Prerequisites for completing the quality chain in the safety management
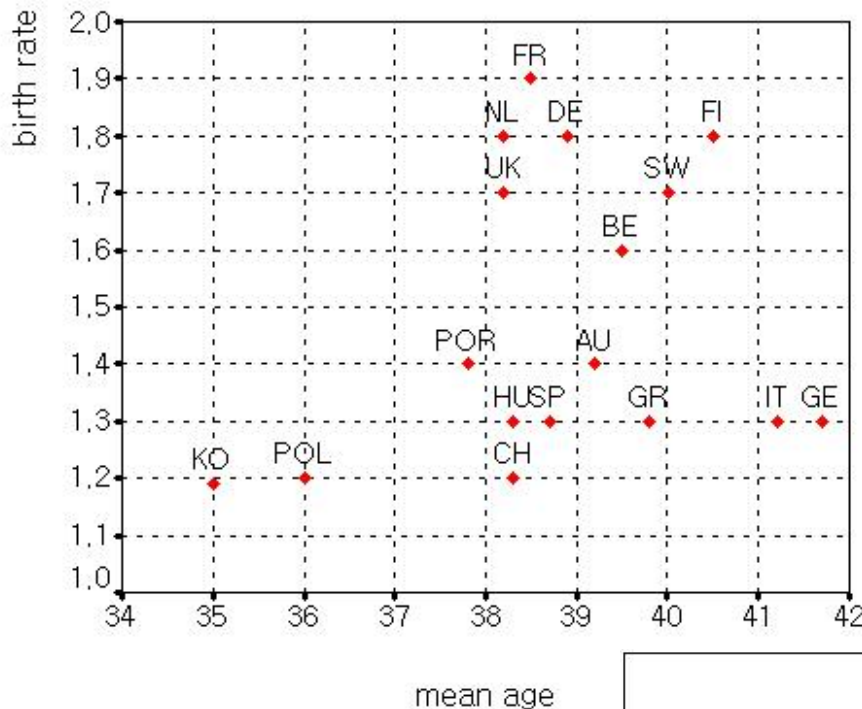
Byongho Choe

Content

1. **Backgrounds and Motives**

2. **Diagnosis of Performance**

3. **Accident Data and Quality Chain**

4. **Recommendations**

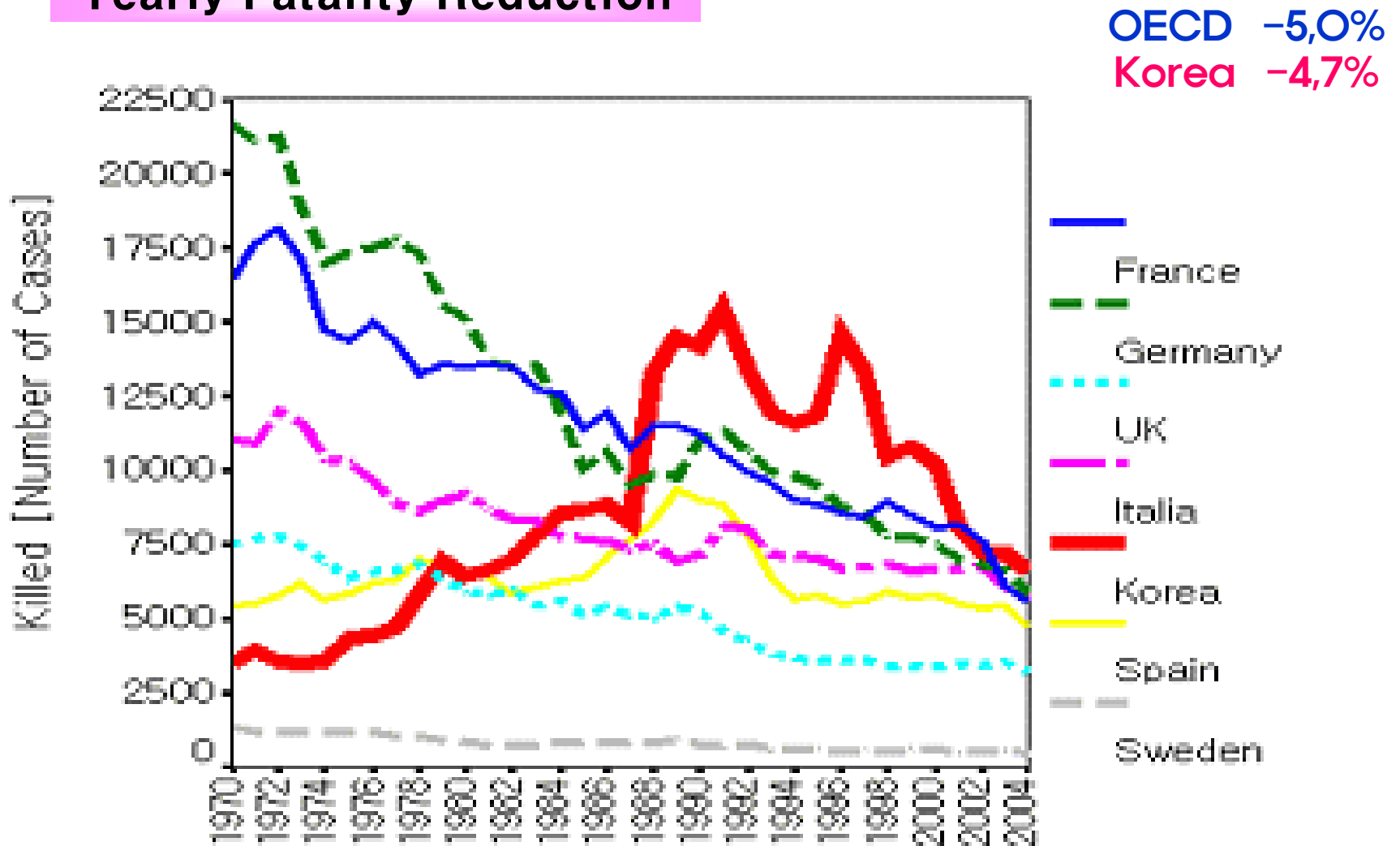# 1. Backgrounds and Motives

Demographical Change

· the lowest in birth rate

· relatively young in OECD

· the youth on the decrease

· the elderly on the increase

	2005 1.000(%)	2030 1.000(%)	2050 1.000(%)	change (%)
0~14 years	9.241(19,2)	➡ 5.525(11,4)	➡ 3.763(8,9)	−10,3%
15~64 years	34.530(71,7)	➡ 31.299(64,4)	➡ 22.424(53)	−18,7%
over 65 years	4.367(9,1)	➡ 11.811(24,3)	➡ 16.156(38,2)	+29,1%

1. Backgrounds and Motives

Yearly Fatality Reduction
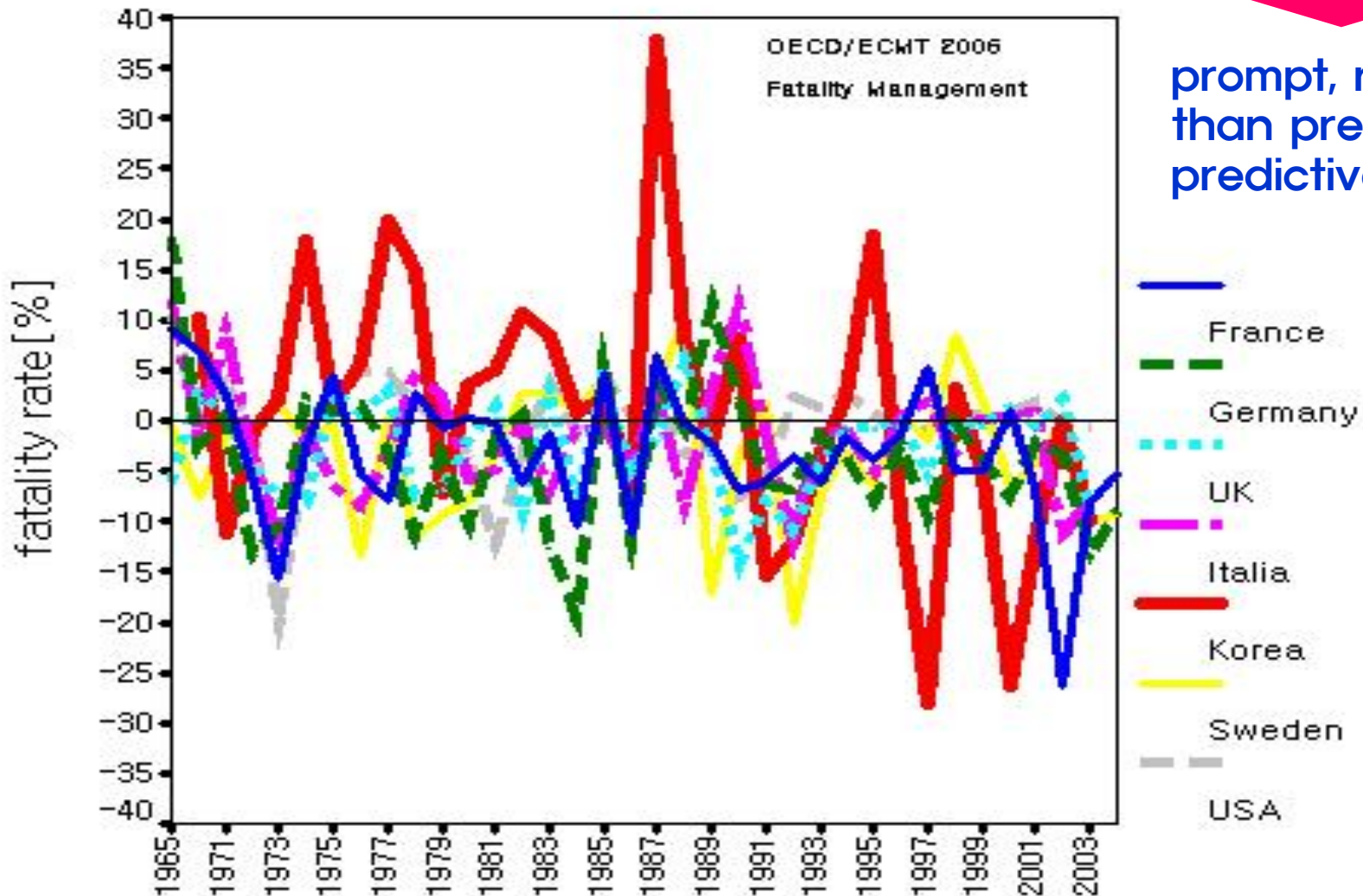
OECD −5,O%
Korea −4,7%

1. Backgrounds and Motives

Yearly Fatality Rate   range 〉15%

prompt, reactive
than preventive,
predictive policy

1. Backgrounds and Motives

Fatalities by Road Category

Improving or not ?

