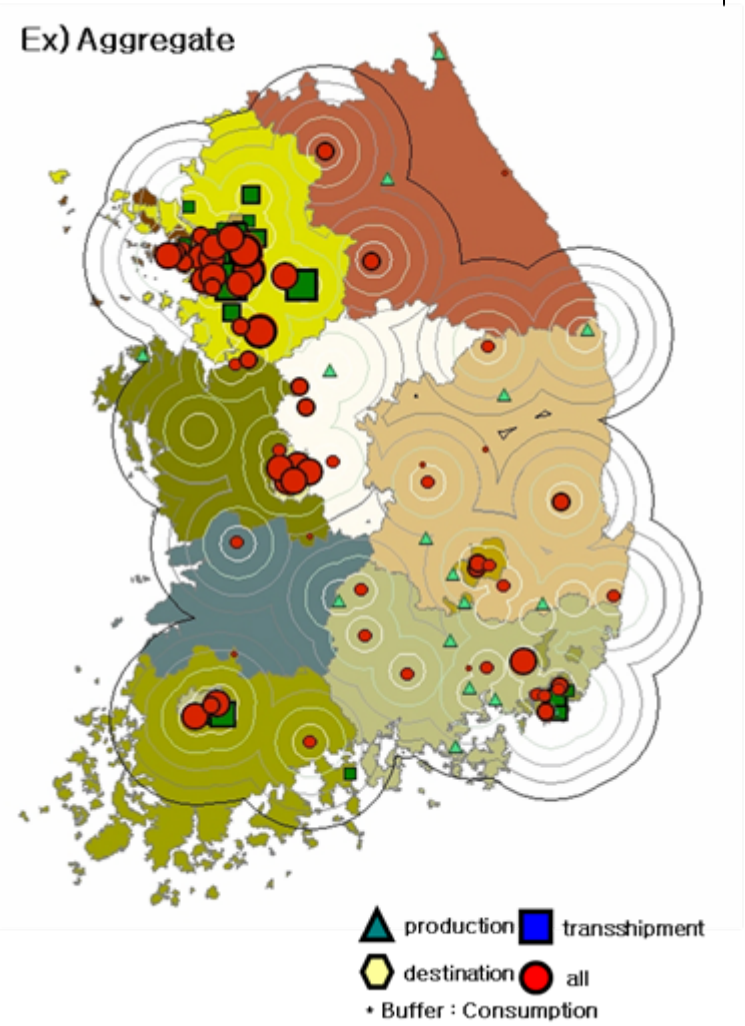
유통 경로 상의 애로사항 (시설 정보, 기술... 등)	1. 물류비가 부담되게 비싸다. 2. 다양한 제품이 동시에 운반되어 관리가 불편하다. 3. 운송시간이 오래 걸린다. 4. 제품 도착 시간(정시성)을 맞추기가 불편하다. 5. 신선도 유지 등으로 운송 시간 지연에 따른 손해를 감수해야 한다. 6. 고가의 제품이라 별도 보험 가입이 필요하다. 7. 기타(구체적으로 적어주세요:_____)

* 운송 비용 및 보관 비용 등 산출 시 단위당 비용 등을 활용하여 환산하여 기재
* 지역은 "대도시"에서는 구단위까지 응답받고, "도"에서는 군단위까지 응답받으세요.

The concept of the distribution of aggregate



Ex) Aggregate



3. Freight Demand Analysis

❑ Forecast of Inter-Regional Freight OD

◆ Scope

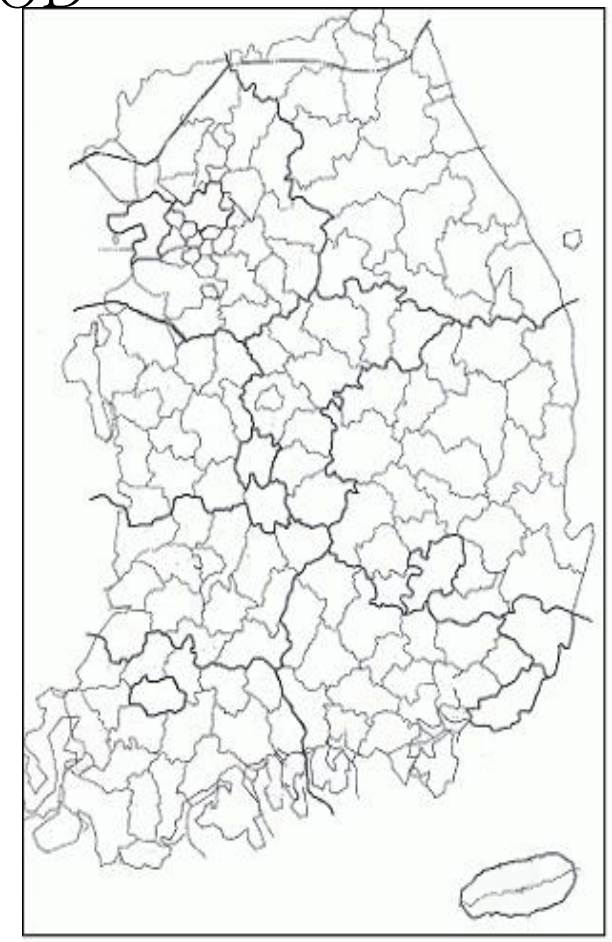
- Base year: the last year
- Spacial scope: whole country

