The Good, the Bad, and the Ugly: Public-Private Partnership Experiences from Taiwan's Rail Projects

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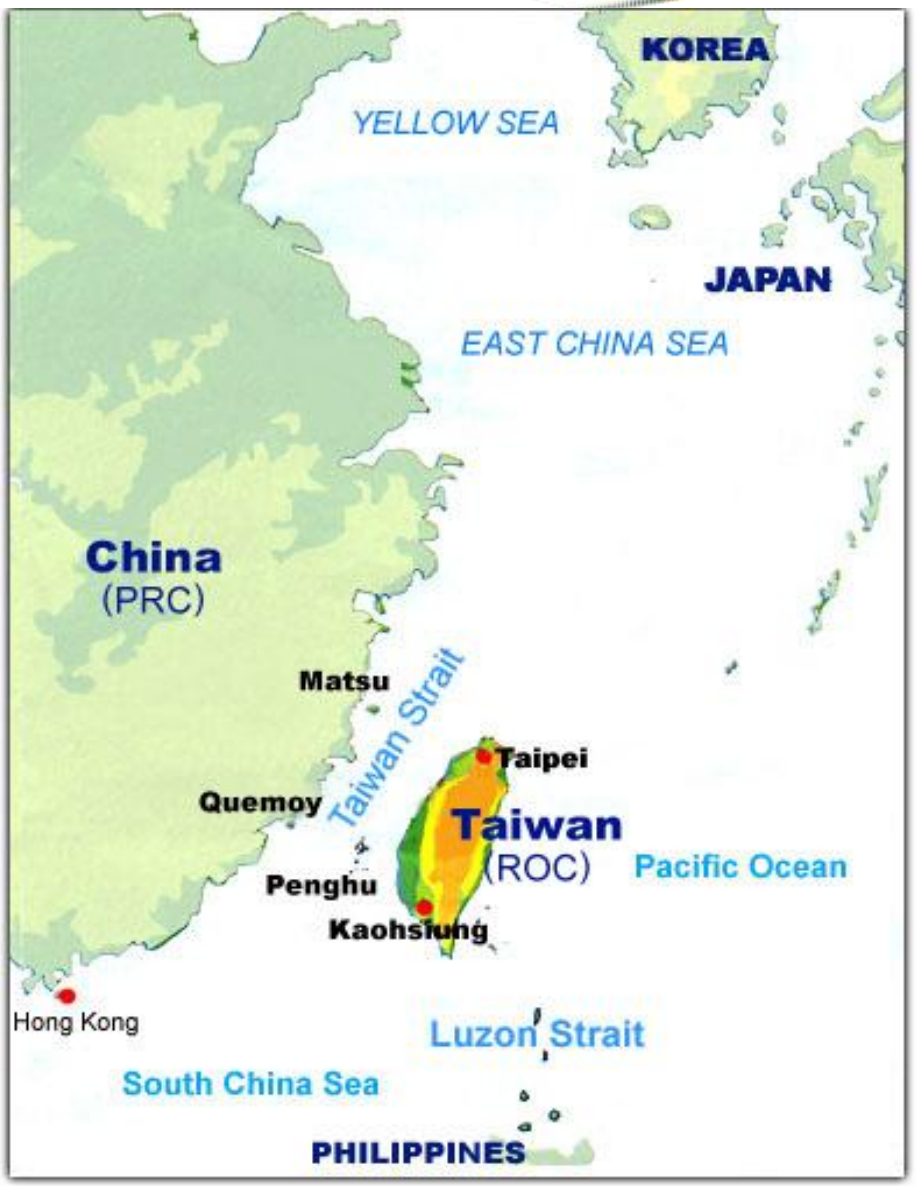
Outline

- About Taiwan
- About PPP
- Research Questions & Approach
- Case Studies
  - Taiwan High Speed Rail
  - Kaohsiung Mass Rapid Transit Systems
  - Other Rapid Transit Projects
- Final Remark

