



**XXIV<sup>th</sup> World  
Road Congress  
Mexico 2011**  
Mexico City 2011.

# The Medium-Term Strategy to Realize Multi-Modal Mobility in Tokyo Metropolitan Region

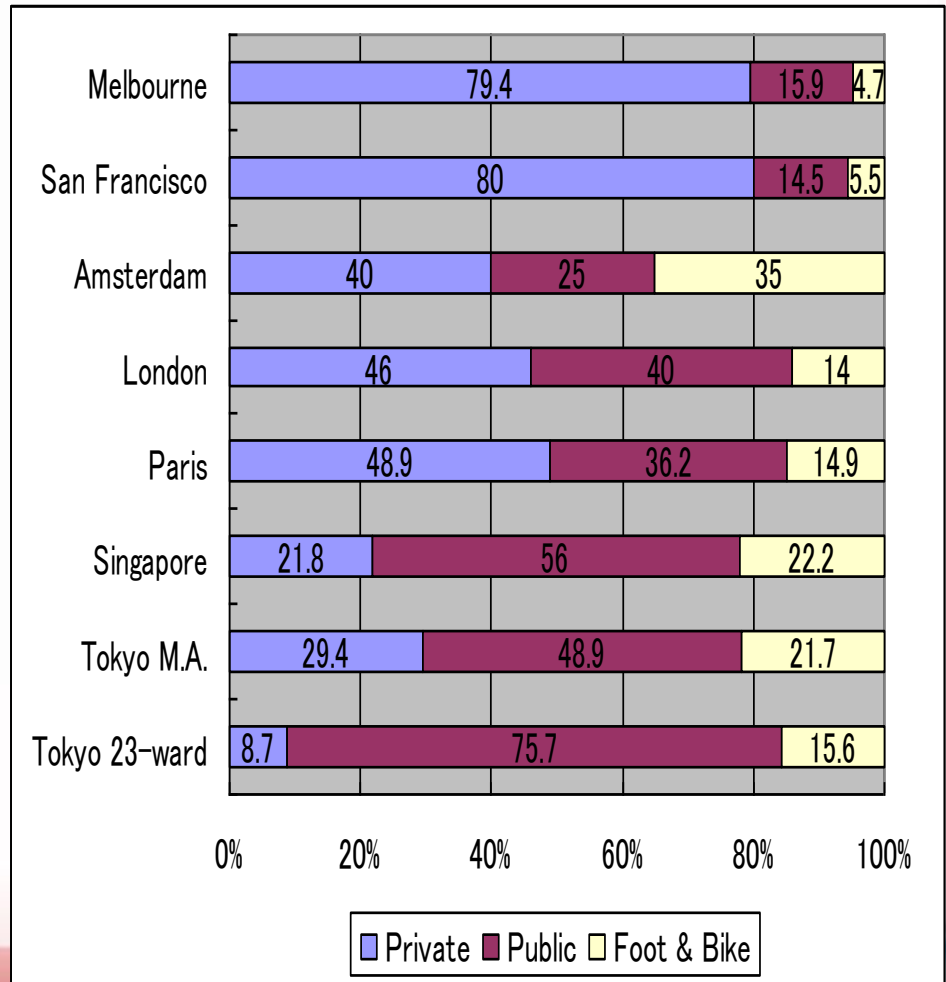
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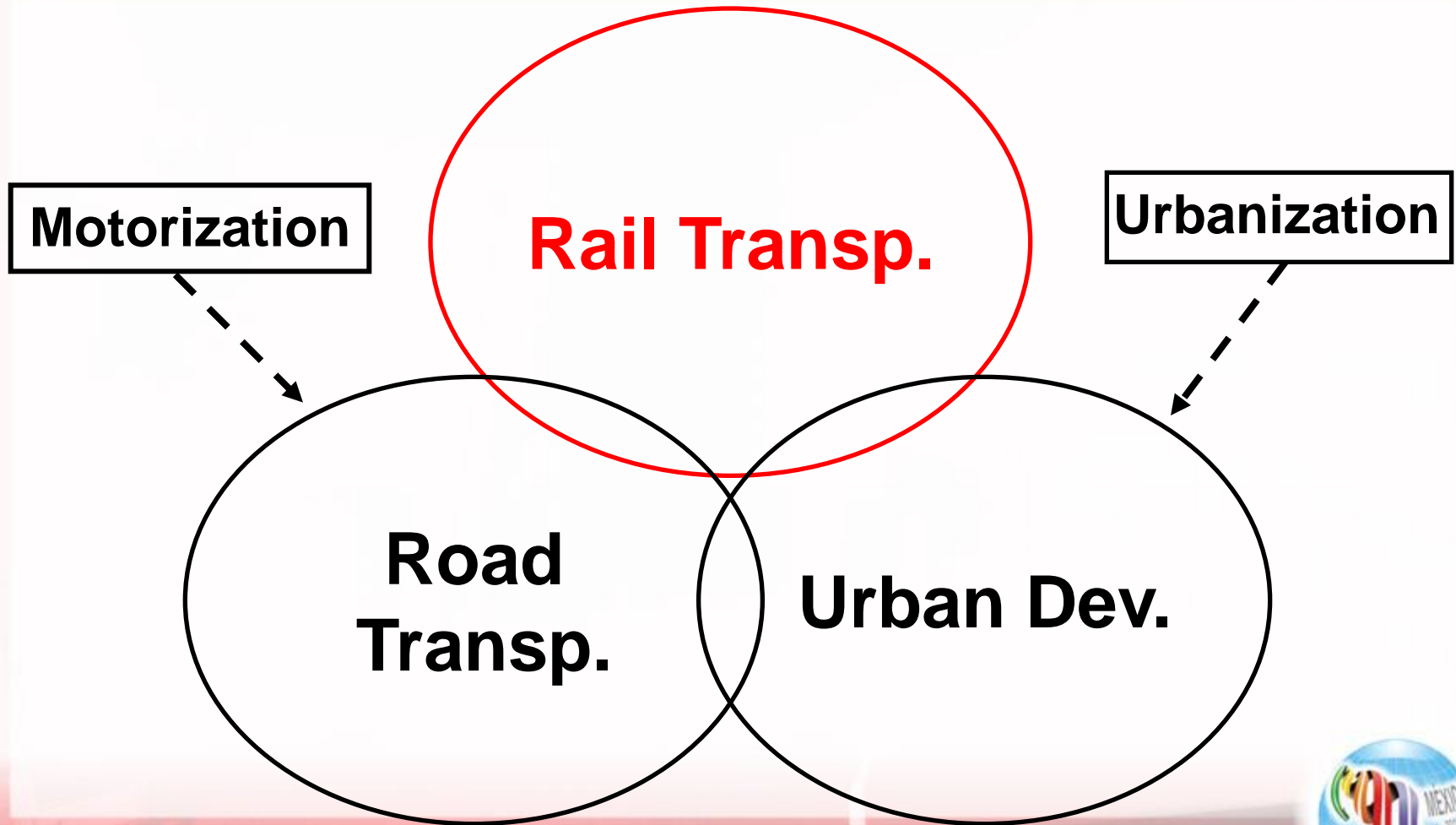
# Higher Rail Use in TMR

- Public transp. share for commuting trips
- In TMR, rail share 30%
- For Central Tokyo, rail share 70%
- <Fundamental Q>  
Why is it so ?



# Three Sub-sectors in Urban Transport

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# Urban Transp. Problems in Megacities

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- (1) Two Basic Changes: Urbanization (U)  
Motorization (M)
- (2) Tokyo Metro. Region: Experienced U+M  
(U) came earlier, (M) followed
- (3) Growing Megacities ; experiencing  
extensive (U+M) overlapped



# Contents

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1. Urbanization, Motorization and Urban Transp. System in Tokyo Metropolitan Region (TMR)
2. Coordinated Planning and Finance between Rail and Suburban Development
3. Conclusive Remarks