◆ Estimation Method

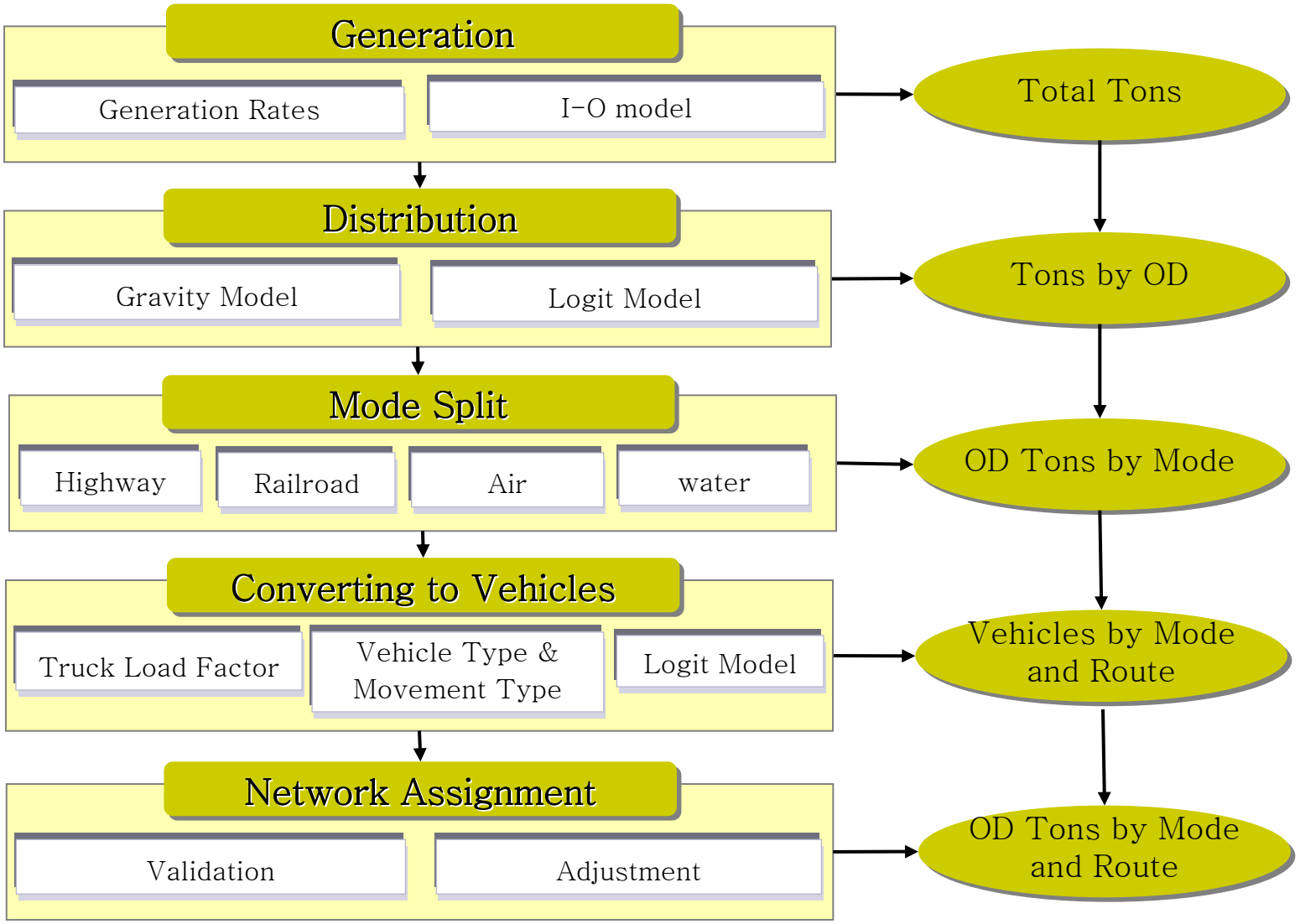
- Four-step Commodity Forecasting

◆ Results

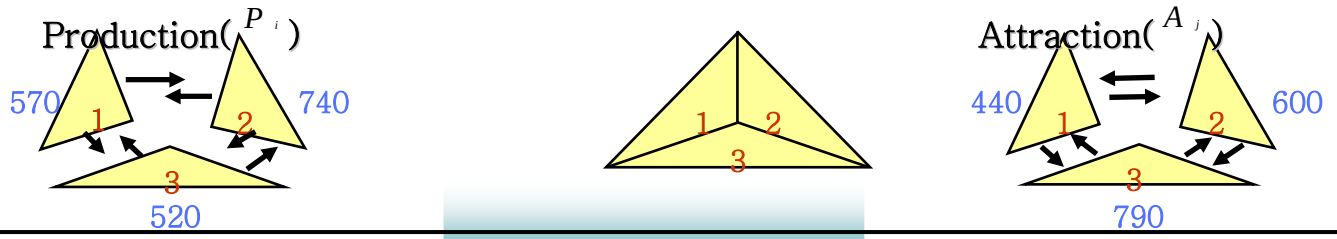
- Estimates of Inter-Regional Freight & Truck OD in Current year
- Estimates of Inter-Regional Freight & Truck OD in Future years



❑ Forecasting Process

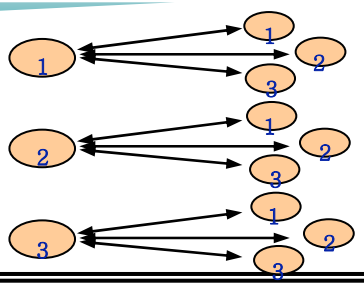


Generation (P_i, A_j)



Distribution (C_{ij})

from \ to	1	2	3	P_i
1	200	150	220	570
2	160	310	270	740
3	80	140	300	520
A_j	440	600	790	1830

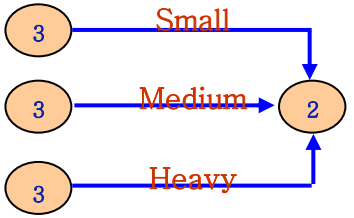


Mode Split(Ton) (C_j)

Small		20 ton
Medium		20 ton
Heavy		100 ton

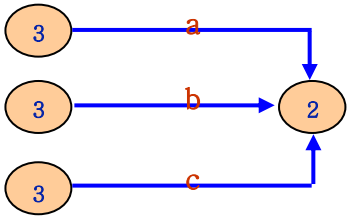
Mode Split (Ton to Vehicle)