Others
Freeway
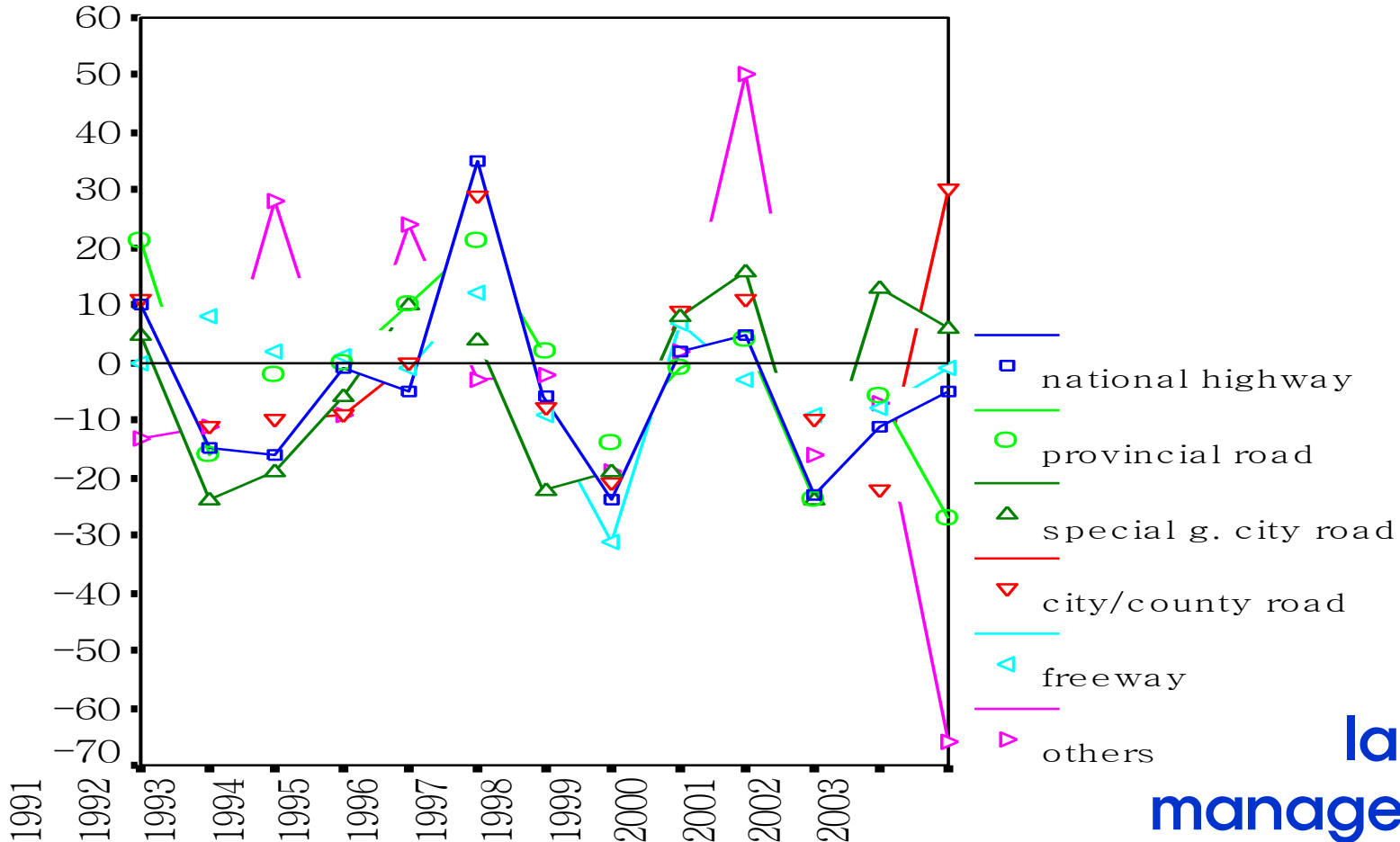City/County Road
Special Greater City Road
Provincial Road
National Highway
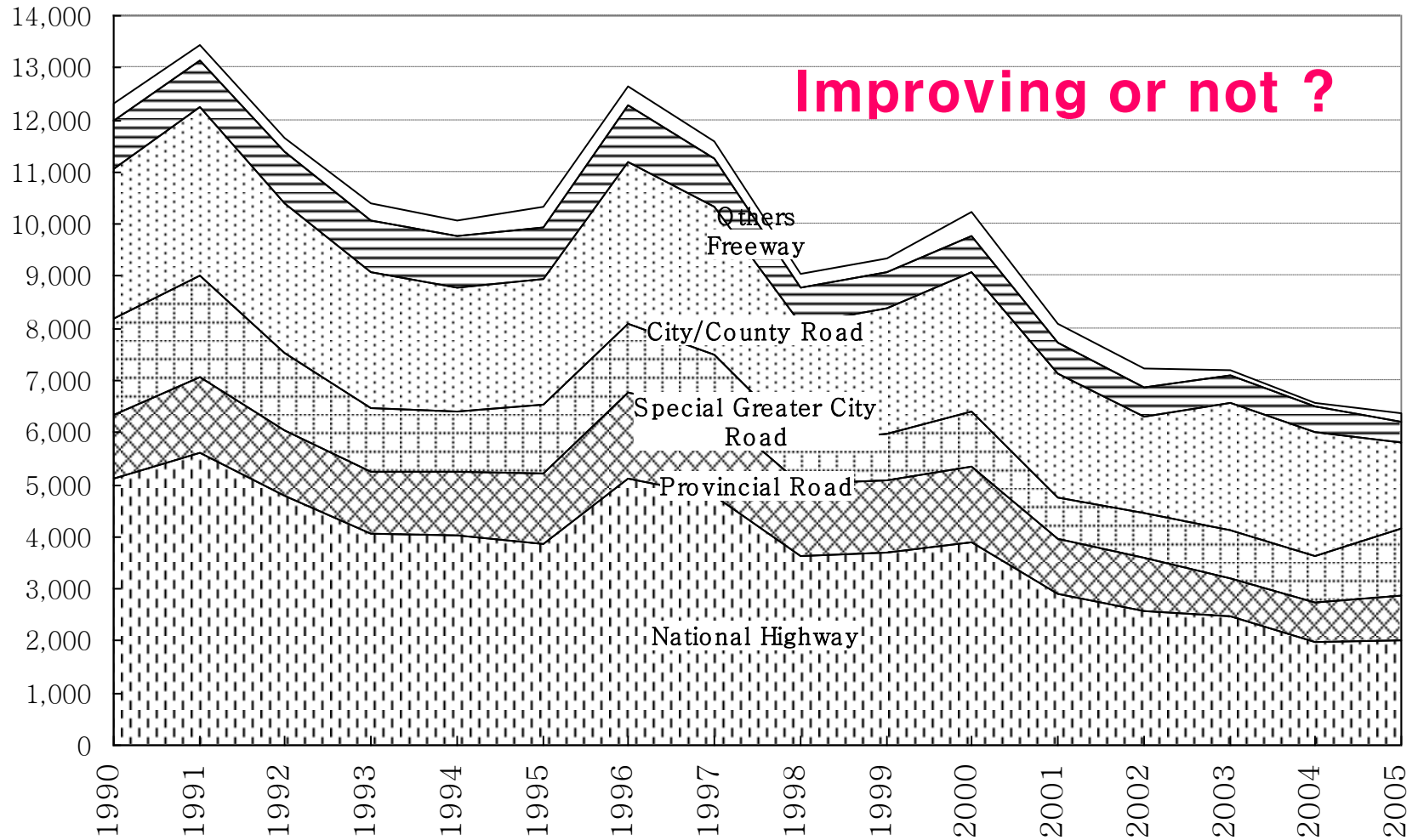
1. Backgrounds and Motives

Fatality Rate by Road Category

fluctuation 〉30%

lack of management capacity

2. Diagnosis of Performance

Fatality Reduction Depth

reduction depth

system margin?