# 1. Urbanization, Motorization and Urban Transp. System in Tokyo Metropolitan Region (TMR)



# 1-1 Tokyo Metropolitan Region (TMR)



**Tokyo and 3 pref.**

Area: 6,060km<sup>2</sup>

Population: 28 million

50km radius from  
central Tokyo



# 1-2 Three Phases of Urbanization in TMR

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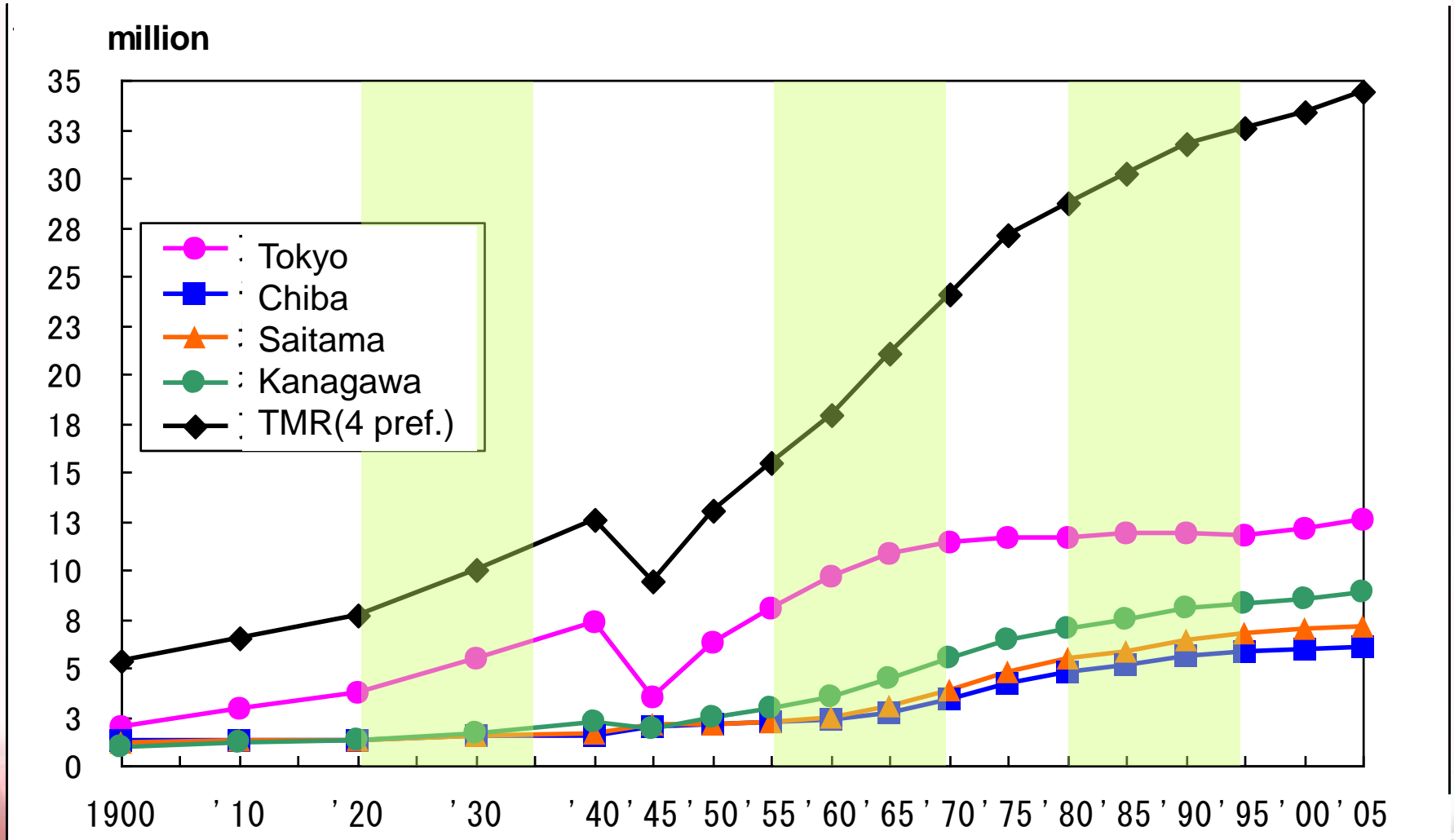
- Phase I ('20 - '35) Light Industry
  - Phase II ('55 - '70) Heavy Industry /  
High economic growth
  - Phase III ('80 - '95) High-tech and Service Industry
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- Phase I, II ⇒ Common to major large cities
  - Phase III ⇒ Solely to TMR / Cosmopolitan TMR



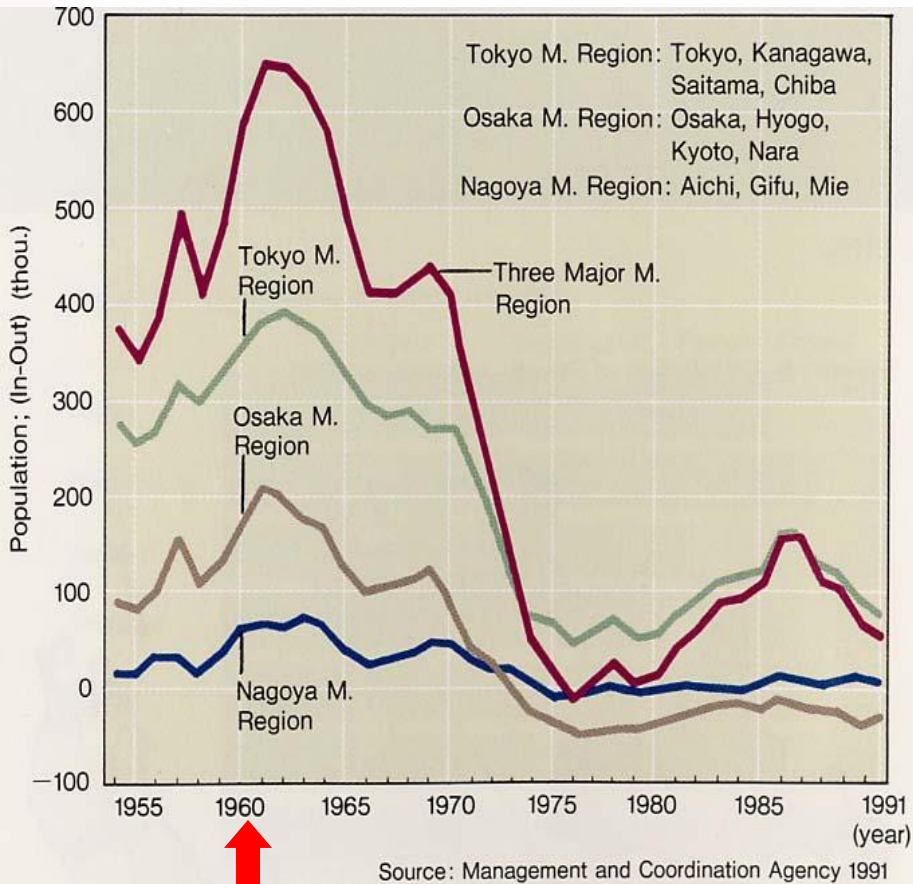


# 1-3 Trend of Population in TMR

Trends of population in TMR



# 1-4 Degree of Urbanization



Phase I: Moderate

Phase II: Overwhelming

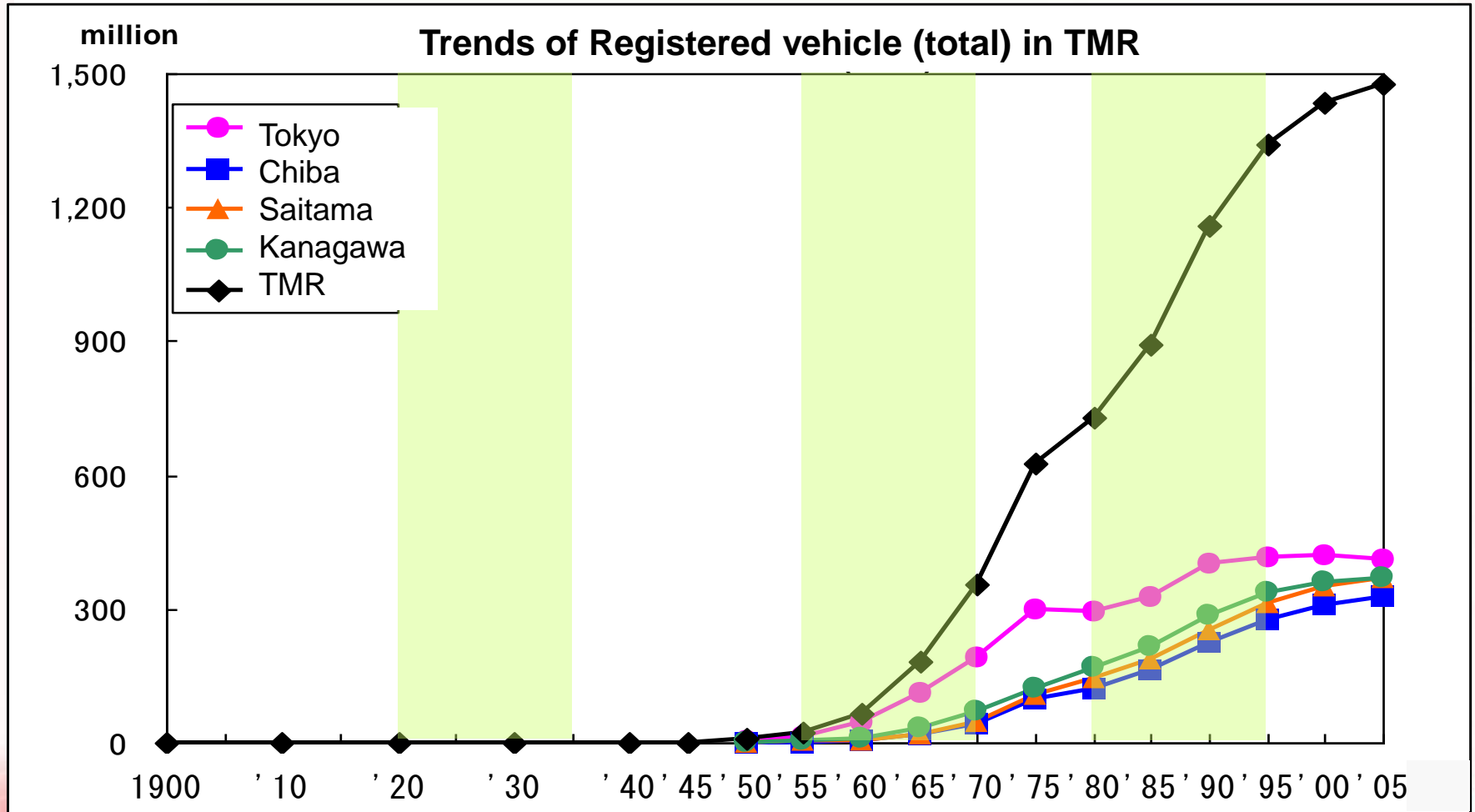
Phase III: Moderate

(Needs for office floor in central Tokyo)