Small	20 Trucks
Medium	10 Trucks
Heavy	10 Trucks



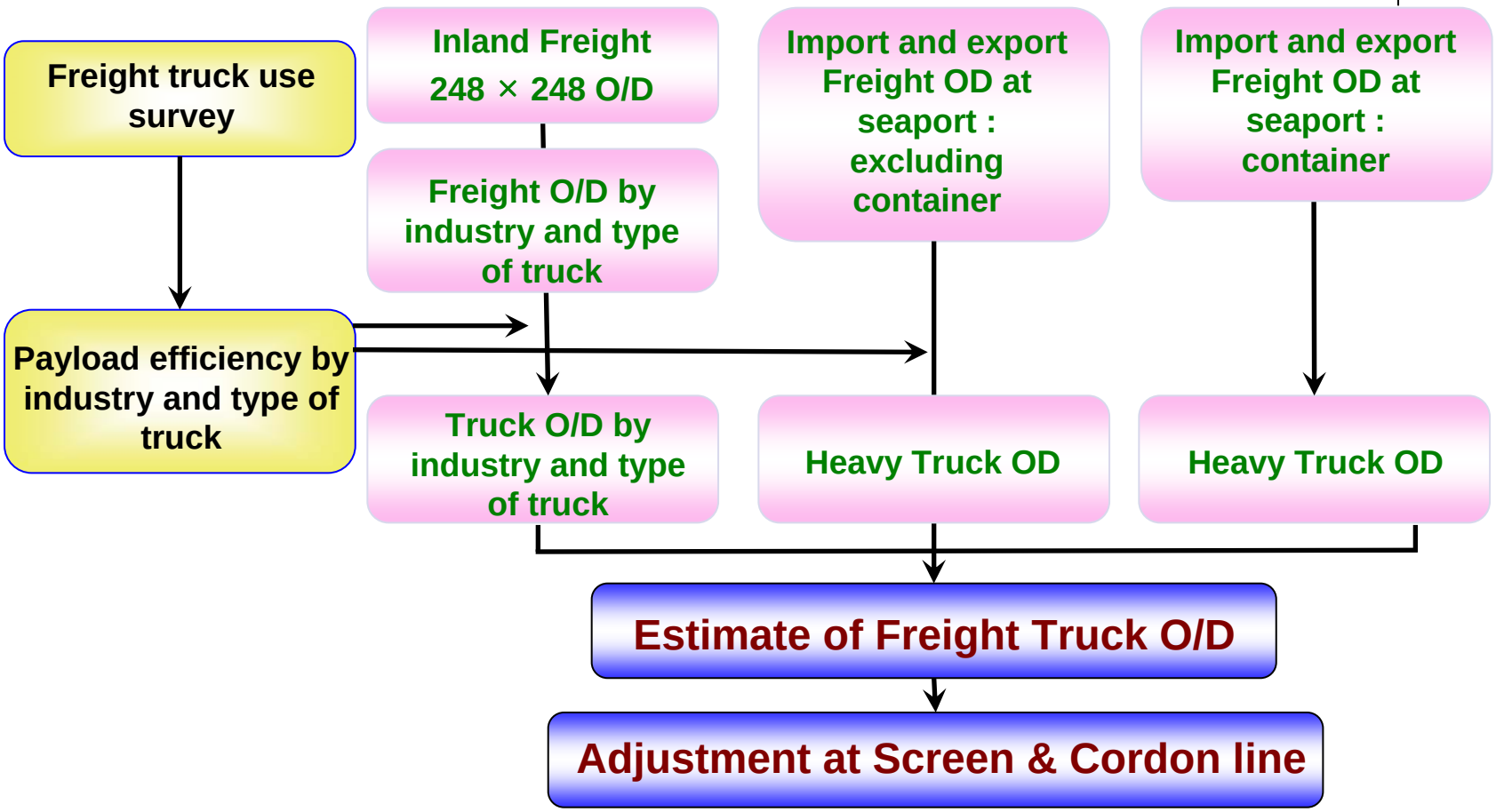
Assignment

Route a	20 Trucks
Route b	10 Trucks
Route c	10 Trucks