leaving no room for improvement
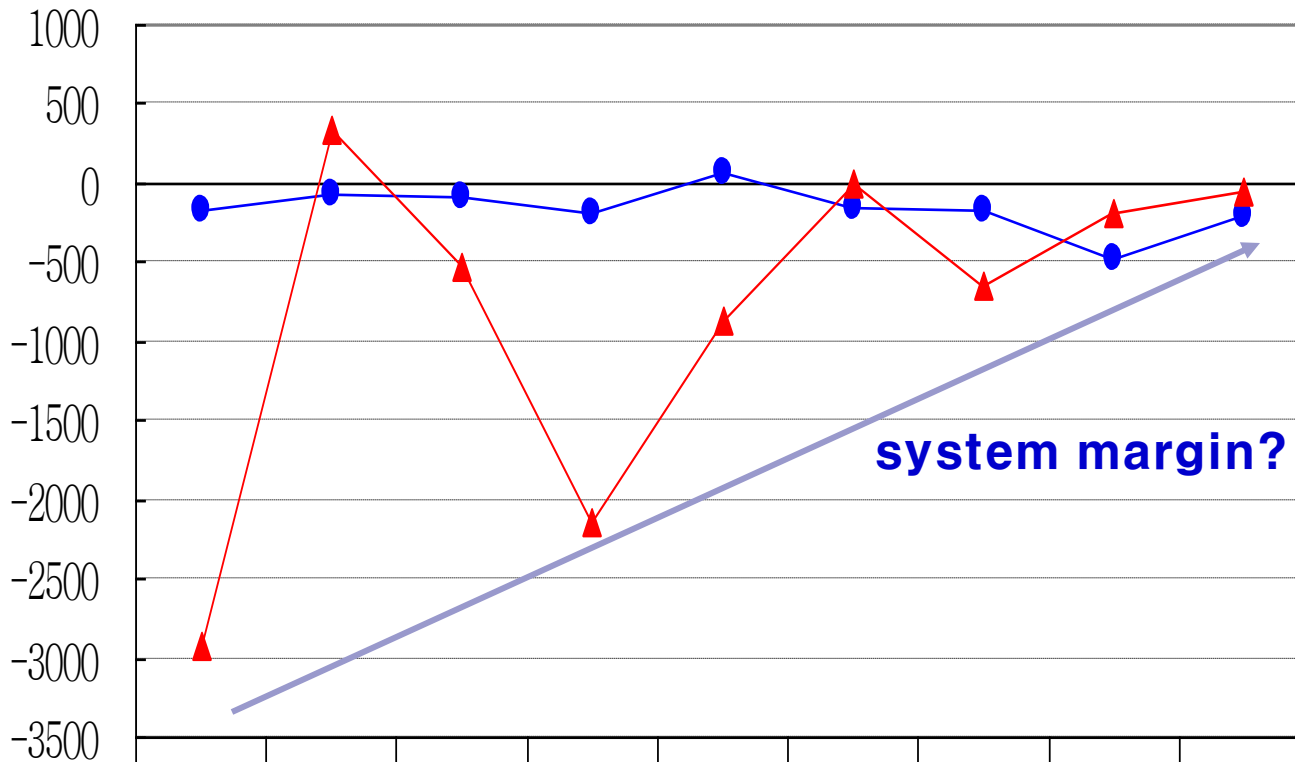
	1998	1999	2000	2001	2002	2003	2004	2005	2006
oecd	-179	-61	-89	-190	63	-156	-167	-473	-198
korea	-2929	341	-520	-2139	-875	-10	-649	-187	-49

Pedestrian Fatality Reduction

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
oecd	829	777	752	719	673	673	627	601	578	612
korea	4901	3874	4083	3764	3137	3108	2896	2581	2548	2442

	1998	1999	2000	2001	2002	2003	2004	2005	2006
oecd	-51	-25	-33	-46	0	-46	-27	-22	34
korea	-1027	209	-319	-627	-29	-212	-315	-33	-106
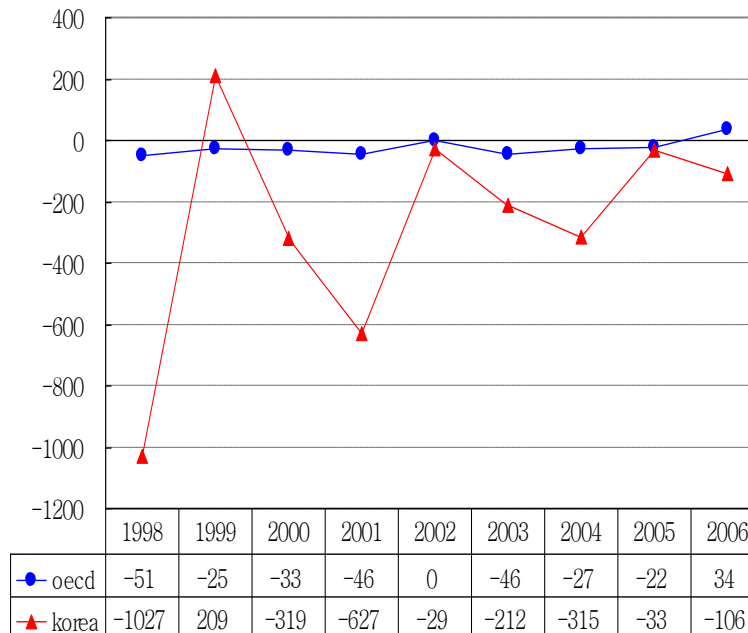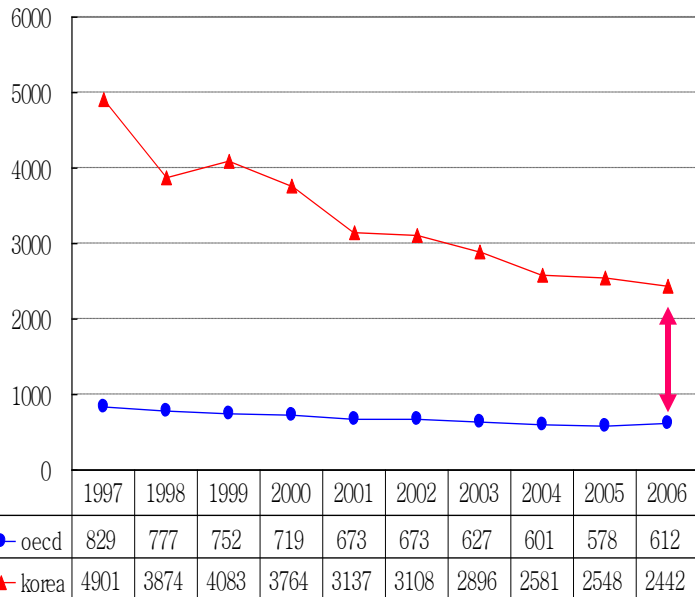
OECD	17.6%
NL	9.1%
USA	11.3%
France	11.4%
Germany	14.0%
Austria	14.2%
Spain	14.9%
UK	21.1%
Japan	32.5%
Poland	34.4%
KOREA	38.6%

Vehicle Fatality Reduction
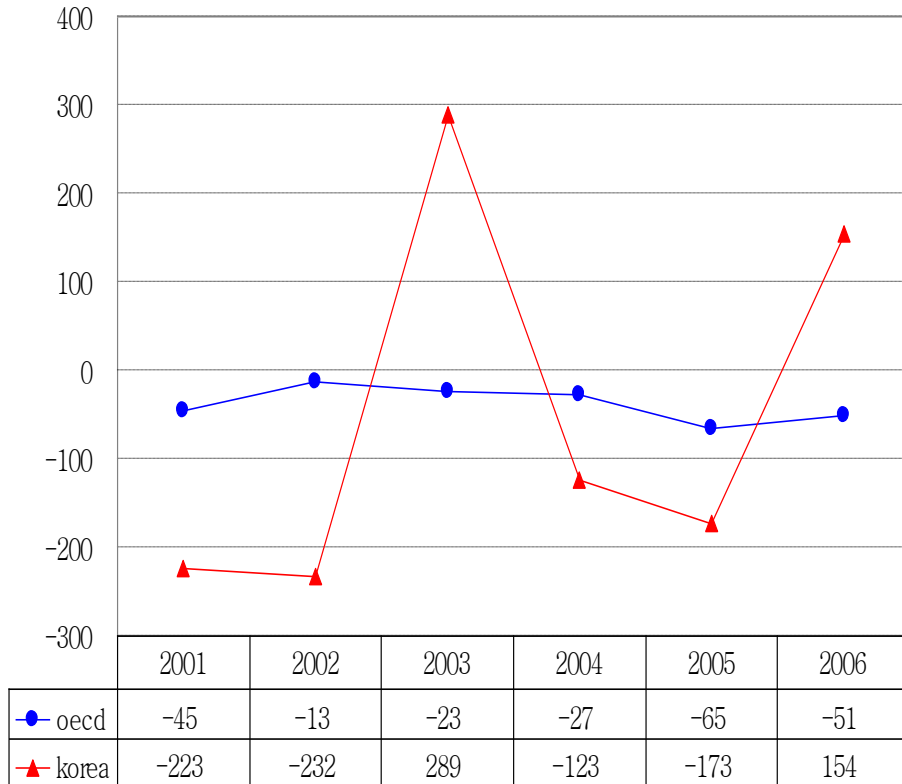
Private Vehicles

	2001	2002	2003	2004	2005	2006
oecd	-45	-13	-23	-27	-65	-51
korea	-223	-232	289	-123	-173	154