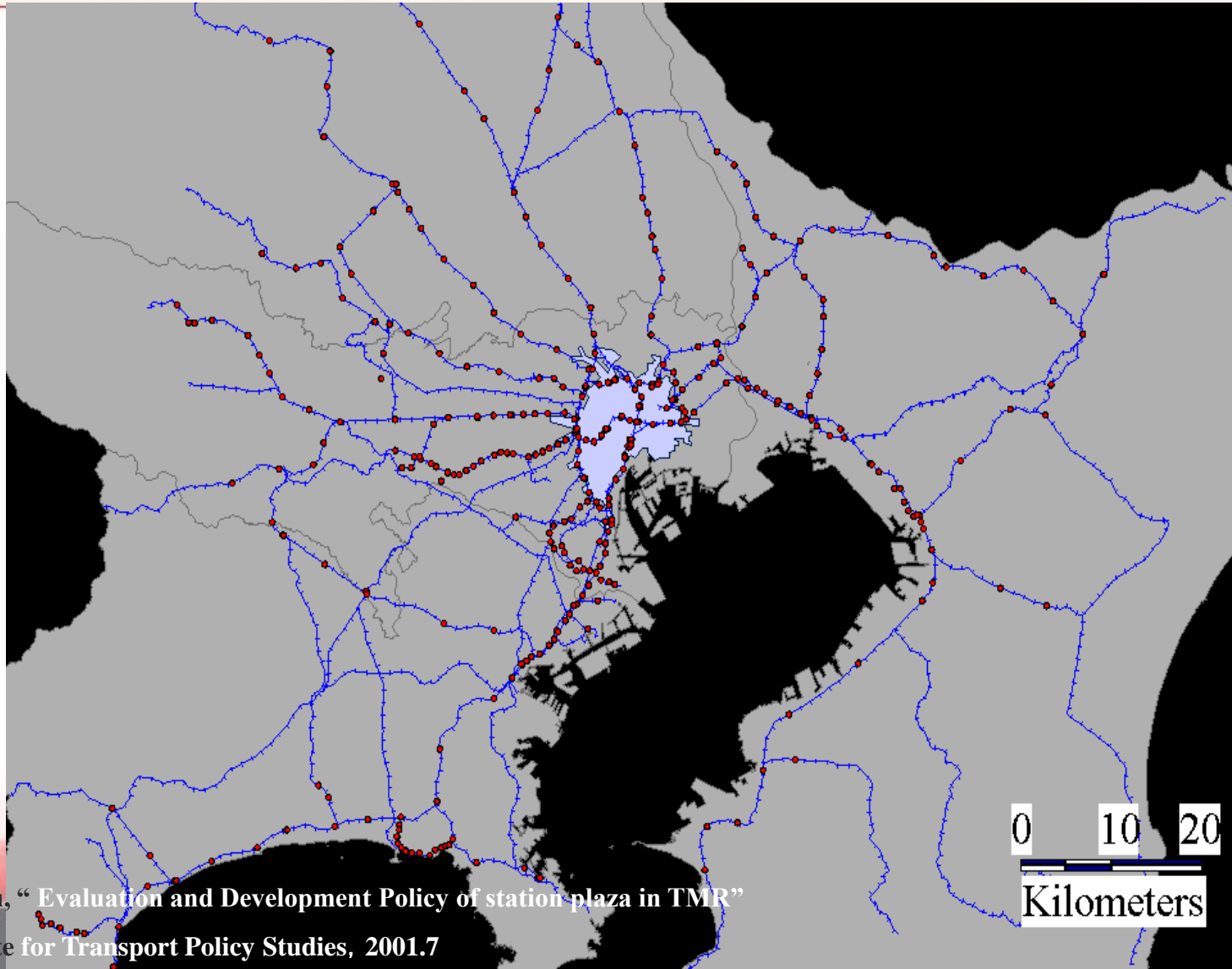
(TMR: 350 thousand/year)



# 1-5 Trend of Motorization



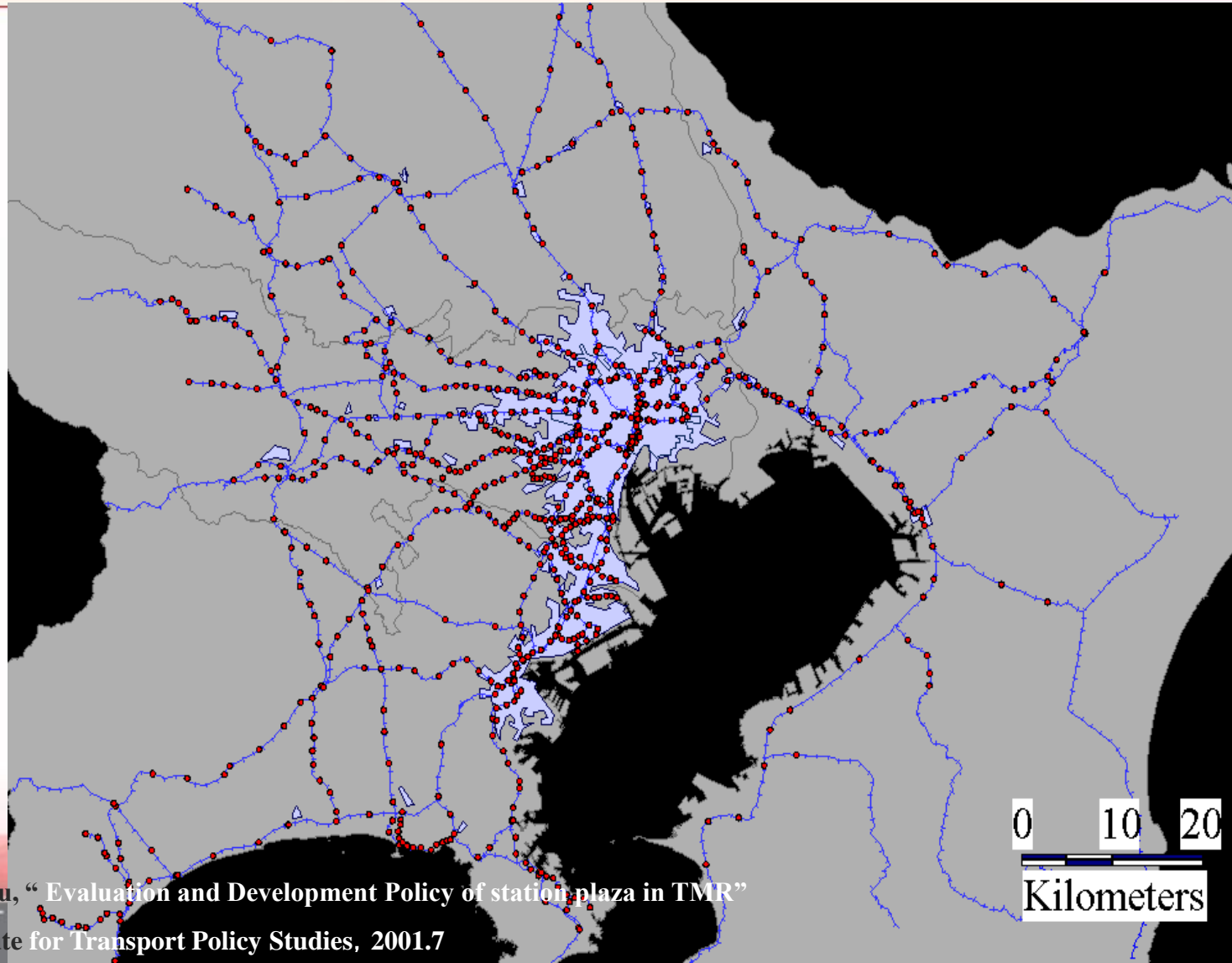
# 1-6(1) Urbanization and Rail Net Phase I ( - 1923)



KII, Masanobu, "Evaluation and Development Policy of station-plaza in TMR"

Source: Institute for Transport Policy Studies, 2001.7

# 1-6(2) Urbanization and Rail Net Phase I (1923 - 45)



KII, Masanobu, "Evaluation and Development Policy of station plaza in TMR"