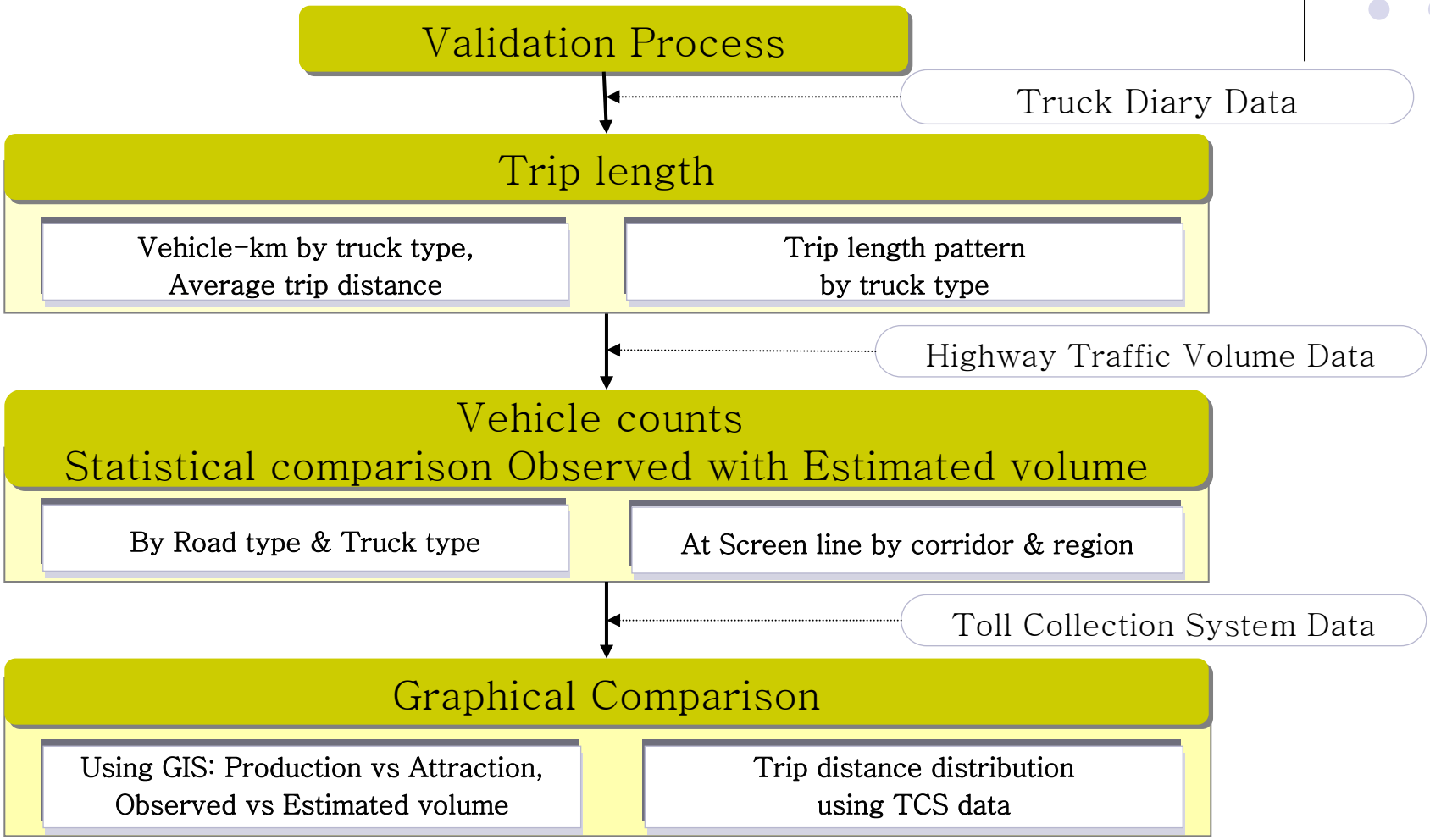


❑ Conversion Commodity Flow to Vehicle Flow

◆ Process for conversion



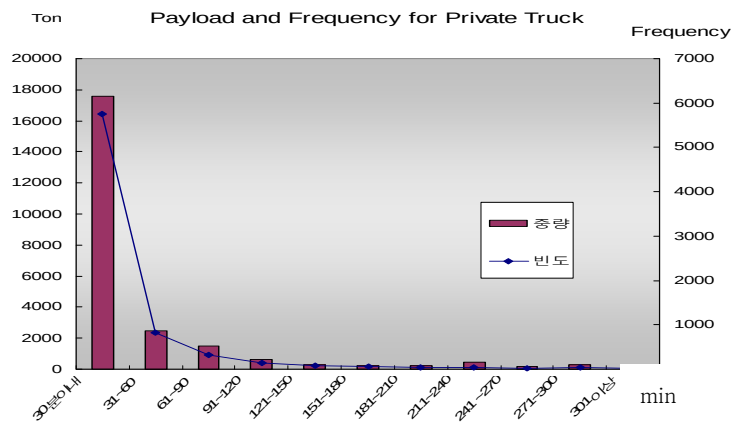
❑ Validation of Freight OD