About Taiwan

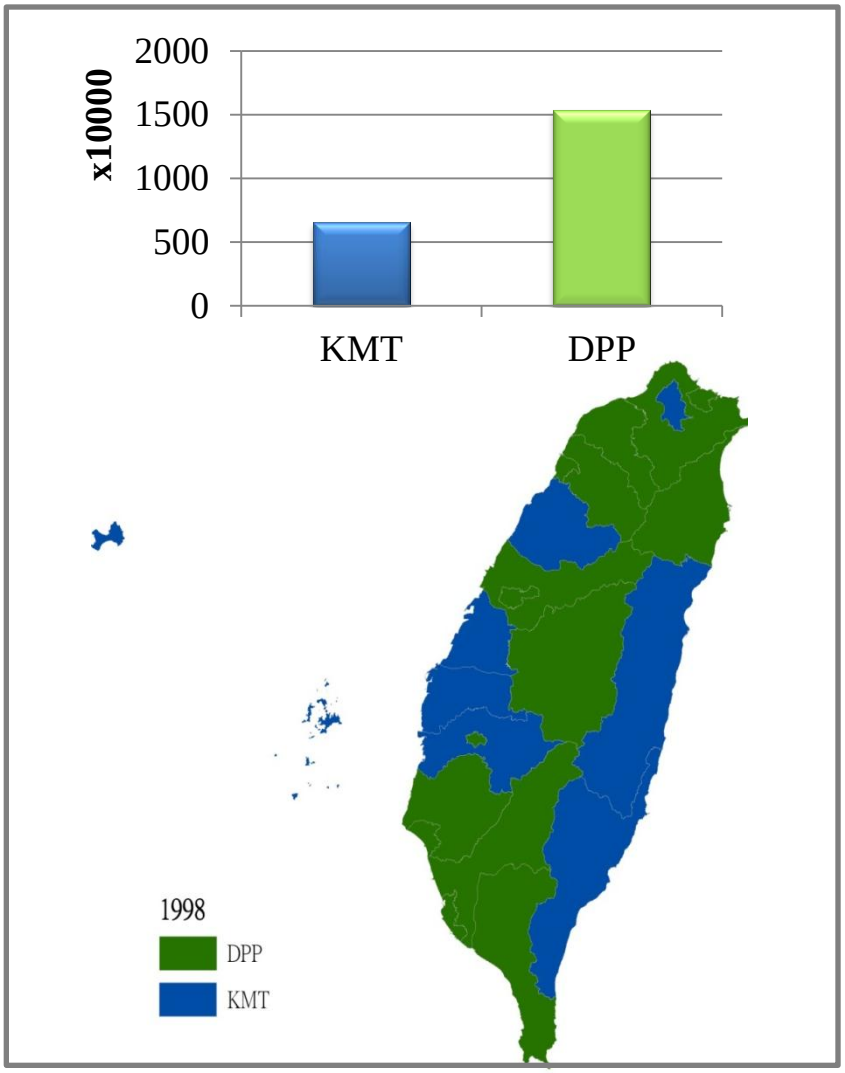
- **Area**：35,980 km²
- **Population**：23,164,459 (Feb. 2011)
- **Ethnic groups**：Taiwanese
  - Aborigine 2%
  - Han Chinese 98% (Minnan70%, Hakka15%, Mainlanders 13%)
- **Political Regime**
  - KMT candidate Lee was elected at the 1st presidential election in 1996.
  - Chen from the opposition DPP won the presidential election in 2000. (first peaceful transition in our history)
  - KMT candidate Ma was elected as President in 2008.