Source: Institute for Transport Policy Studies, 2001.7

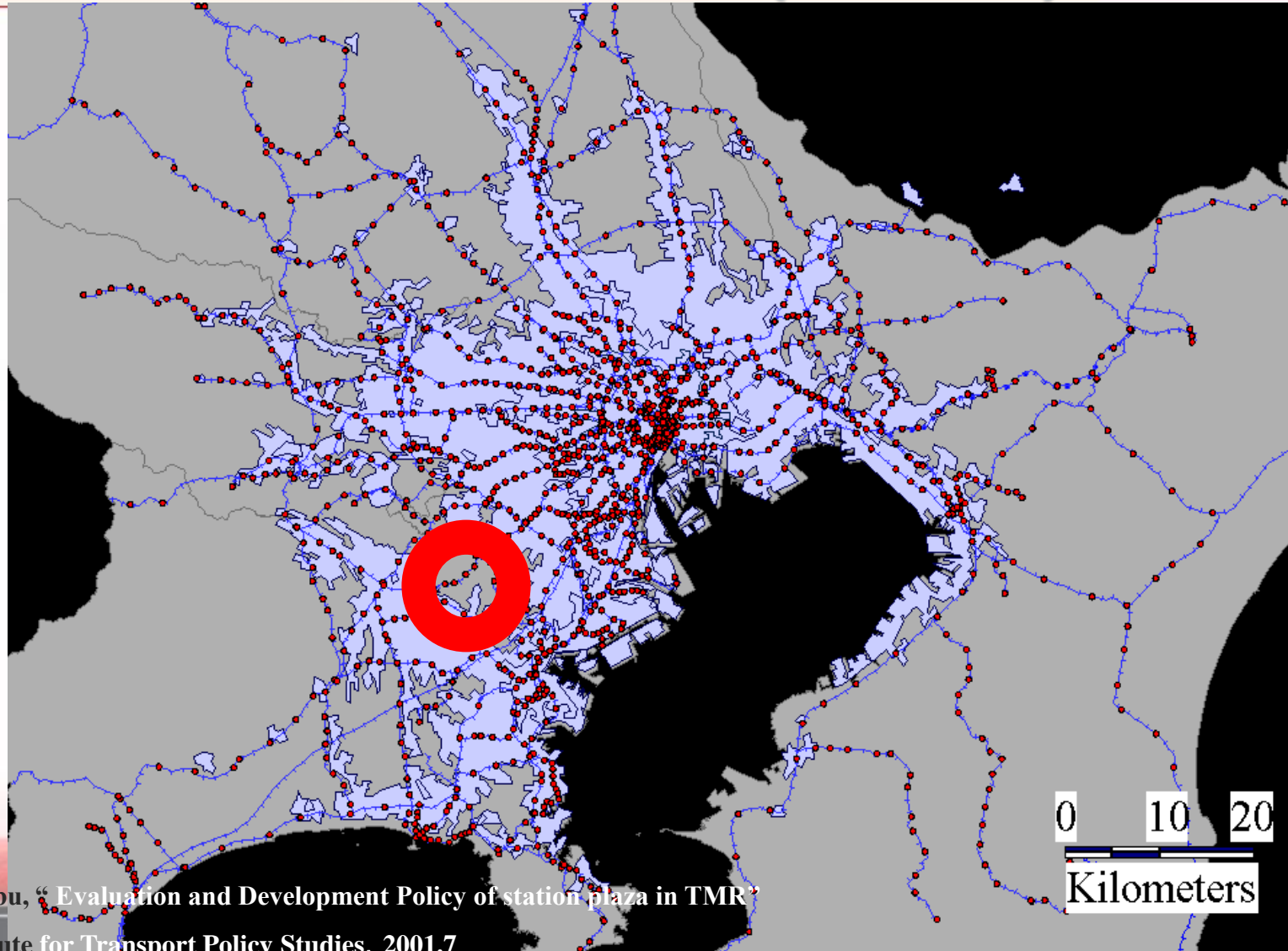
# 1-7 Rail Network and Urbanization

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- Urbanization phase II → supported by rail net, network dev. continued, but limited extensive rail improvement
- Urbanization → along existed rail routes
- Rail Improvement  $\doteq$  capacity expansion  
→ shorten headway , double tracking, separation of freight / pax train tracks, increasing number of cars per train, etc.



# 1-8 Urbanization and Rail Net Phase II + III (1945 - )



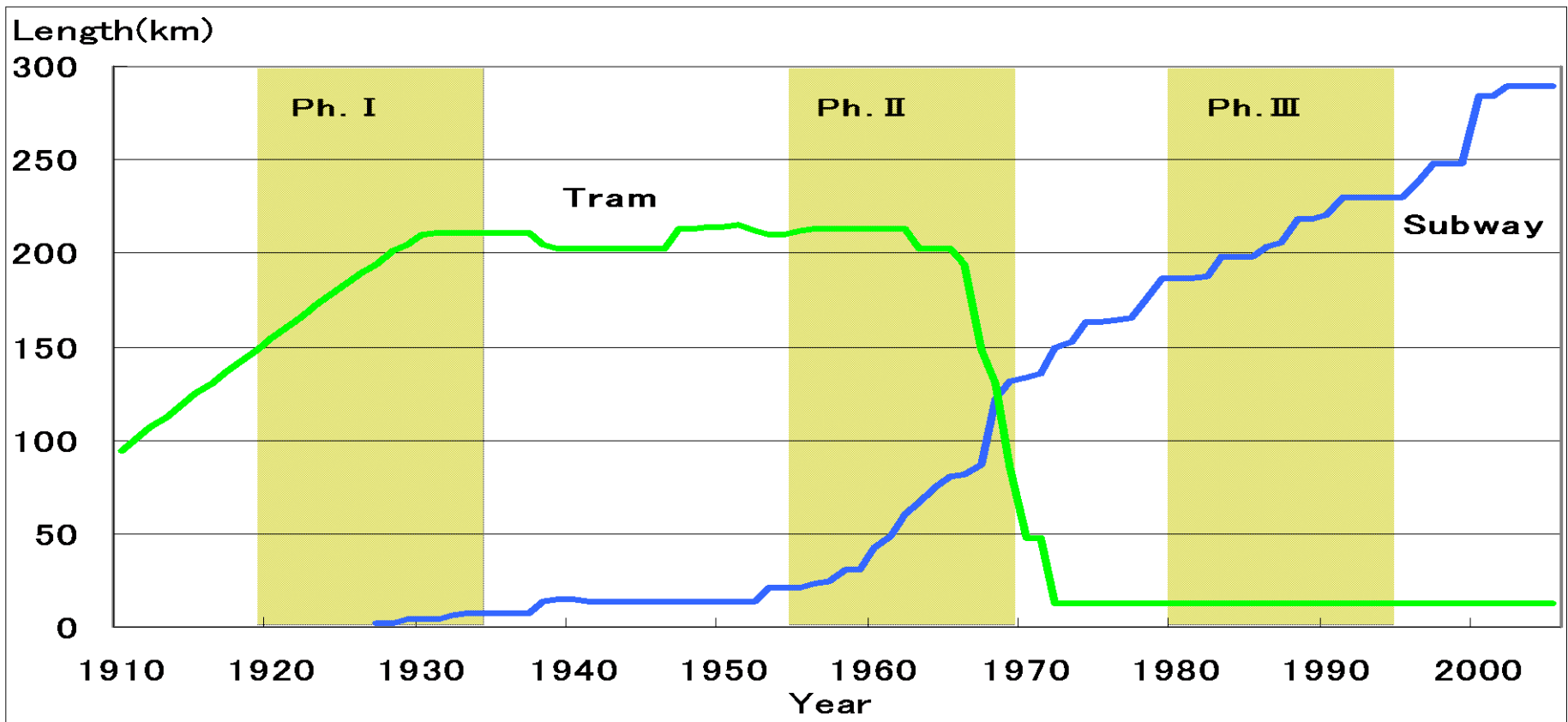
KII, Masanobu, "Evaluation and Development Policy of station plaza in TMR"

Source: Institute for Transport Policy Studies, 2001.7

# 1-9 Subways and Trams in TMR

Phase II Change from tram to subway

## TREND OF OPERATIONAL LENGTH in Tokyo - SUBWAY vs TRAM -





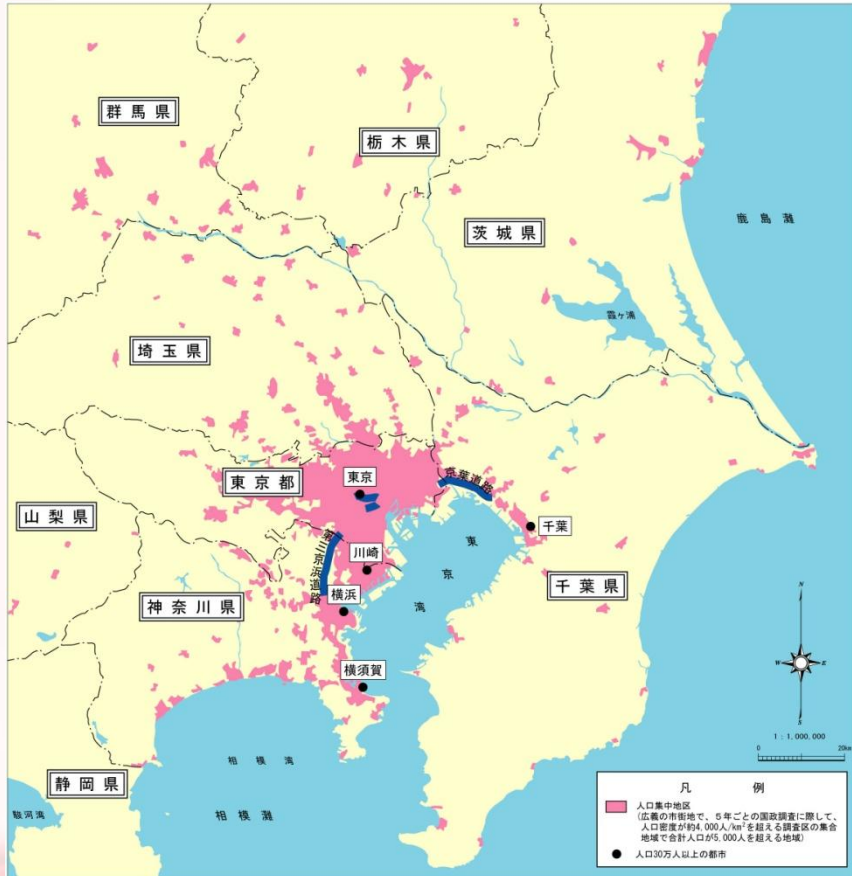
# 1-10 Urbanization and Road Dev.