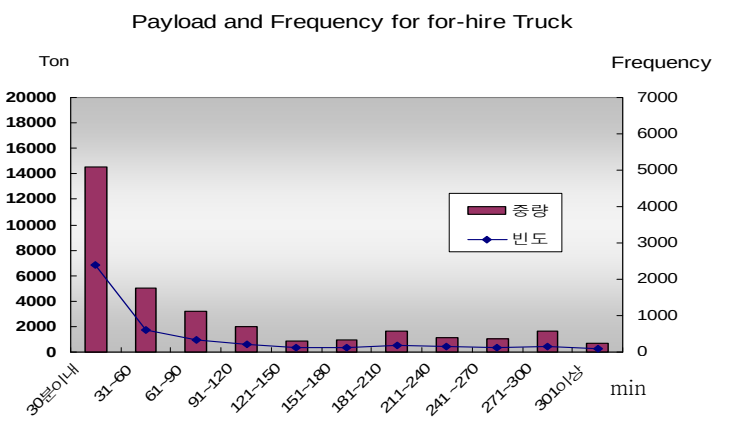


◆ Validation by Trip length distribution

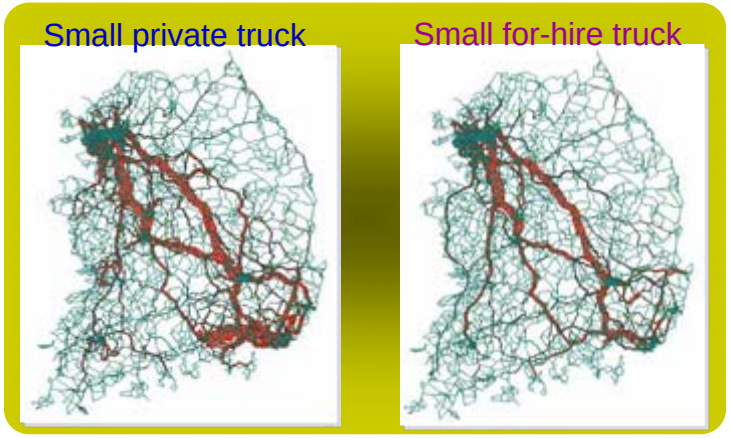
- Comparison observed versus estimated trip length distribution