Commercial Vehicles

	2001	2002	2003	2004	2005	2006
oecd	-18	-18	24	-15	-19	-32
korea	-272	-199	225	-88	-238	-16
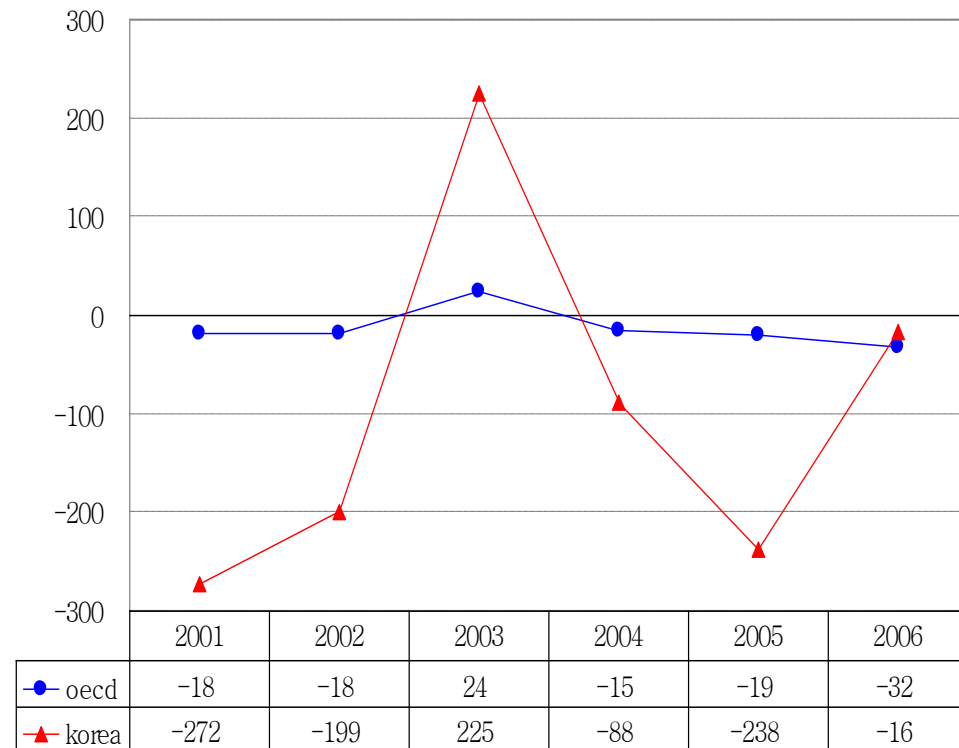
2. Diagnosis of Performance

Typical Safety Defects in Korea
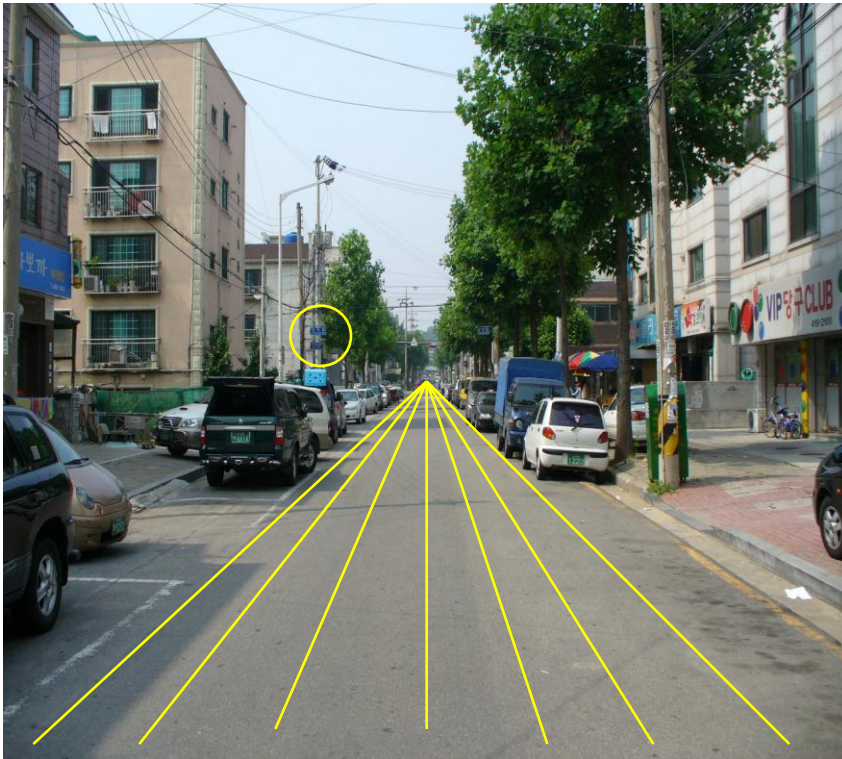
**junction
recognizable?**

**right-of-way
explained?**

PTW Fatality Reduction
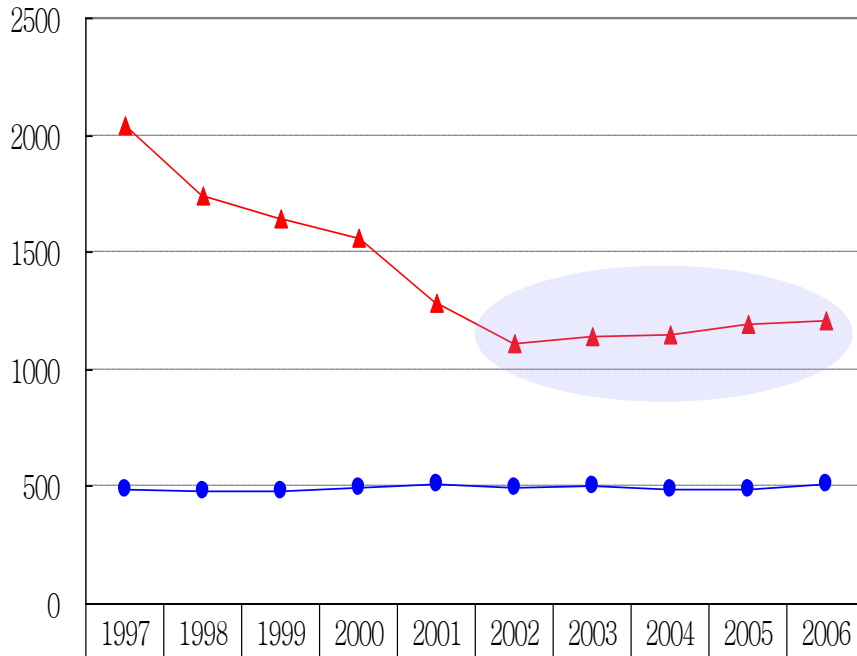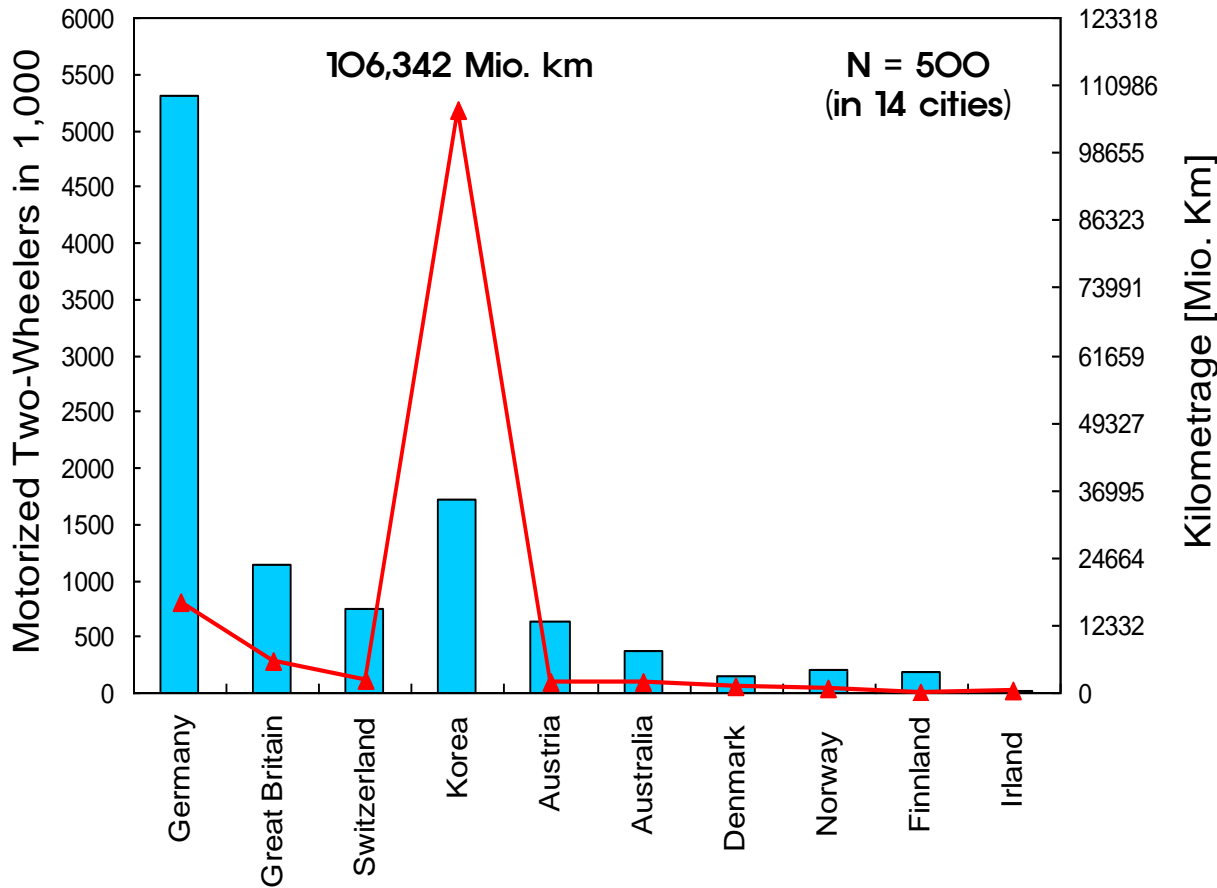
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
oecd	492	482	481	492	511	494	505	487	486	513
korea	2045	1741	1642	1564	1284	1109	1138	1145	1195	1209
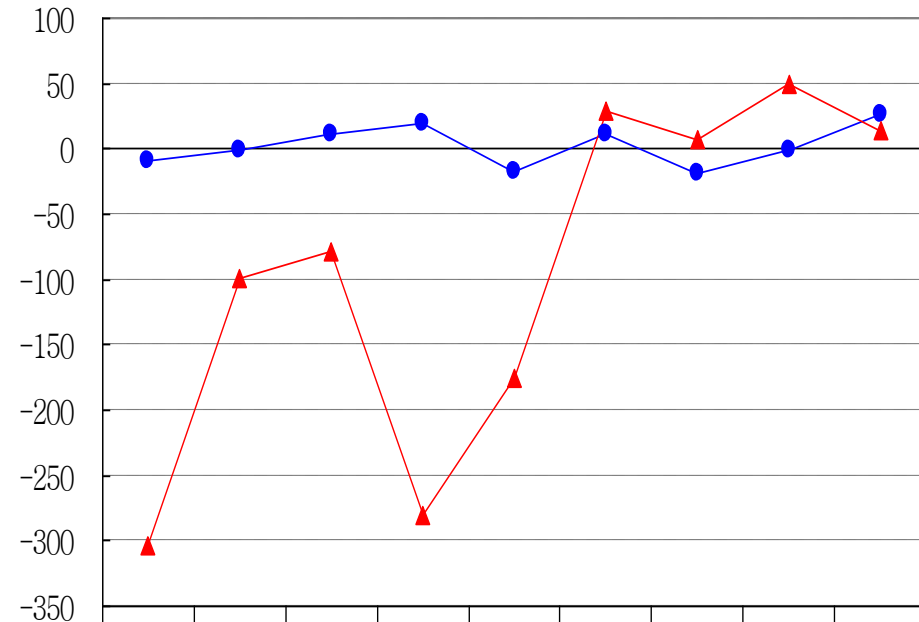
	1998	1999	2000	2001	2002	2003	2004	2005	2006
oecd	-10	-1	11	19	-18	11	-19	0	27
korea	-304	-99	-78	-280	-175	29	7	50	14