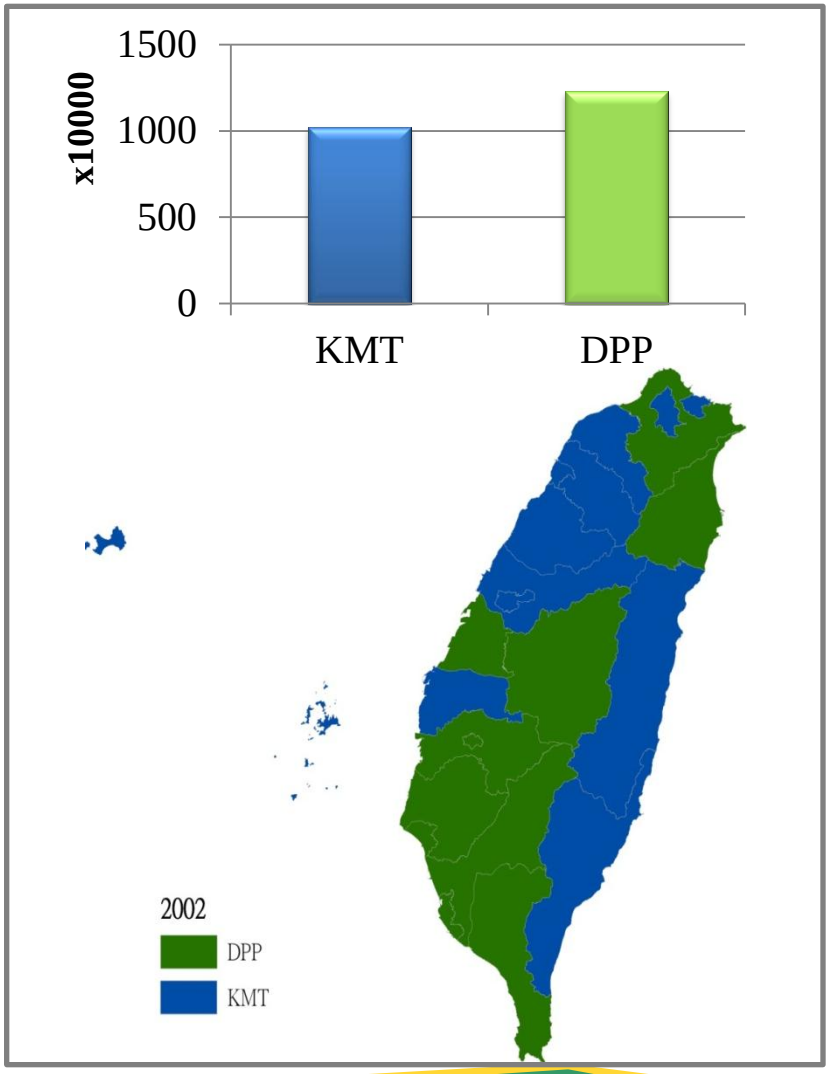


KMT : Kuomintang (Chinese Nationalist Party)