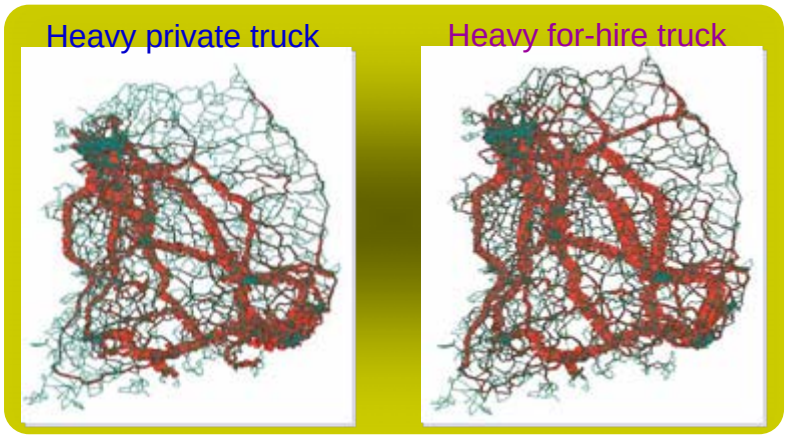
- Truck volume distribution by trip length





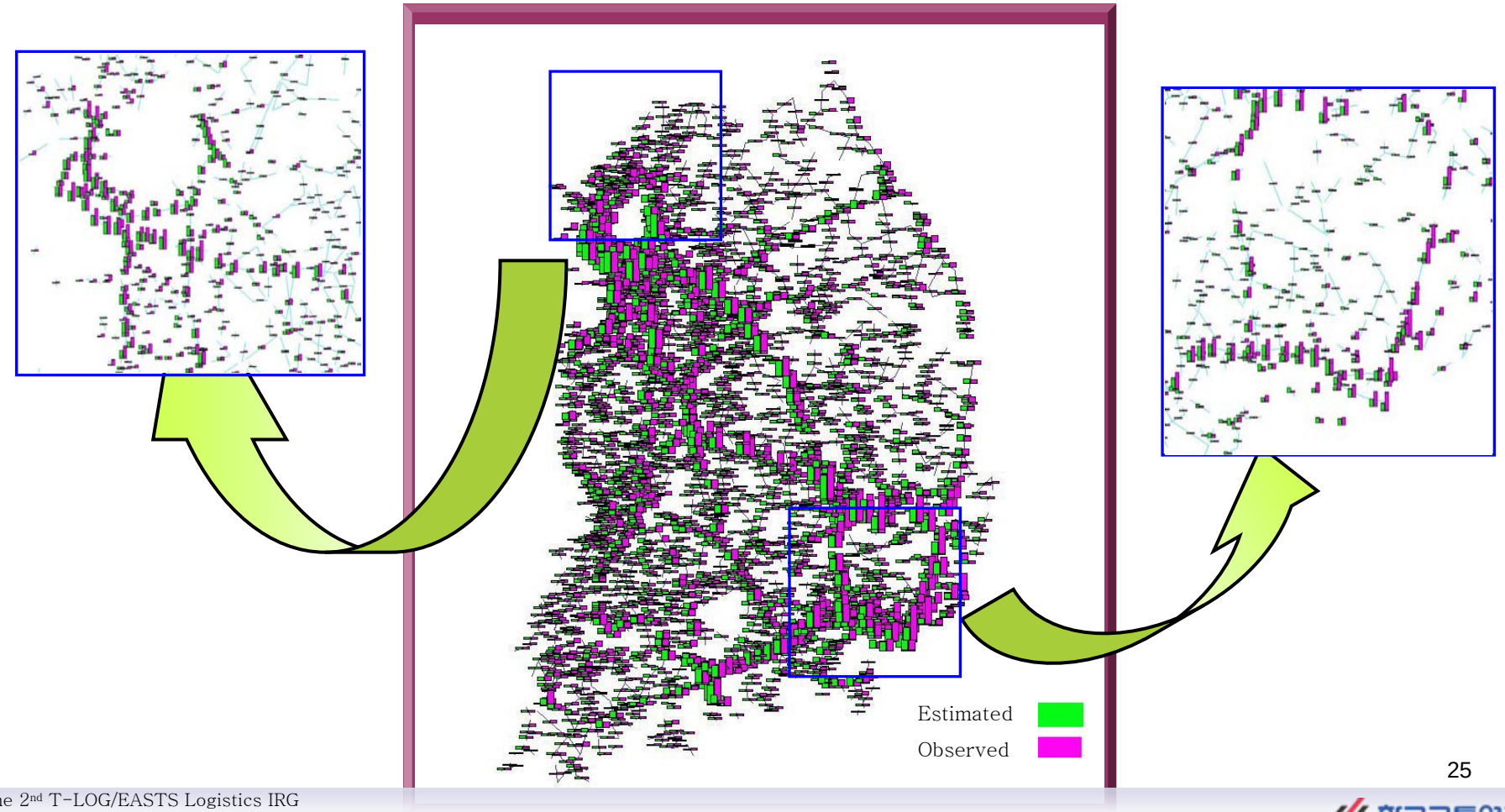
- Assignment results by industry and truck type