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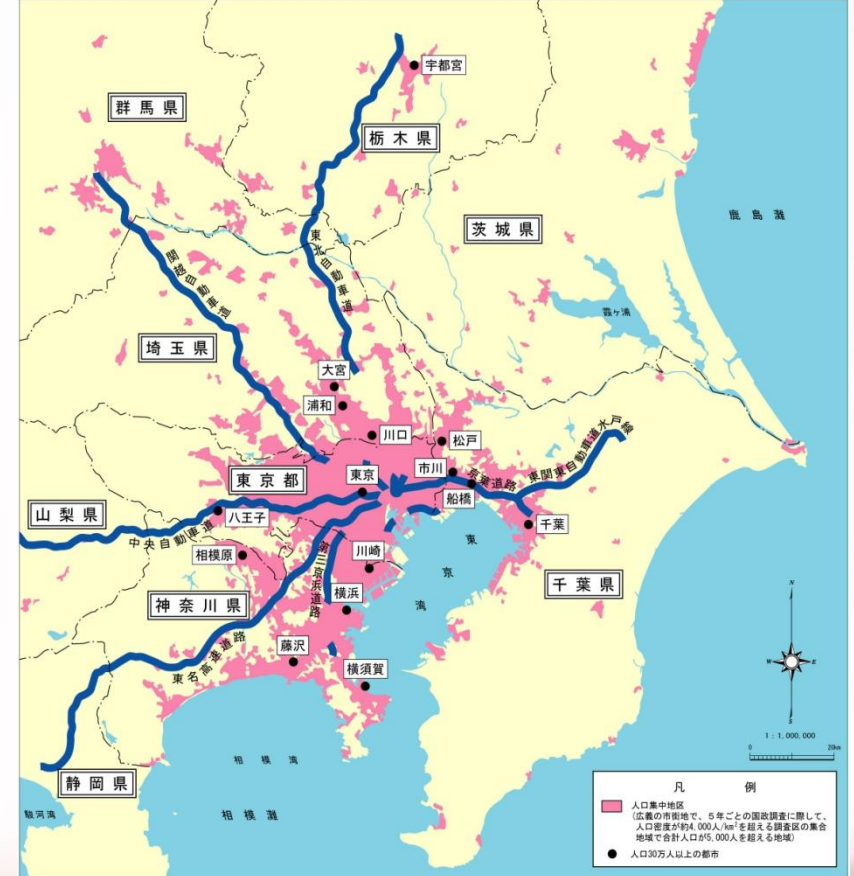
- Phase I: initial road development  
(limited scale)  
(urban road in central Tokyo reformed)
- Phase II: overlapped with rapid motorization
  1. extensive road dev. (mid 1950's ~)  
exclusive resource (gas tax revenue)
  2. preparation for the Olympic Games (1964)  
triggered urban road and expressway dev.
  3. network expanded (1965→1980)

# 1-11 National Expressway Net. Dev.

## From outskirts to center



1965  
(The Olympic)

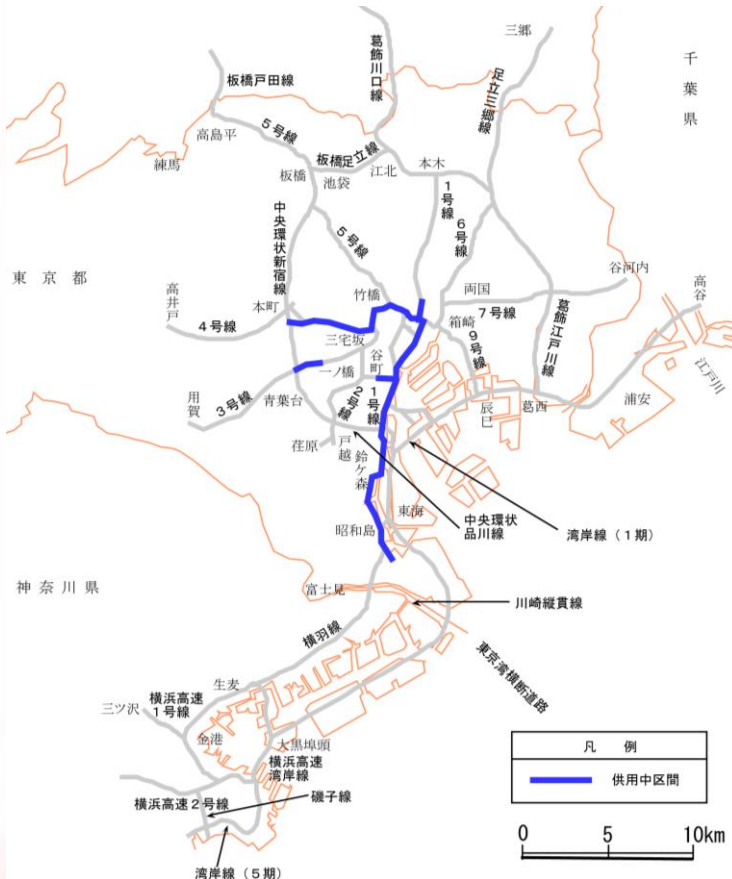


1980

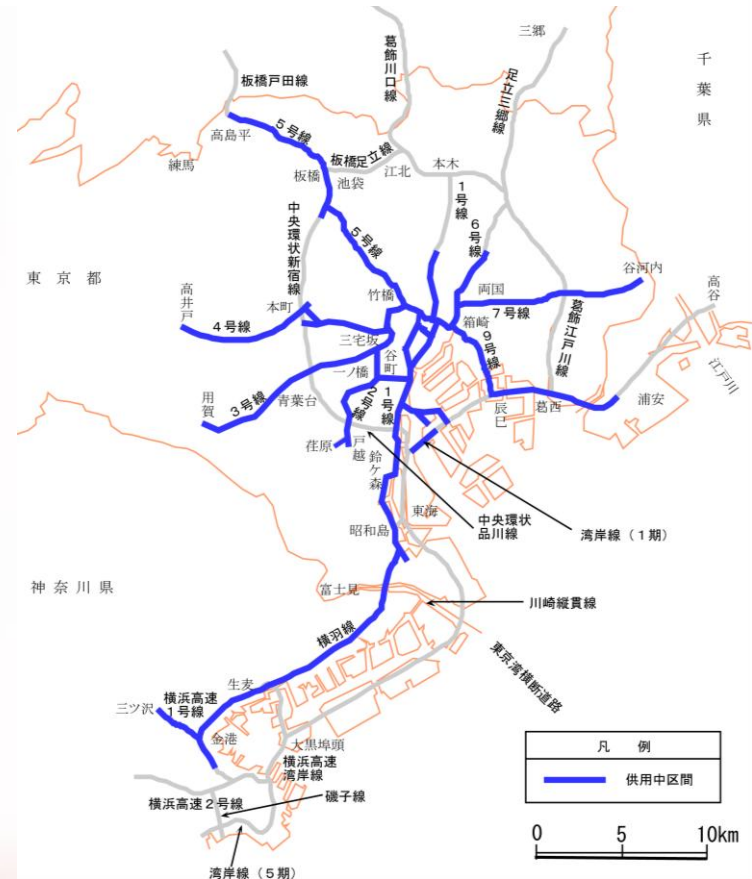


# 1-12 Urban Expressway Net. Dev.

## From center to outskirts



**1965**  
**(The Olympic)**

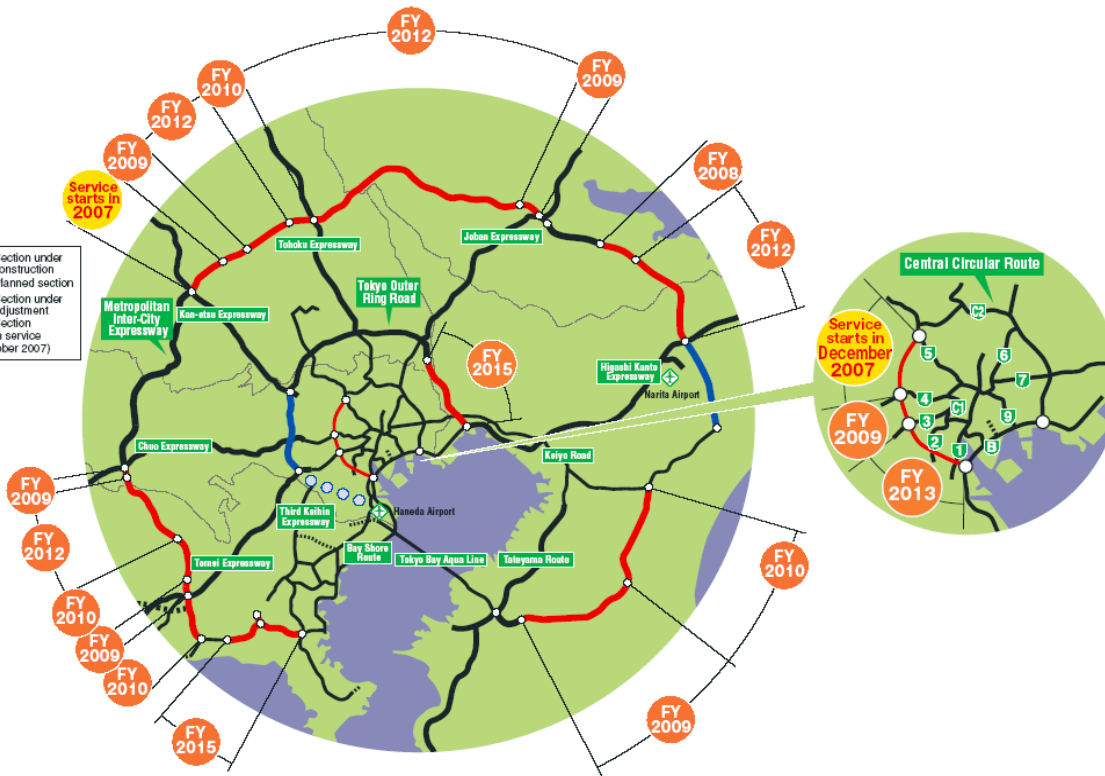


**1980**



# 1-13 Delayed Ring Expressway

- Missing links on ring routes
- Some are under construction
- Some are awaiting authorization in city planning



Source: Roads in Japan 2007 (MLIT)



## **2. Coordinated Planning and Finance between Rail and Suburban Development**



## 2-1 Backgrounds and Basic Idea

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- The 20C: Age of urbanization in Japan
  - i) Huge demand for housing/housing site, soaring land price
  - ii) Suburban detached housing, secure way of asset holding
  - iii) Suburban forest and farmland, low-productivity
- Basic idea of coordination; development benefit finances rail investment



# 2-2 Private Rail Companies in Large Cities

- Private rail companies play key role in urban transport
- More or less 80-100 years history
- Without gov't subsidy, construct and operate (ROW, facilities, rolling stock)
- A rail business model  
(Two sectors under one company; rail and dev.)
- Mutually supportive business activities;
  - (i) Rail extension and new stations provide means of commutation and attract people for new dev't.
  - (ii) New dev't. provides passenger increase for rail operations