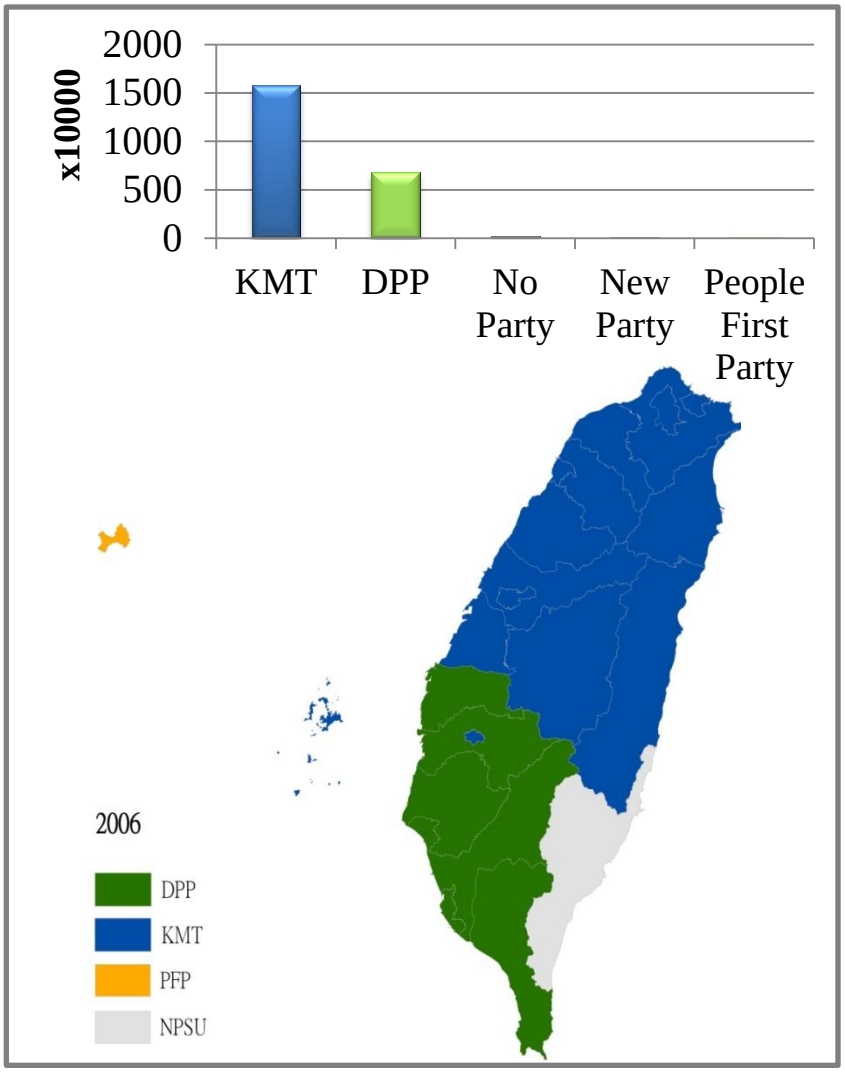
DPP : Democratic Progressive Party

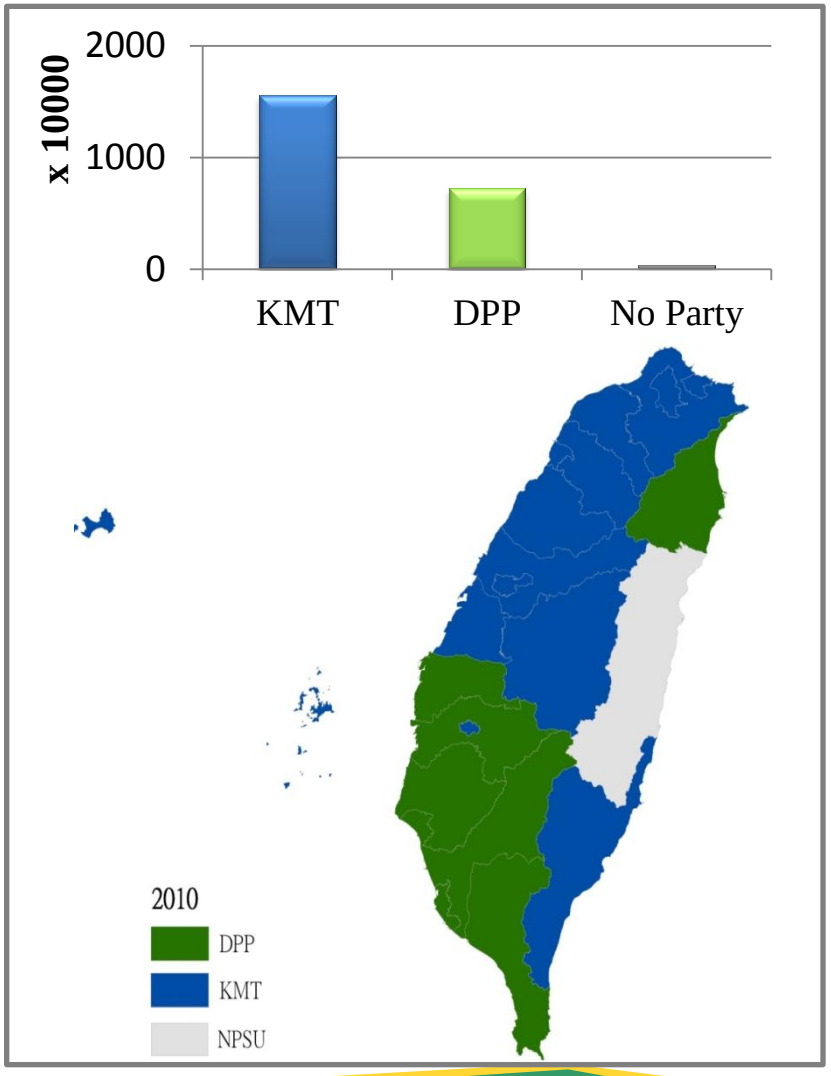
About Taiwan • Transition in Local Elections