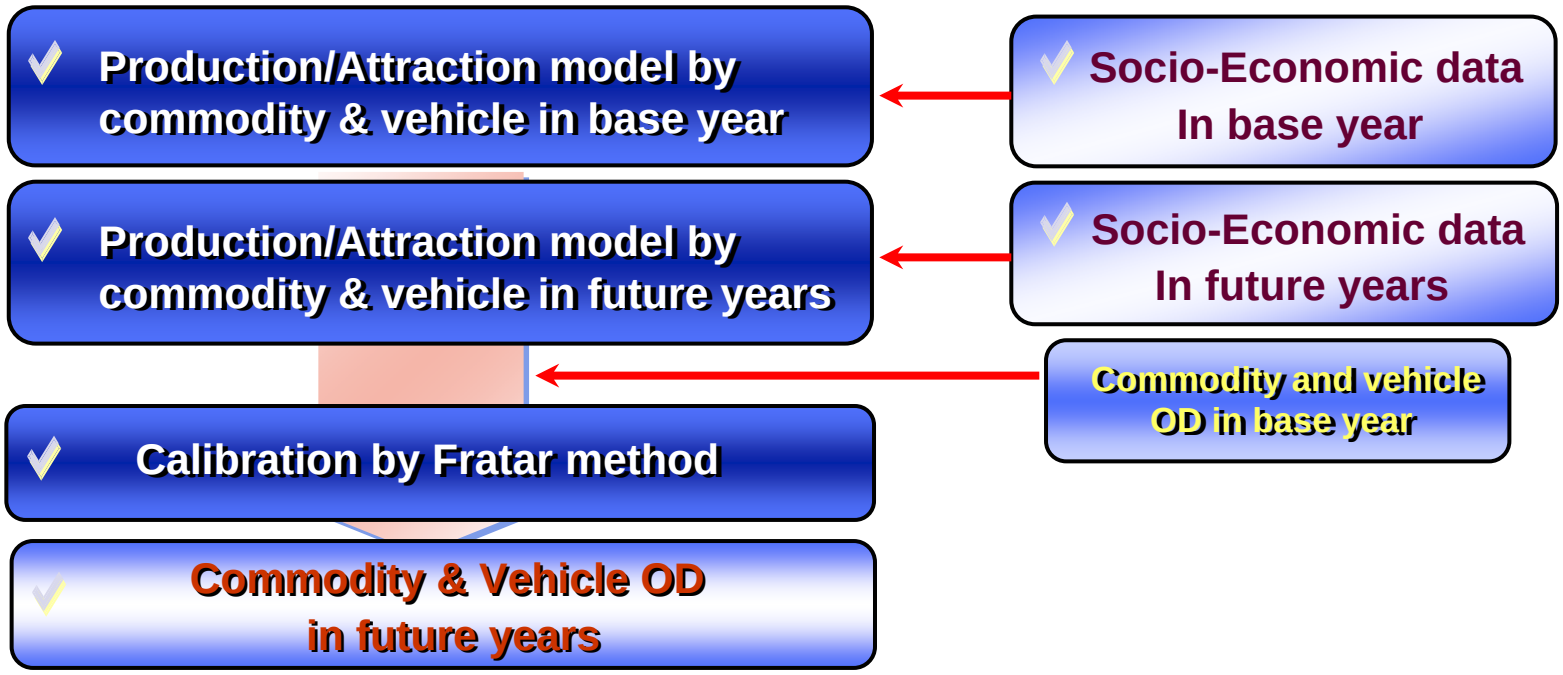
◆ Validation through Graphical Comparison

- **Comparison observed versus estimated trips**
- **Check the model for geographical biases**