PTW Mileage

106,342 Mio. km   N = 500
(in 14 cities)

Motorized Two-Wheelers in 1,000 — *Kilometrage [Mio. Km]*

Countries: Germany, Great Britain, Switzerland, Korea, Austria, Australia, Denmark, Norway, Finnland, Irland

Elderly Cyclists Fatality

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
oecd	85	80	83	80	81	76	76	75	71	75
korea	136	114	133	143	144	112	124	136	148	150

	1998	2000	2001	2003	2004
over 61 years	47.6	54.9	59.7	59.1	64.9
15~60 years	42.5	35.3	30.0	35.7	30.5
under 14 years	9.9	9.8	10.2	5.2	4.6
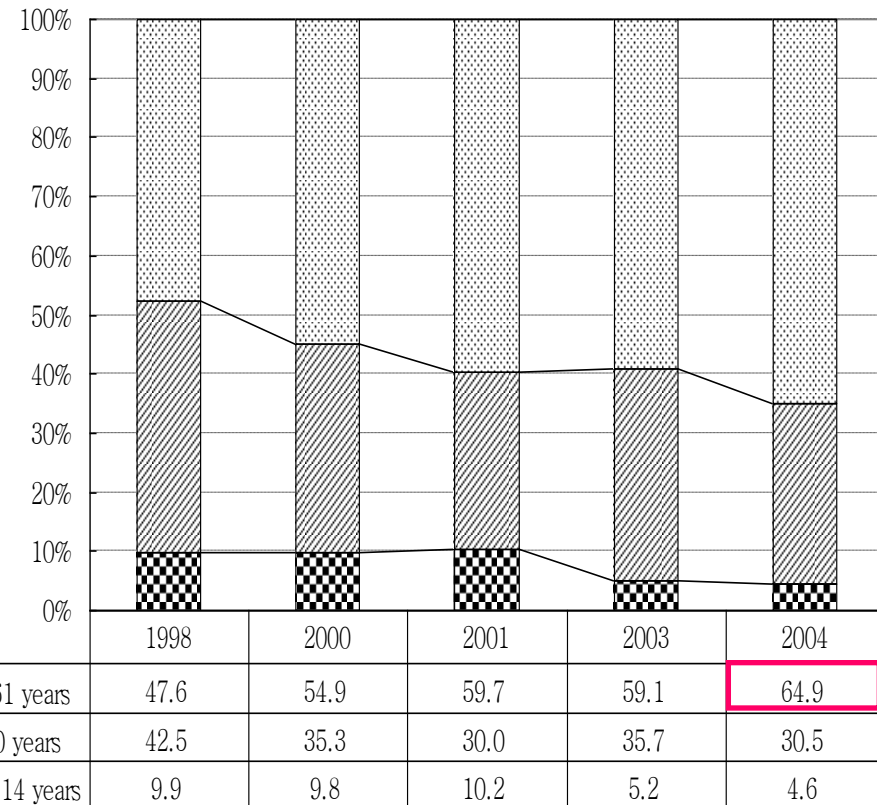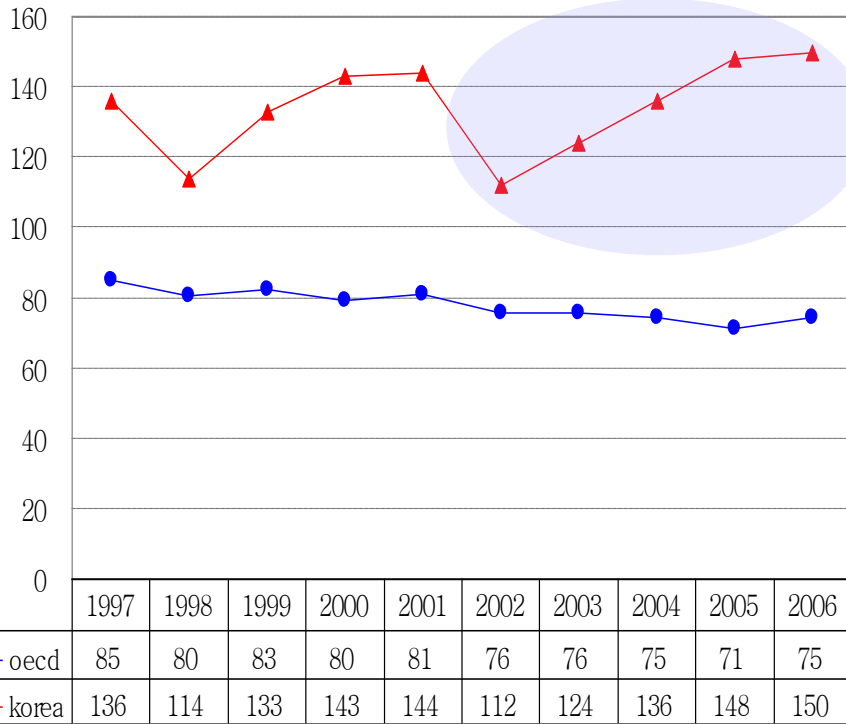
2. Diagnosis of Performance

Mobility Structure

N = 1,067
(in 3 cities)

	1km	5km	10km	15km	20km	50km	100km	150km	160km
Walking	237	438	65	46	11	34			
			58	18	15				
Cycling	47	85	71	92	127	193	94	75	11
PT		76		47	53	66	64	31	
MV		75	48						1

Legend: ⊠ MV   ⊠ PT   ⊠ Cycling   ⊠ Walking

2. Diagnosis of Performance

2. Diagnosis of Performance

Pedestrian Fatality by Accident Form
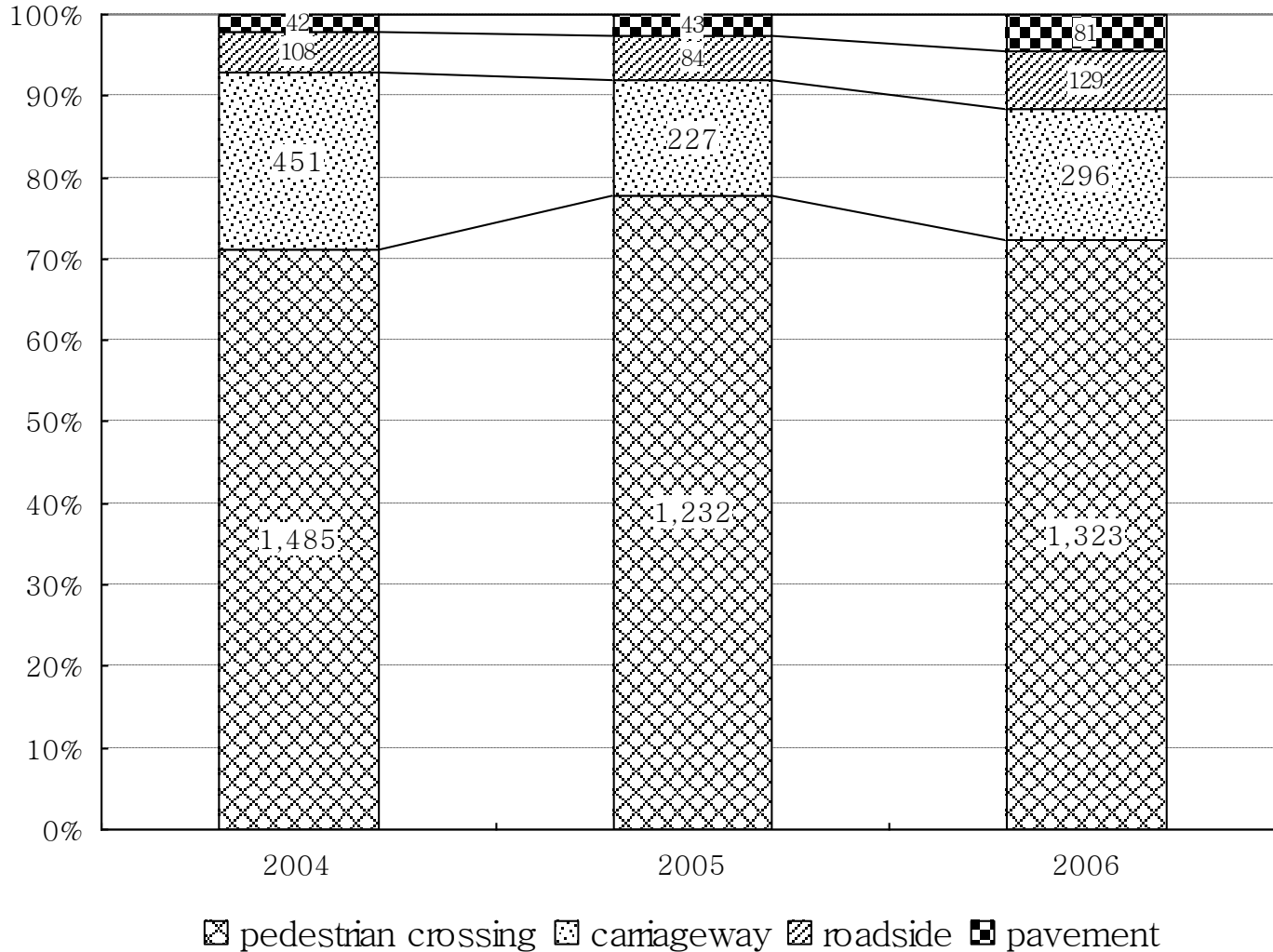
risky while crossing the crosswalk