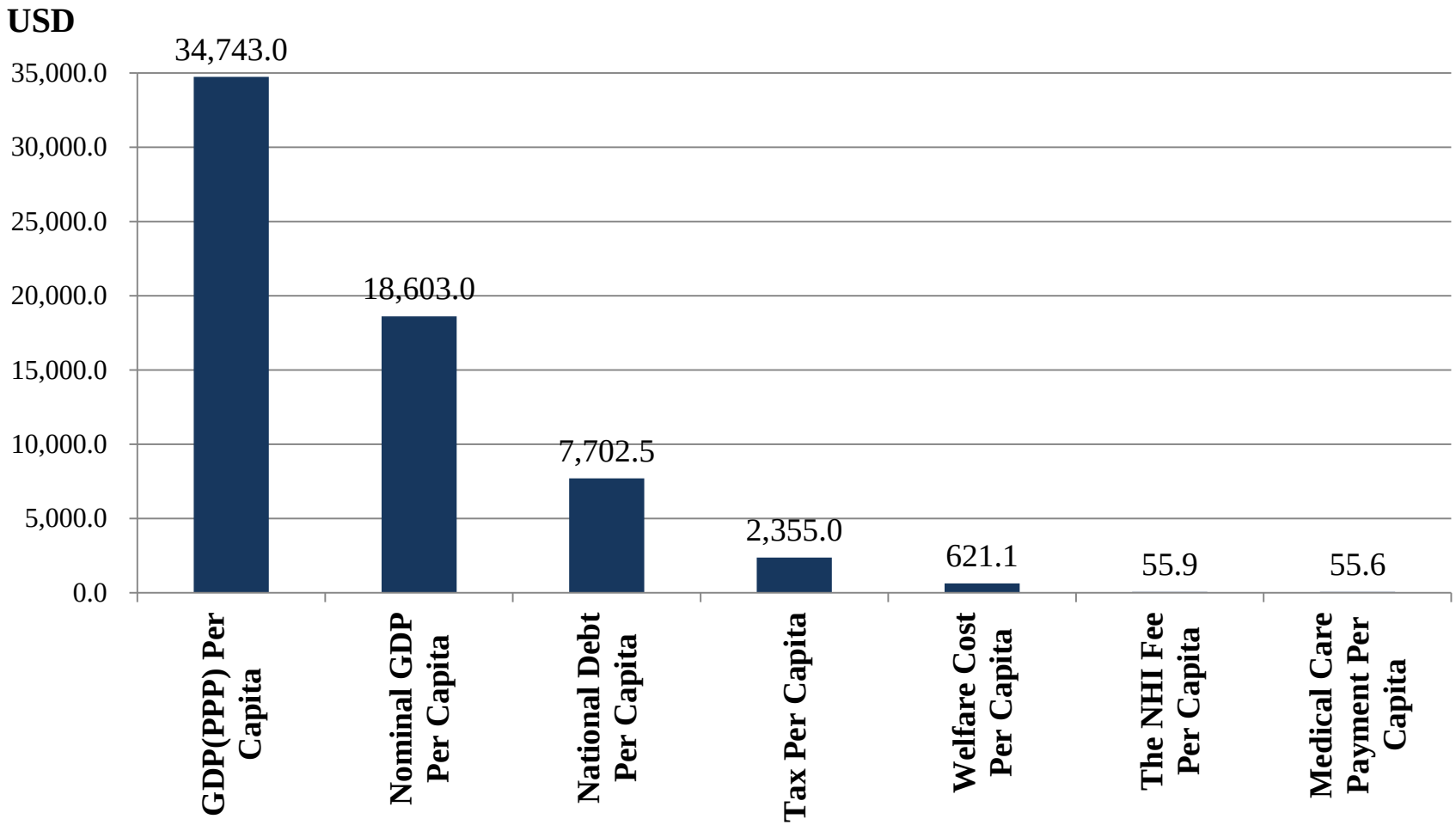
About Taiwan • Transition in Local Elections