❑ Prediction of Freight OD in Future years

◆ Freight Vehicle OD: Using generation model



◆ Railroad & Air OD: Using growth rate provided by related resources

❑ Results

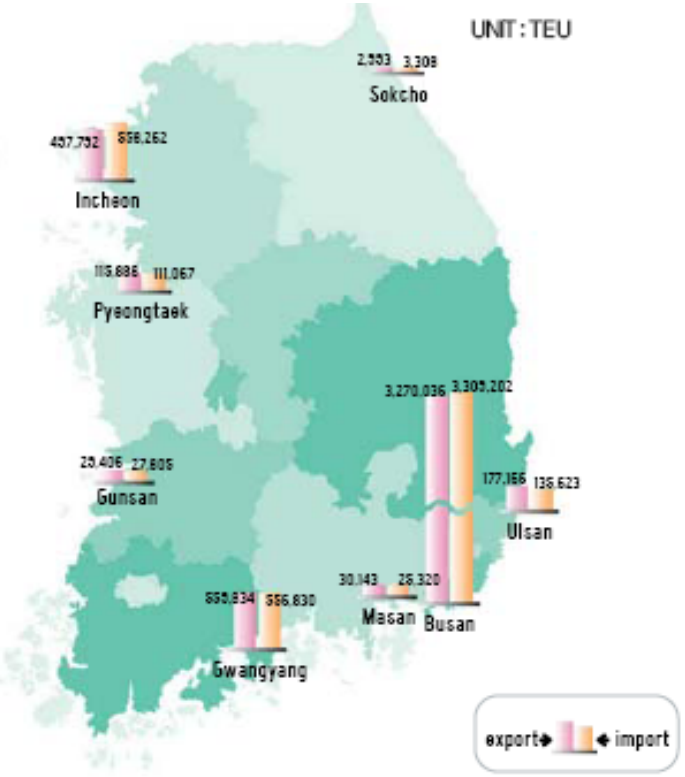
- Amount of Commodity Flow in 2006

Mode	Shipment (1000 tons)	Ration (%)
Highway	1,617,581	91.14
Railroad	43,341	2.44
Water	113,561	6.40
Air	355	0.02
Total	1,774,838	100.00

- Freight Highway OD of in 2006

(1,000 Tons)

	Seoul	Busan	Deagu	Incheon	...	Total
Seoul	57,413	2,529	252	10,427	...	101,444
Busan	1,971	65,097	4,511	1,862	…	133,765
Deagu	453	5,470	18,094	189	…	41,453
Incheon	25,539	2,347	253	46,102	...	109,841
...	…	…	…	…	...	…
Total	188,728	243,408	61,870	87,859	…	1,617,581



❑ Results

◆ Comparison Commodity Flow with Other Countries

	Japan		Korea		USA		UK		France	
Mode	Million ton-km	Ratio	Million ton-km	Ratio	Million ton-km	Ratio	Million ton-km	Ratio	Million ton-km	Ratio
Road	334,979	58.72	100,869	73.24	2,081,406	28.50	163,400	63.63	177,447	71.60
Rail	22,813	4.00	10,108	7.34	2,790,244	38.21	21,700	8.45	23,518	11.44
Water	211,576	37.09	26,590	19.31	951,566	13.03	60,900	23.71	-	-
Air	1,075	0.19	151	0.11	25,317	0.35	2	0	-	-
Others	-	-	-	-	1,454,543	19.92	10,800	4.21	4,640	2.26
Total	570,443	100	137,718	100	7,303,075	100	256,802	100	205,605	100

4. Future Research Plans

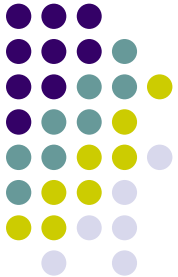
Strategy	Projects
Improvement of Freight OD Reliability	• 4th Commodity Flow Survey • Distribution Channel Survey by Main Commodities • Freight Generation Rate Survey for Logistic Hubs • Analysis of Logistic Network using I-O Table
Provision of Data for User needs	• Survey for Dangerous Material Shipment • Freight Cost Survey
Effective Usage of KTDB	• Manual for Freight Demand Analysis • Integrated Analysis of Urban and Inter-regional Freight Demand
Develop advanced Survey method	• Data Collection using Advanced Survey Methods

5. How to share our experiences

◆ Sharing of Human resources & materials of KTDB

◆ International Cooperation with KTDB center

- Exchange information through joint seminar by specific topic
- Supporting other country for DB system establishment
- Education through technical assistance
- Exchange Experts



Thanks for your attentions !!

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