# 2-3 Steps of Coordinated Planning and Finance by Private Rail Companies

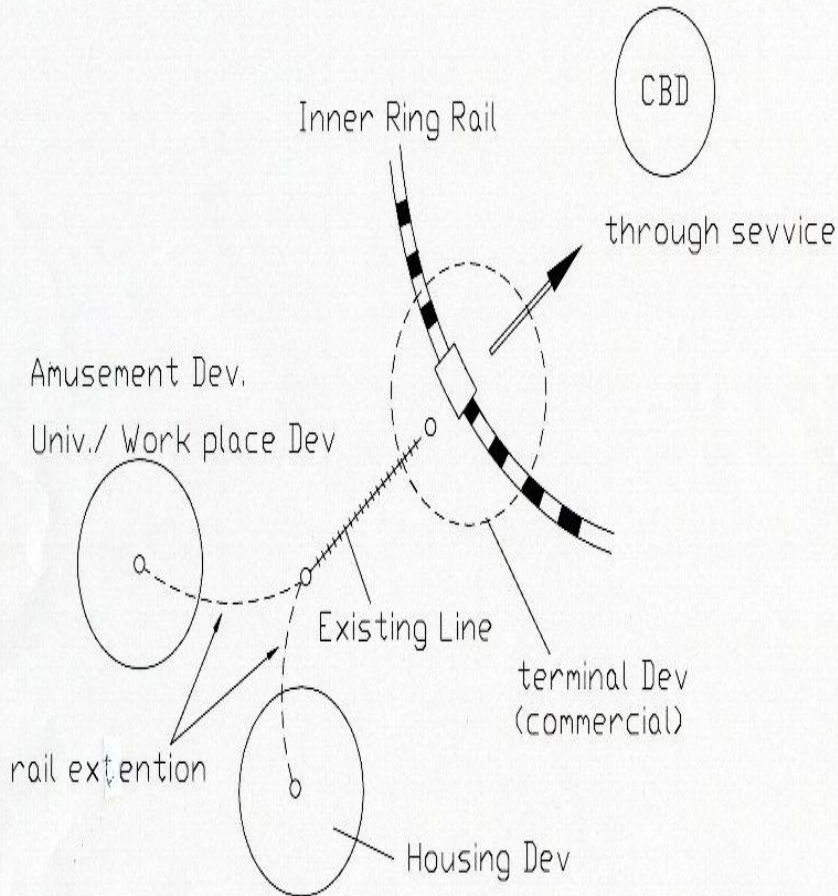
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1. Obtain blanket license for suburban rail operation, in a radial corridor (before the 1930's)
2. Purchase of land tenure for development, and set up development unions (including ROW)
3. Form up development plans, including rail route and stations
4. Implementation of rail and suburban dev.
5. Sales of suburban housing/housing site
6. Reinvestment of gained dev. benefit





# 2-4 Important Consideration for Coordinated Planning and Finance

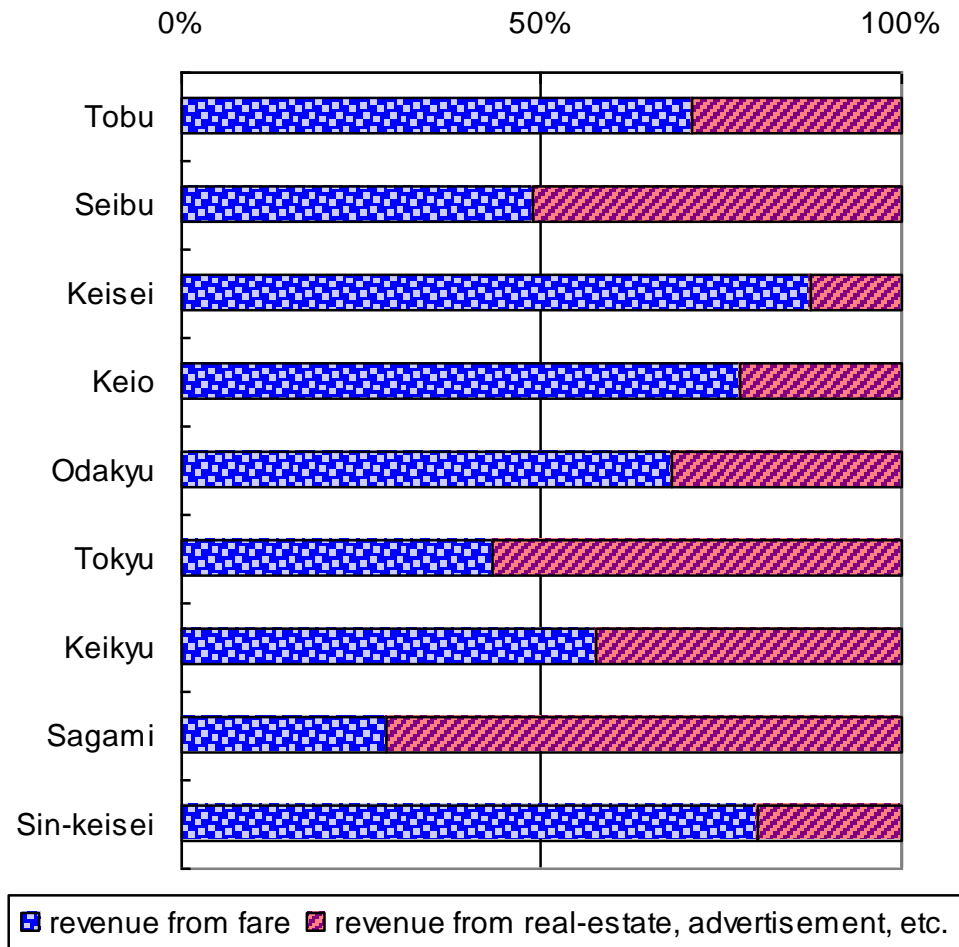


- (1) Rail extension and/or new station coupled with piecemeal development (size and timing of development)
- (2) Choice of land-use pattern, creating dual directional transport demand
- (3) Through service to CBD enabling faster and seamless commuting



# 2-5 Revenue Base of Private Rail Companies

- In TMR, 9 companies operate 880km lines
- Rail companies rely on non-rail revenue, esp. on real estate and advertisement
- Its percentage is 30~50% for private rail companies in TMR excluding JR



## 2-6 Traditional Business Model

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- 1910 Ikeda City (20km from central Osaka),  
by Hankyu Electric Rail Co. , Area 11ha
- Land acquisition and dev. works before rail  
opened, sales (ready-made house + lot) after  
rail opening
- Average lot area 330m<sup>2</sup>, 248 lots  
two-storied wooden house  
floor area 66 - 99m<sup>2</sup>





## 2-8 Role of Public Sector

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- Supporting the coordinated P & F
  - (1) License for exclusive rail operation,  
in a certain corridor
  - (2) Provision of low-interest loan  
for rail investment
  - (3) Issue development permits
  - (4) Authorize city planning and land use  
control in favor of the Strategy



# 3. Conclusive Remarks



# 3-1 Timing, Efforts and Strategy

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- Fundamental question:  
Why rail is highly utilized in TMR ?
- Answer from the above:
  - (i) good timing and efforts for rail network formation (Phase I)
  - (ii) rail improvement efforts (Phase II)
  - (iii) explicit coordinated P & F through Phase I and II



## 3-2 Good Timing and Efforts

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- Phase I urbanization was limited to the center
- By the end of Phase I, basic rail network completed (central and suburban)
- During Phase I, motorization was negligible. Public investment efforts for the National Rail. Private investment for suburban rail
- During Phase II, effective improvement of existing rail network and construction of subway network.
- Since Phase II, road improvement implemented, but delayed.