↓

no protected right-of-way of pedestrians even on feeder roads

	2004	2005	2006
pavement	42	43	81
roadside	108	84	129
carriageway	451	227	296
pedestrian crossing	1,485	1,232	1,323

☒ pedestrian crossing ☒ carriageway ☒ roadside ◼ pavement

2. Diagnosis of Performance

Typical Safety Defects in Korea

**protect sovereignty
of pedestrians?**

**no jaywalking
in residential area?**

3. Accident Data and Quality Chain

Problematic of Korea

☞ **Institutional Barriers**

▪ **monopolizing public assets like accident data by police**

▪ **having no data in common leads to ineffective practicing**

▪ **police only focusing on who be culprit or victim**

☞ **Data Unreliability**

▪ **accident data too short for road safety engineering**

▪ **unreliable due to disparity between police and insurance**

3. Accident Data and Quality Chain

Data Reliability

POLICE 'Traffic Accidents in 2006'
· accidents in total 214.171
· slightly injured 342.233

**in reality
1,5 million?**

INSURANCE
· accidents in total 807.000 (3,8 more than police)
· slightly injured 1.229.232

Germany BFS 'Traffic Accidents in 2006'
· accidents in total 2.235.318
· slightly injured 327.984

Traffic Safety Strategies

Local Accident Investigation ▶ Core Strategy for Local Authority

3. Accident Data and Quality Chain

Traffic Safety Law
Article 50(Local Traffic Accident Investigation)

①administrative organs in charge of traffic facilities, traffic executive institutions supervising/guiding those who are installing and managing traffic facilities as such, when it comes to severe accidents, are obligated to make a scrutiny into factors whether it being caused by deficits of facilities concerned, lack of safety equipments like traffic signs, road markings etc.

②designated administrative organs are permitted to inquire into the cause, in case of severe accidents issued by a presidential decree, whether it being caused by deficits in car making etc.

③on the Paragraph 1 local authorities which are obliged to make an investigation into accidents ought to submit the results to designated administrative organs within jurisdiction.
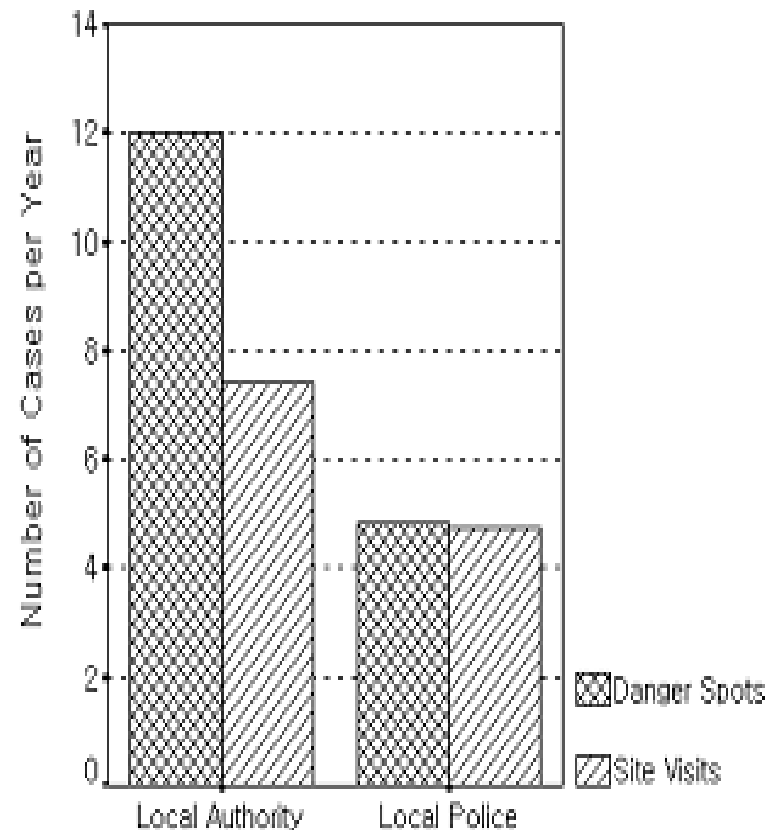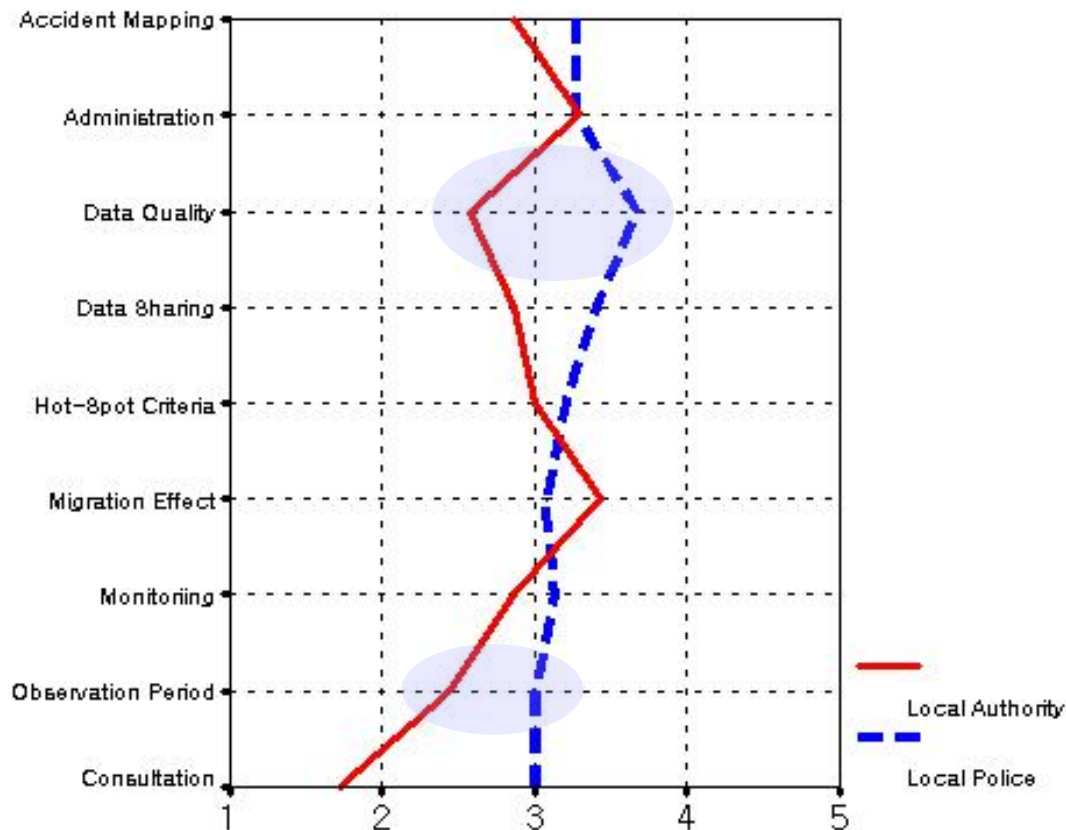
3. Accident Data and Quality Chain