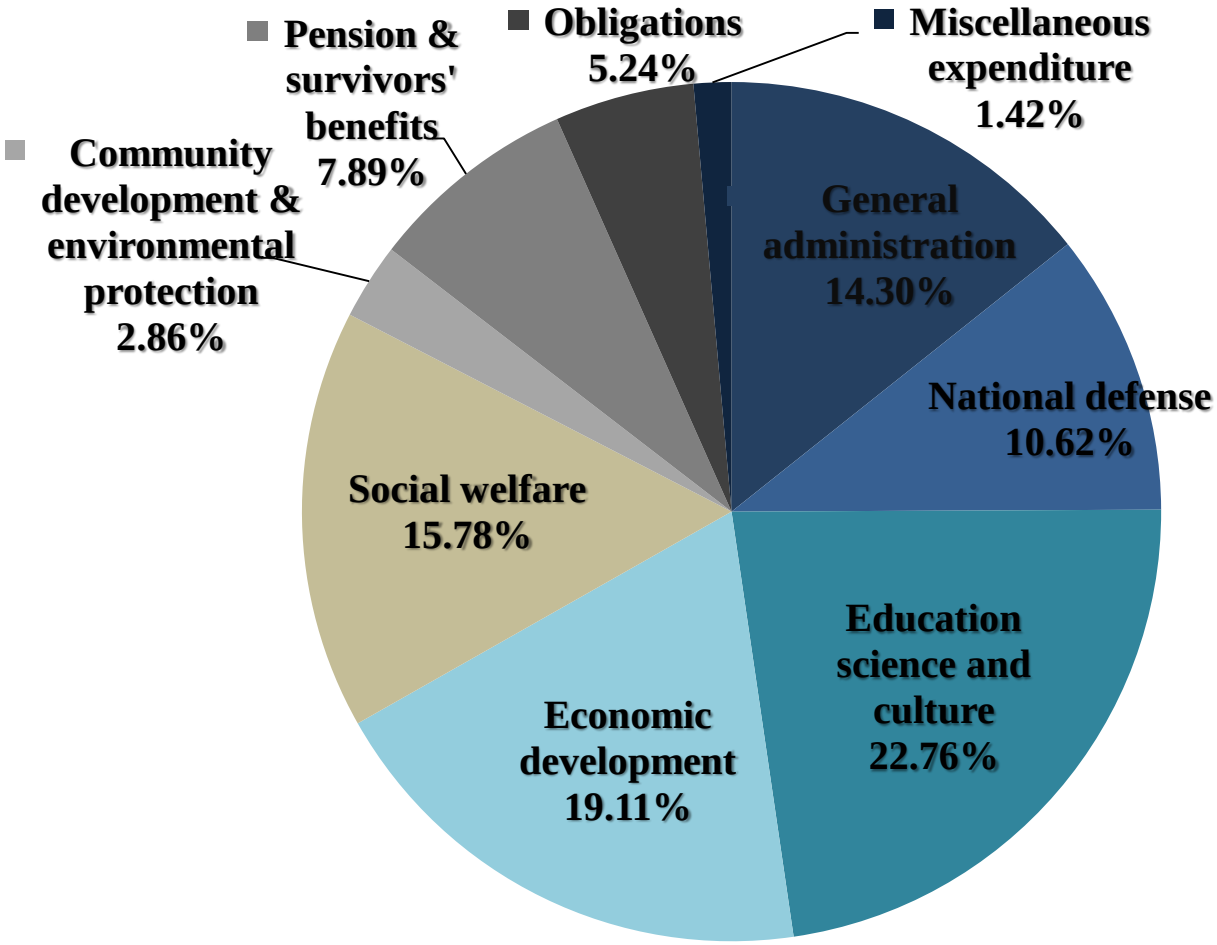
About Taiwan

- **Economic and Financial Performance**



About Taiwan

- Government's Expenditures (2010)