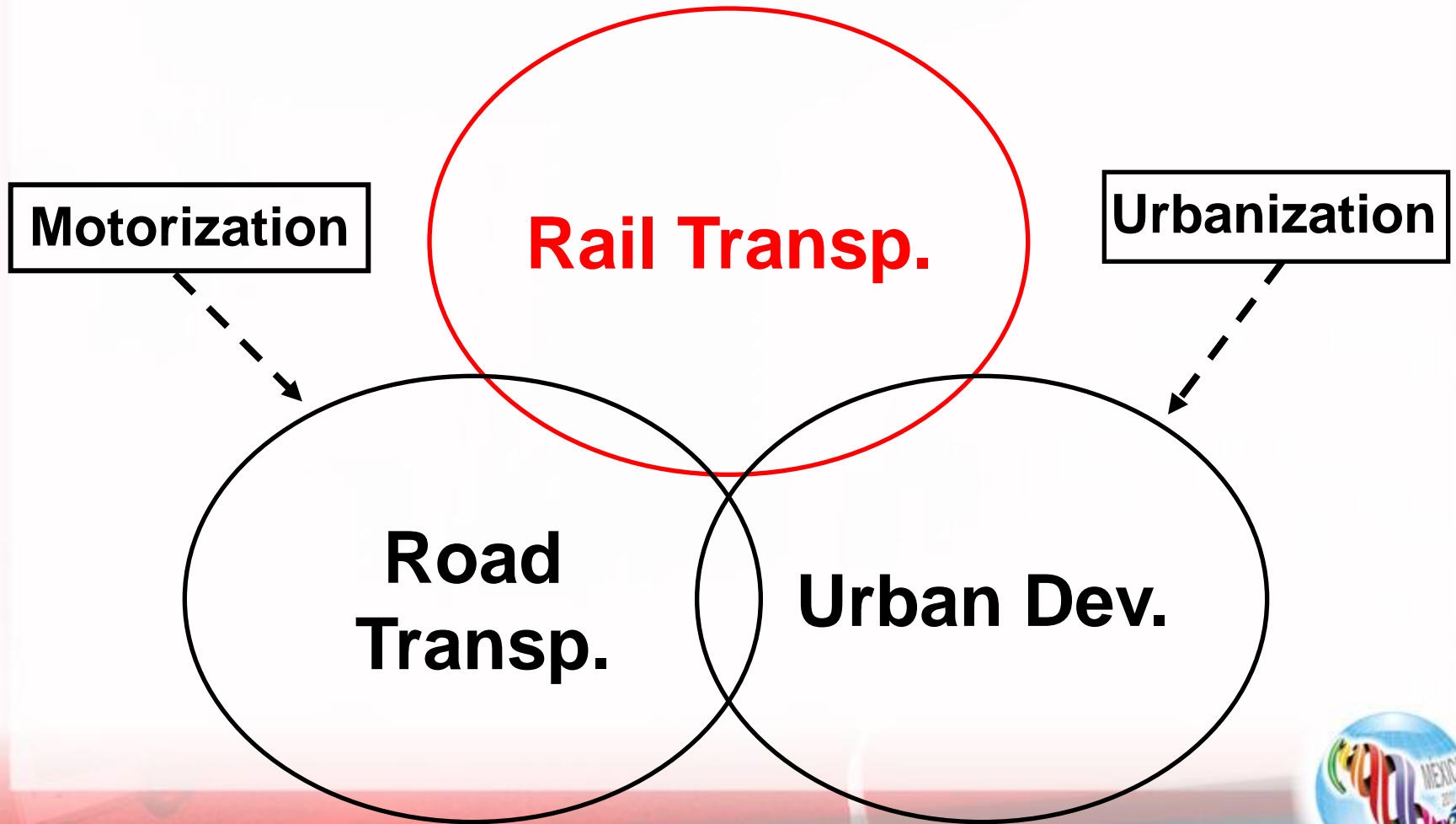
# 3-3 Explicit Coordination Strategy

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- The Coordination Strategy worked well, as an urban transport policy. (Phase I and II)
  - (1) to accommodate increasing urban population,
  - (2) to provide efficient rail service
  - (3) to avoid over-dependence upon motor-traffic
- The Strategy worked well also, as “the Business Model of Private Rail”
- Public sector supports



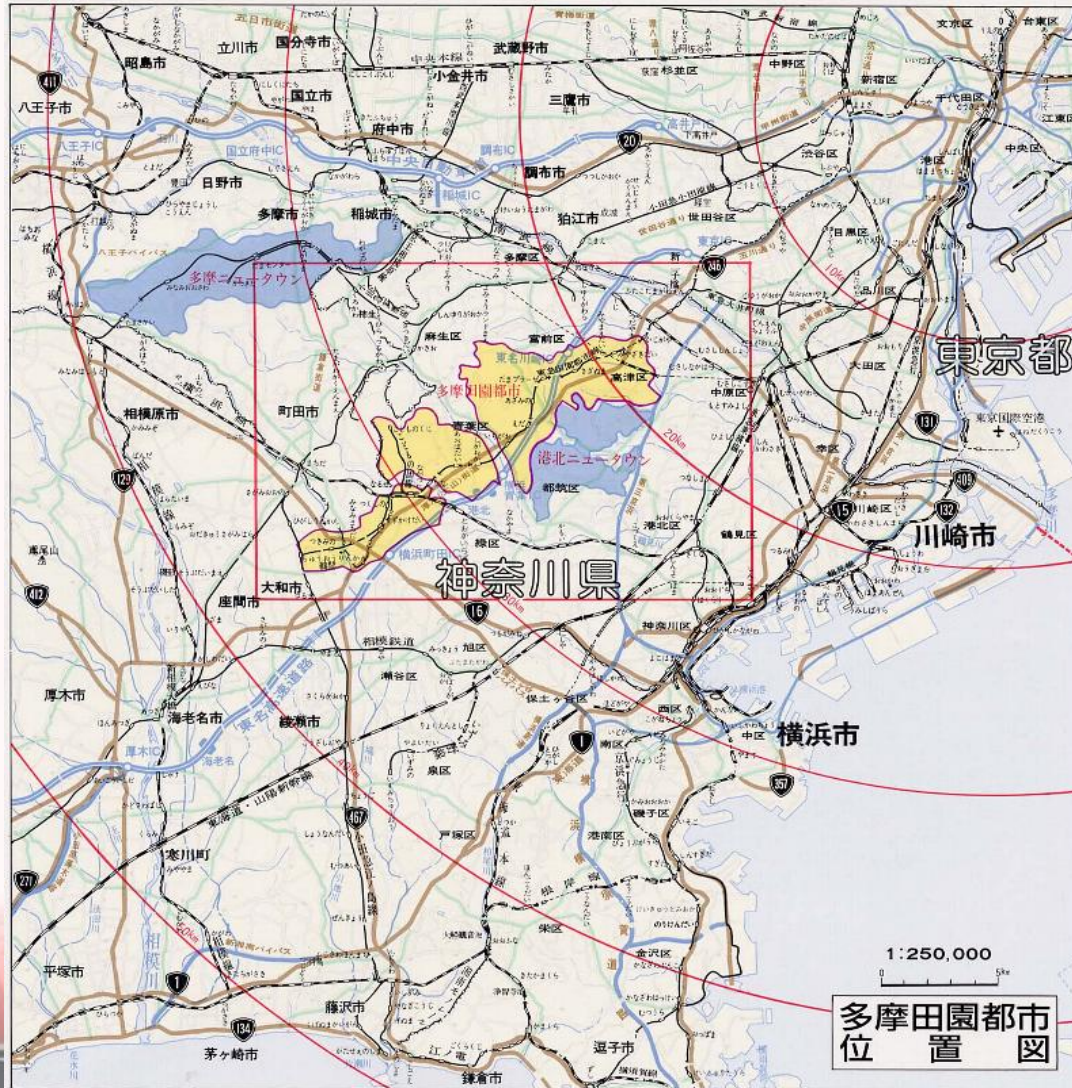
# Coordination !



(END)



# Appendix. Tama Garden City (TGC)



- Largest application of the business model by a private rail company

- Location: 20 - 35km from Central Tokyo



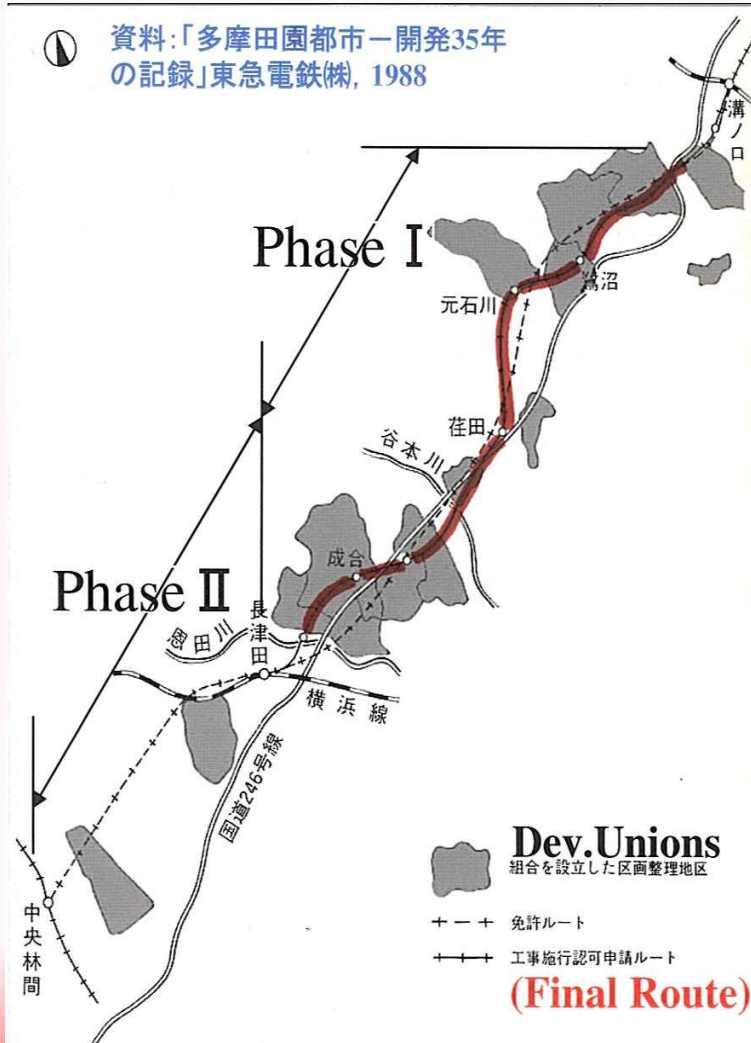
# A-1. TGC Dev. Plan 1956

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- (1) Area: 5,000 ha
- (2) Former land use: hilly forest and farm land
- (3) Goal: amenity conscious residential dev.  
incl. universities etc. (popul. 400 thousand)
- (4) Transportation: Extension of existing rail line
- (5) Planner: Tokyu Corporation



# A-2. Dev. Union Initiated by Rail Company



- Land purchase by Tokyu beforehand from 1953
- 20% purchase from land owners
- Tokyo persuade land owners Agreement on dev. union



Finalize extension route new stations

- { Phase I 14.2K (11 st.)
- { Phase II 5.4K (5 st.)