Criteria for Hot-Spots

Country	Hot-Spots	Hot-Lengths	Accident DB, Statistics Announcement
France	- 10 accidents for 5 years - 10 serious injuries for 5 years - Intersection of 850m	- 50 accidents per one mio cars/km (downtown) - 80 accidents per one mio cars/km (suburb) - Section of 10~30km	- Accident DB and statistics by Transportation and Road Safety Department (D.S.C.R) (Police keeps only recording)
Germany	- 3 fatalities for 3 years - 3 serious injuries for 3 years - 5 slight injuries for 1 year - 15 traffic accidents for 1 year - Intersection of 300m	- 3 fatalities for 3 years - 3 serious injuries for 3 years - 15 slight injuries for 1 year - 15 accidents for 1 year - section of 1km	- Accident DB and statistics by Federal Statistical Office - Local Accident Investigation by Federal Ministry of Transport(BMVBS) since 1974 (Police keeps only recording)
UK	- 4 injuries for 1 year - 8 injuries for 3 years - Intersection of 300m	- 10 injuries for 3 years	- Accident DB and statistics by Department of Transport - Local Accident Investigation by Royal Society for Prevention of Accidents(RoSPA) (Police keeps only recording)
Spain	- 3 accidents for 2 years	- 9 accidents per 1km for 2 years (ADT > 80,000) - 5 accidents per 1km for 2 years (ADT > 4~80,000) - 3 accidents per 1km for 2 years (ADT > 40,000) - 3 accidents of the other sections for 2 years	- Accident DB and statistics by Transportation and Environment Office(Moptma) (Police keeps only recording)
Netherlands	- 12 accidents for 3 years - Road Factor(1-1-0)	-	- Accident DB and statistics by Transportation Department (Directie Verkeersveiligheid) (Police keeps only recording)
Greece	- 5 fatalities for 1 year	- 90% Poisson distribution of section average	- Accident DB and statistics by Transportation Department (Ministry of Public Works) (Police keeps only recording)
USA	- Accident rate > statistical accident rate - EPDO-Method	- Accident rate by state government - 0.01mile, 0.03mile, 0.05mile, 1mile, 3mile etc.	- Accident DB and statistics by Department of Transport (Police keeps only recording)
South Korea	- 3 fatalities for 3 years - 3 serious injuries for 3 years - Intersection of 50m	- 3 fatalities for 3 years - 3 serious injuries for 3 years - Built-ups < 300m - Non-built-ups < 500m	- Police keeps not only recording accidents but also managing accident DB, publishing statistics, and doing engineering(black-spots with 5~7 accidents for 1 year) - Local Accident Investigation by Ministry of Land, Transport and Maritime Affairs(MLTM) since 2008

Optimum Level of Hot-Spots

N = 70

Optimum Level of Hot-Spots

N = 70

N = 70

t = -4,979, p 〈 .001

t = -3,002, p 〈 .01

t = -2,994, p 〈 .05

t = -2,559, p 〈 .05

Killed

Serious Injury

Slight Injury
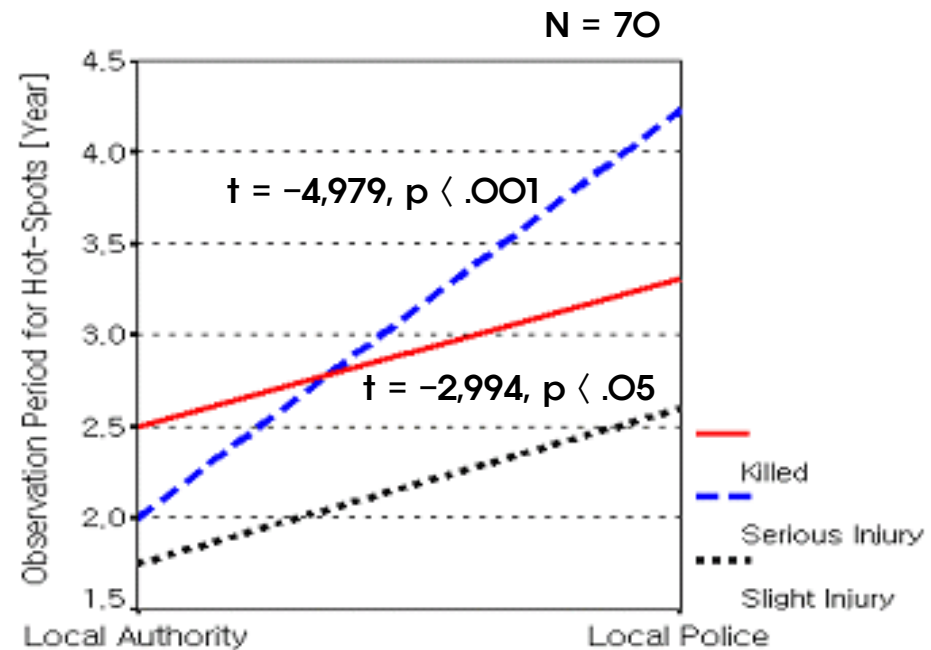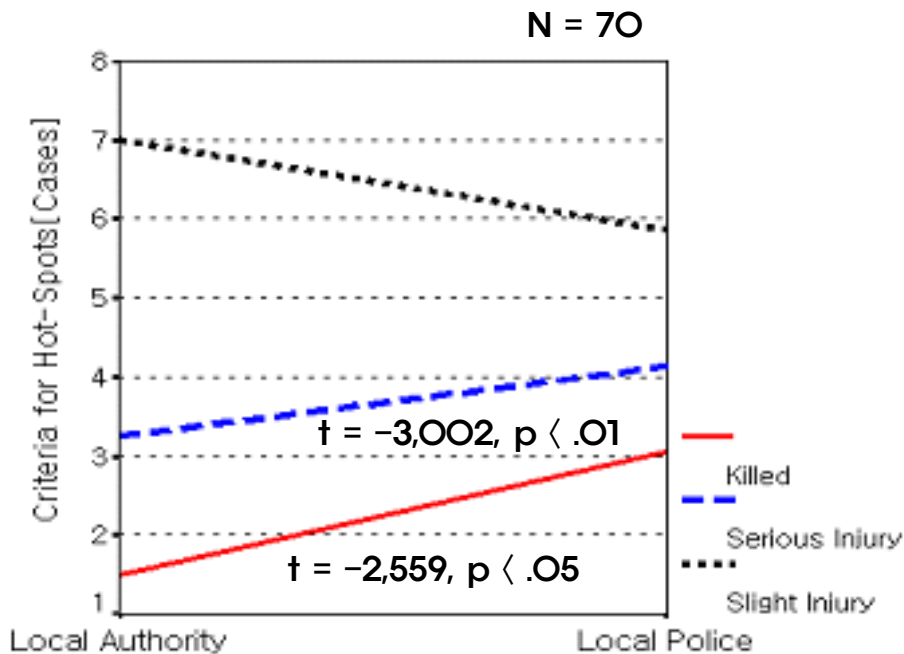
Out of survey results MLTM reflected new criteria toward grasping 'true' dangerous places in Traffic Safety Law.

25

3. Accident Data and Quality Chain

Enforcement Ordinance of Traffic Safety Law Paragraph 36(Severe Accident), 37(Subject·Methods)