About PPP

- Types of PPP practices
  - Build-Operate-Transfer (BOT)
  - Build-Operate-Own (BOO)
  - Operate-Transfer (OT)
  - Build-Transfer (BT)
- How to define a successful PPP practice?
  - Environmental sustainable
  - Economical sustainable
  - Social/cultural sustainable

About PPP

- Needs for PPP in Taiwan
  - Increasing governmental budget deficits as a result of democracy - tax less and expend more
  - Increasing demand for more infrastructure projects
  - No room for new debts
- Motivations of applying PPP
  - To improve the efficiency of construction projects
  - To reduce governmental budget deficit
- Existing challenges of PPP
  - From the public sector's perspective: how to provide sustainable public services?
  - From the private sector's perspective: how to reduce the risks of investments?

About PPP

- Advantages of PPPs (Headicar, 2009)
  - Enable additional investment to be secured without increasing public borrowing and do not involve ‘selling off’ public assets
  - It’s a form of procurement in that the design and delivery of the investment is overseen by specialist companies
  - Many of the risks which would otherwise fall to the commissioning public body are thereby transferred to the contracting consortium
  - Consortium has the incentive achieve reliability in the design, construction and operating of the facility, thereby reducing the liability for maintenance expenditure and maximizing income through performance-related payments

About PPP

- Disadvantages of PPPs
  - From the public perspective a great deal of their potential ‘success’ depends on negotiating appropriate details of the contract, which is an extremely complex and time-consuming business.
  - If difficulties arise during the period of the contract then the public client may still find itself having to shoulder the ultimate burden of responsibility - since the facility cannot be allowed to cease functioning.

About PPP

- Ten principles for successful PPPs (Corrigan, et al, 2005)
  - Prepare properly for PPPs;
  - Create a shared vision;
  - Understand your partners and key players;
  - Be clear on the risks and rewards for all parties;
  - Establish a clear and rational decision making process;
  - Make sure all parties do their homework;
  - Secure consistent and coordinated leadership;
  - Communicate early and often;
  - Negotiate a fair deal structure;
  - Build trust as a core value

About PPP

- North American infrastructure P3s: examples and lessons learned (Boardman, etc, 2005)
  - The key issue: whether the total cost of the P3 is lower than the total cost of the government provision
  - The sobering reality: ‘there are no free lunches’
  - Evidence from North America suggests that profit-making private sector entities are adept at making sure that they are fully compensated for risk-taking or go to considerable lengths to avoid risk.

About PPP

- North American infrastructure P3s: examples and lessons learned (Boardman, etc, 2005)
  - Private sector will tend to establish ‘standalone’ operating firms when carrying out P3 contracts that entail large risks from technological or demand uncertainty. These stand-alone entities can avoid large losses by the parent when things go badly wrong by declaring bankruptcy or even by threatening to go bankrupt.
  - Unless public sector managers recognize that they must design contracts that both compensate the private sector for risk and then ensure that they actually bear it, P3s will not improve allocative efficiency (make society better off).

Research Questions & Approaches

- What lessons can be learnt from the planning, appraisal, construction, and operation of the mega rail projects?
- Which of the above lessons are generic, and which are context specific?
- What guidelines can be written from the above research outputs?
- What are the strategies or modifications needed for future PPP programs?