# A-3. Planned Dev. Prior to Rail Extension

stage dev.	ha.	
Dev. Union	(A)	3,160
before ext. start	(B)	1,188
before ext. complete	(C)	1,903
after ext. complete		69
Other Dev.		1,840
<b>TOTAL</b>	<b>(D)</b>	<b>5,000</b>

- Planned dev. by union  
A/D = 63%
- Dev. agreed prior to rail extension  
B/A = 38%  
(B+C)/A=98%



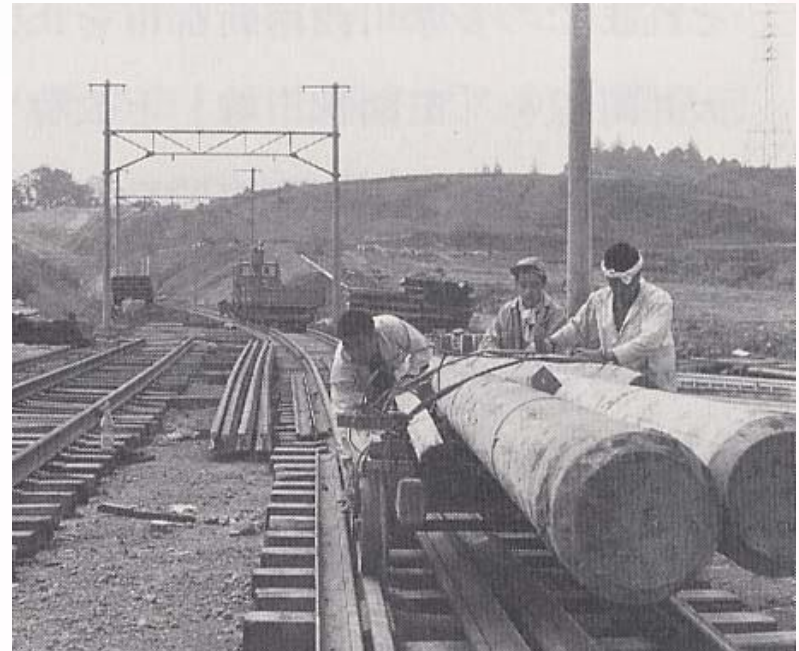
# A-4. Implementing Dev. and Rail Extension

## Development



Near Tama Plaza station

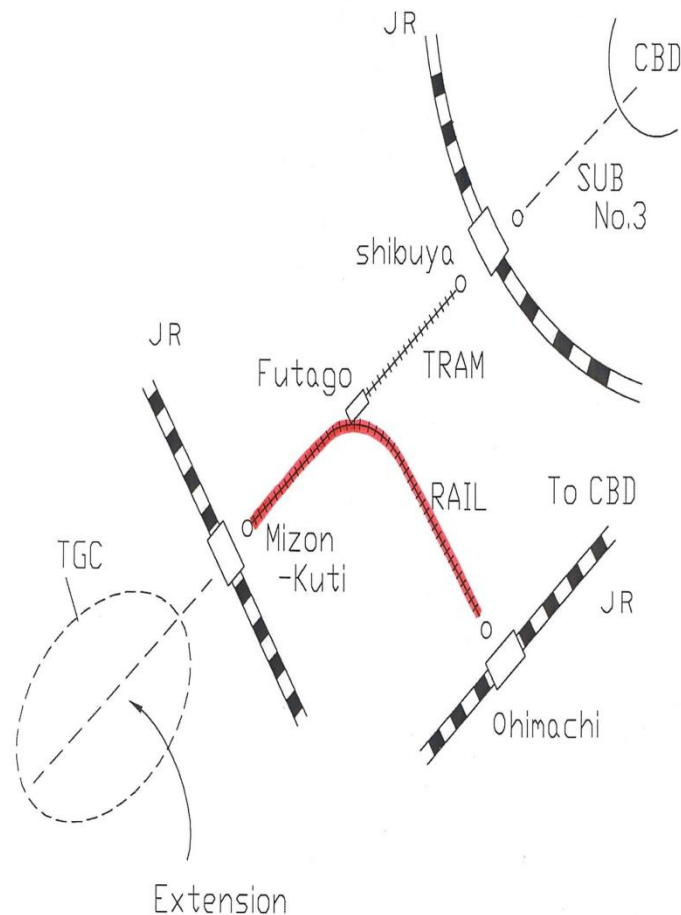
## Rail. Ext.



Near Tama Plaza station



# A-5. Rail System before TGC Dev.

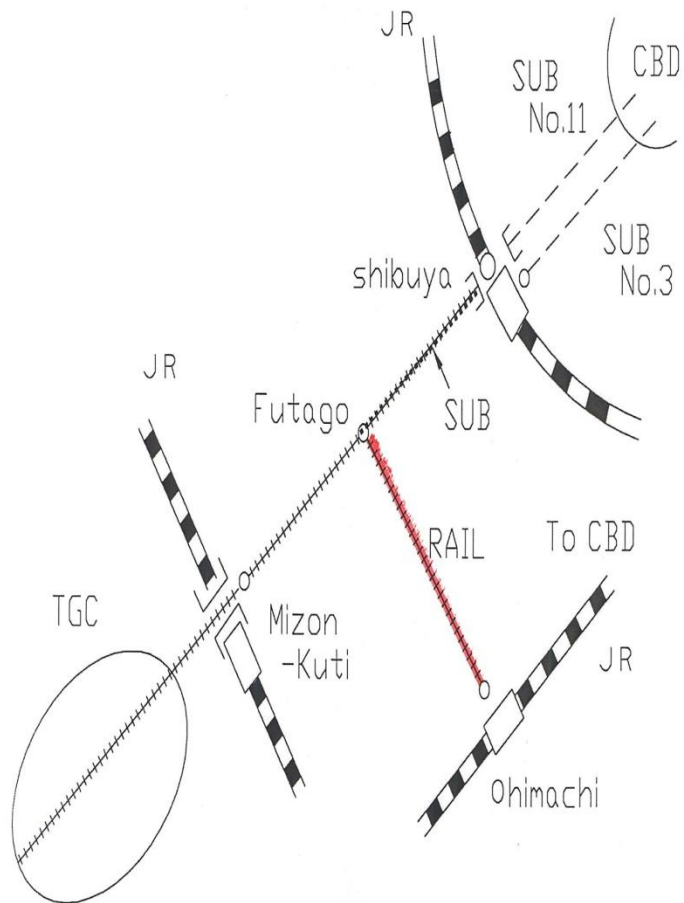


- Extension  
Track gauge: 1,067mm  
Power collect: overhead
- Tokyu tram (1,372mm)
- Subway No.3  
Track gauge: 1,435mm  
Power collect: third rail





# A-6. Through service to CBD after TGC Dev.



- Tram replaced by new Tokyu subway (8.8km)  
Track gauge: 1,067mm  
Power collect: overhead
- Subway NO.11 (new)  
(Gauge / Power: same)
- Through service to CBD from TGC, enabled



# A-7. TGC Development History

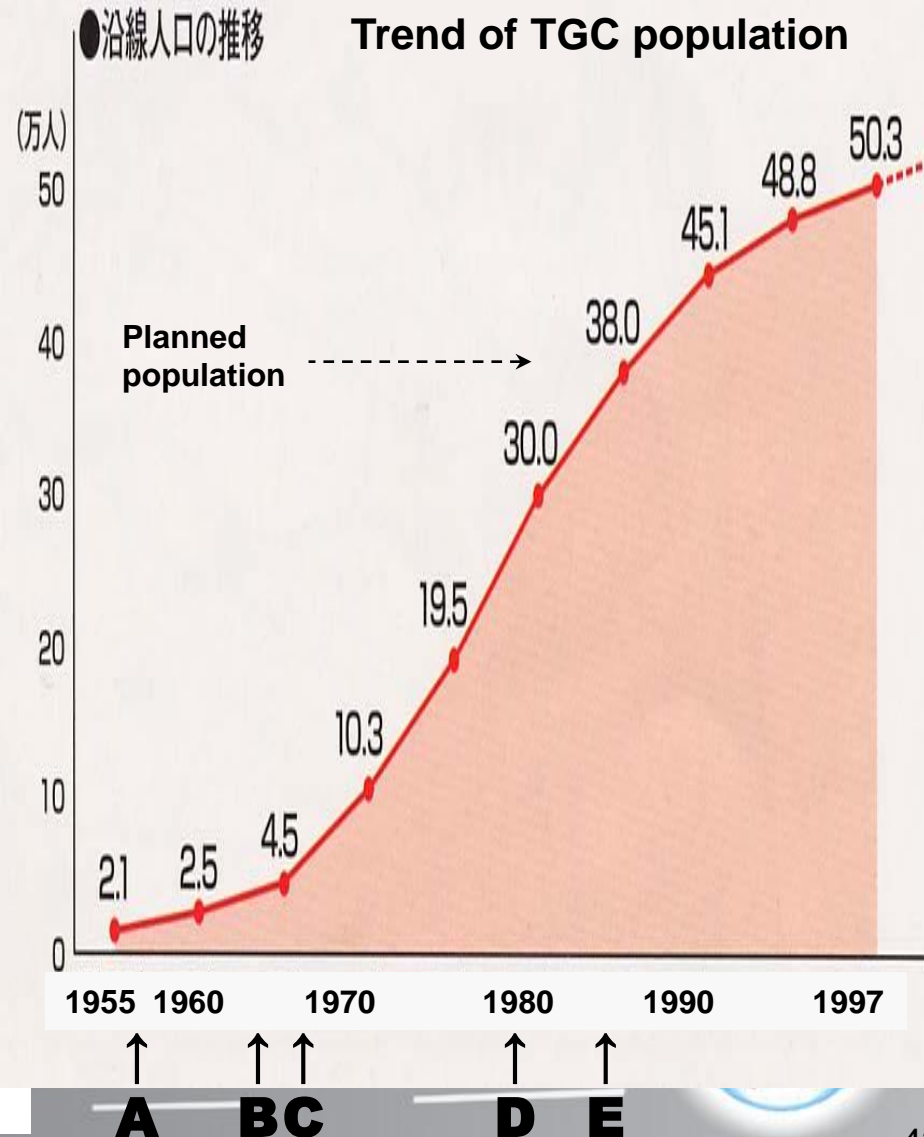
1956: Master plan announced  
(A)

1963: Rail extension started  
(B)

1966: Phase I extension  
completed  
(C)

1979: Through service to CBD  
(D)

1984: Extension completed  
(E)



# A-8. View of TGC (1984)



Near Tama Plaza station (1984)

Source: Tokyu Corporation, "Tama Garden City – History of 35 years of Development" (1988)



**(END)** 43