- **3 Killed and Seriously Injured (KSI) in the last 3 years**

- apply to KSI as of 01.01.08

- classify accident type of hot-spots/-lengths annually

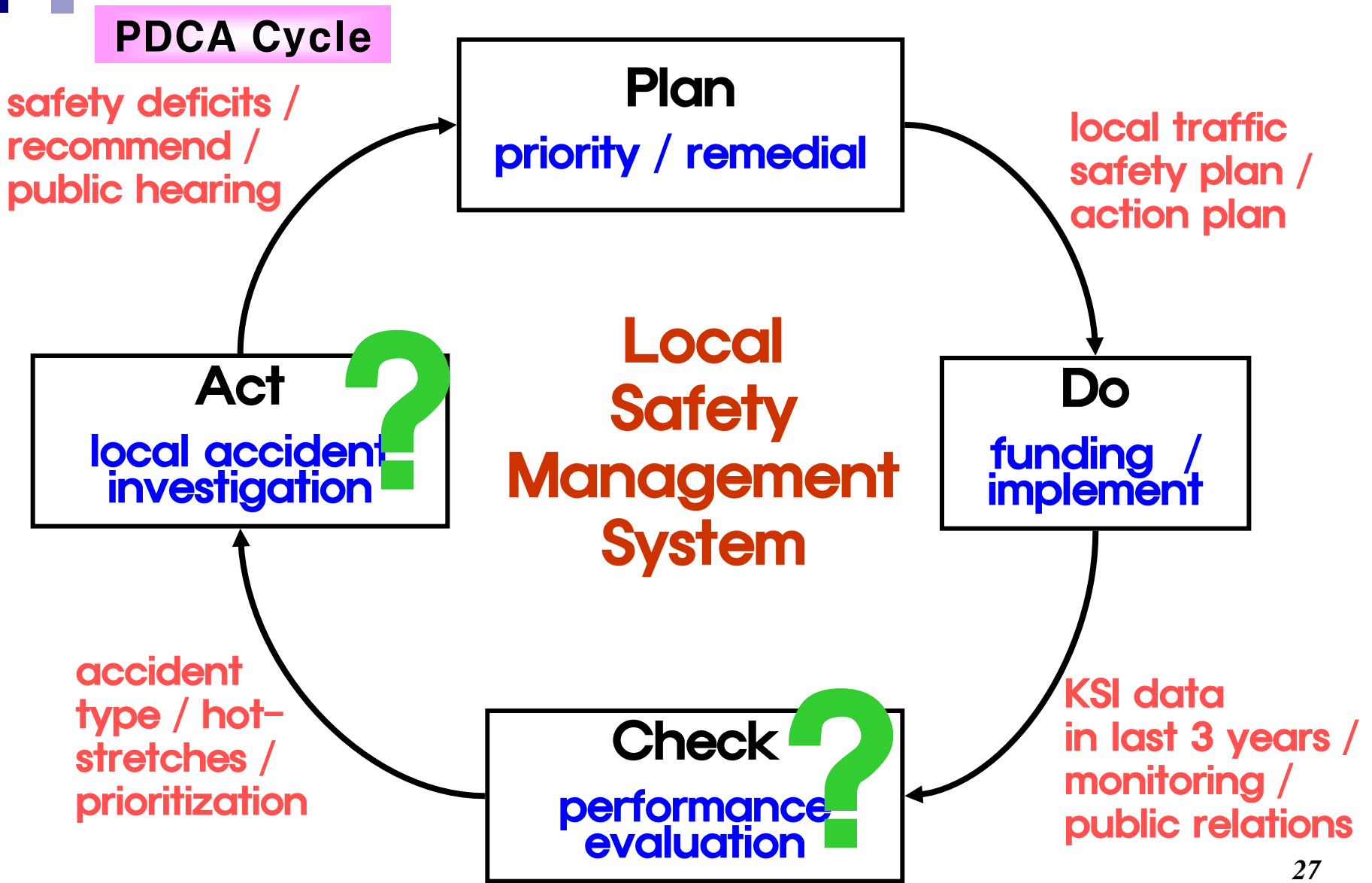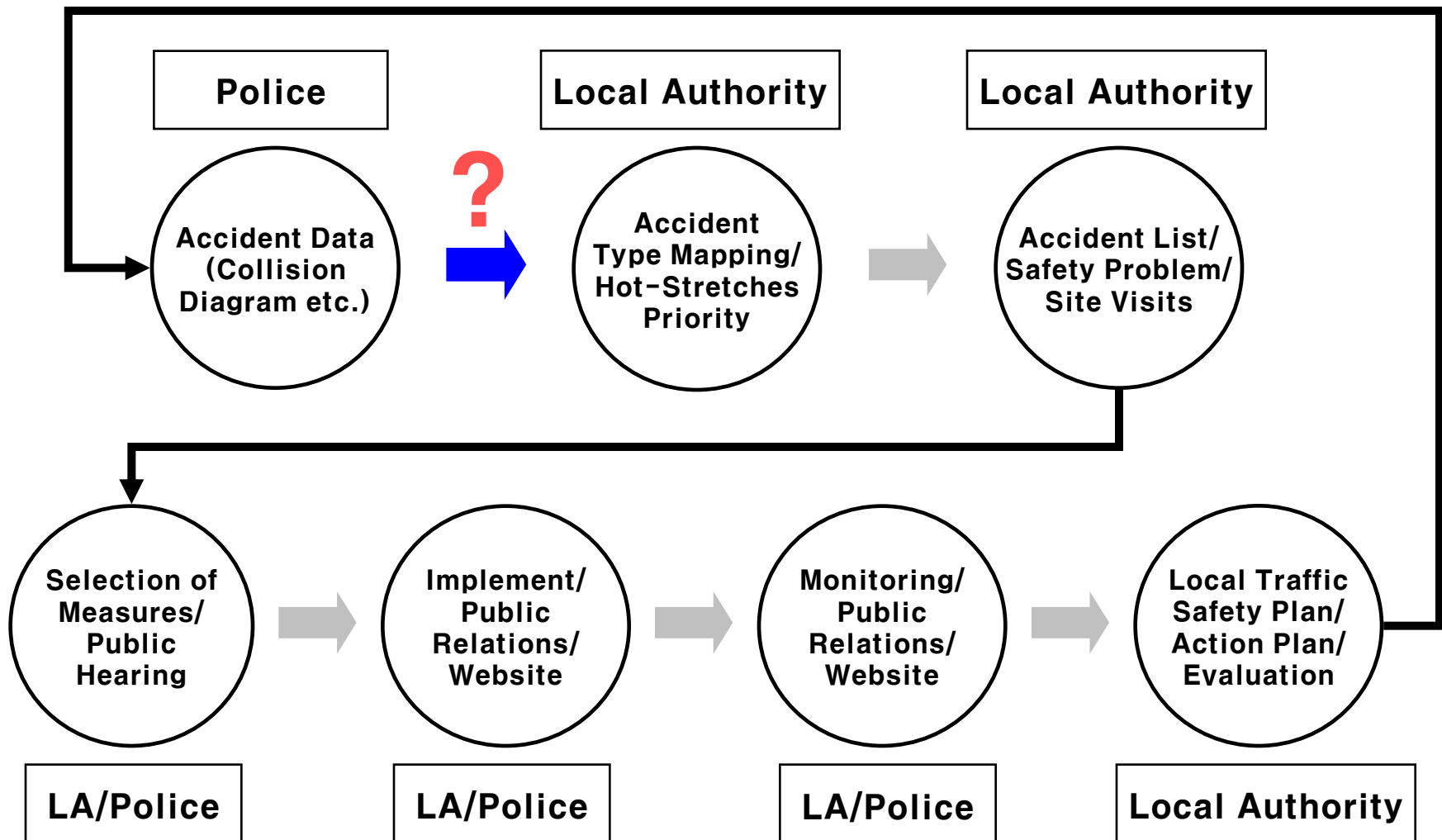- rank analysis and priority of hot-spots/-lengths

- accident list, accident diagram, site-visits etc.

- accident commission on local level

- submit the results to traffic safety information system

- with exceptions of driving while intoxicated / unlicensed

3. Accident Data and Quality Chain

PDCA Cycle

safety deficits /
recommend /
public hearing

local traffic
safety plan /
action plan

Plan
priority / remedial

Local Safety Management System

Act
local accident investigation

Do
funding / implement

Check
performance evaluation

accident
type / hot–
stretches /
prioritization

KSI data
in last 3 years /
monitoring /
public relations

3. Accident Data and Quality Chain

Prerequisite for Quality Chain

Police	Local Authority	Local Authority

Accident Data (Collision Diagram etc.) **?** → **Accident Type Mapping/ Hot-Stretches Priority** → **Accident List/ Safety Problem/ Site Visits**

Selection of Measures/ Public Hearing → **Implement/ Public Relations/ Website** → **Monitoring/ Public Relations/ Website** → **Local Traffic Safety Plan/ Action Plan/ Evaluation**

LA/Police	LA/Police	LA/Police	Local Authority

Practical Use of Accident Data
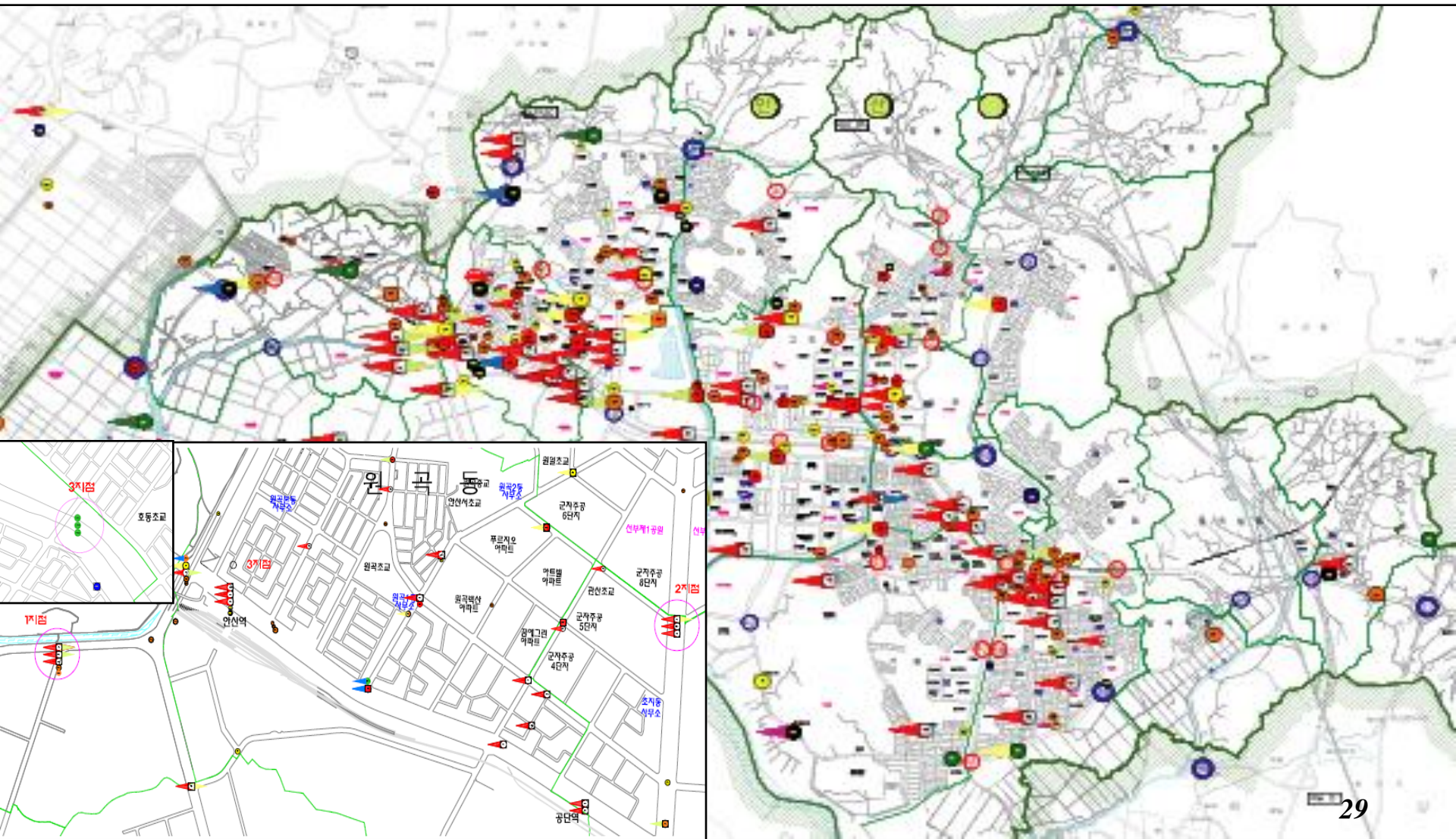
3. Accident Data and Quality Chain

where structural-similar accidents frequent?

help making priority and finding ways of improving the road

4. Recommendations

✓ **Road is a social system, not just physical facilities**

✓ **Human error is not to be removed by education and enforcement**

✓ **Design road as it allows human error of perception and cognition**

✓ **Stick to design guidelines : Lower Speed + Fewer Traffic**

✓ **Holding accident data in common (local authorities and polices)**

✓ **Cooperate local authorities and polices for accident prophylaxis**

✓ **Do not monopolize accident data for commercial gain**

✓ **Bring local authorities remedial measures up-to-date**

Thanks for your attention!