Research Questions & Approaches

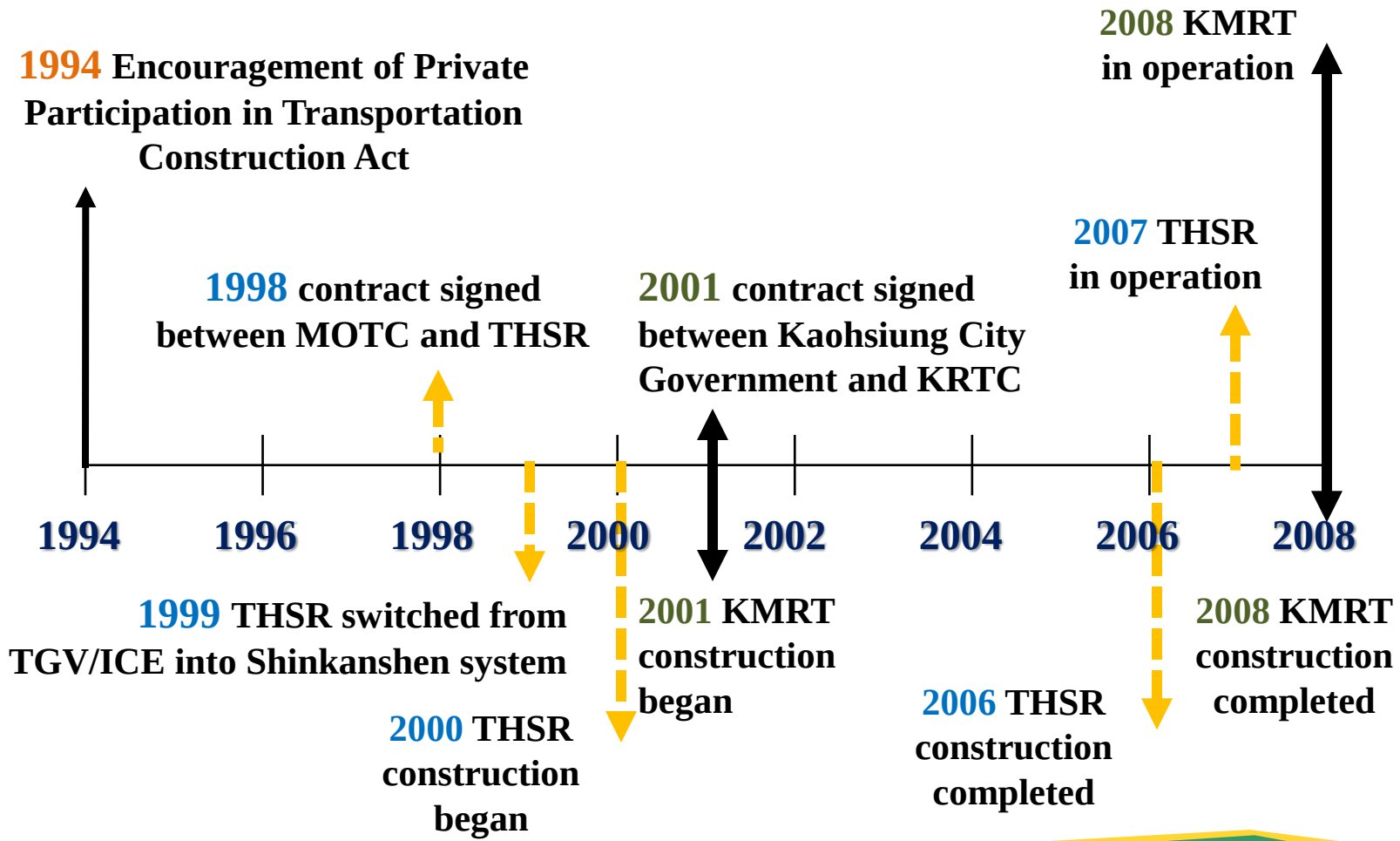
- Qualitative Approach
  - Interview returns from key decision makers involved in the PPP projects
  - Public domain literature reviews regarding all the case studies investigating three key themes in decision making, namely: the treatment of multiple contexts; the treatment of risk, uncertainty and complexity; and the response to C21st sustainability challenges

Research Questions & Approaches

- Quantitative Approach
  - Analyze our data from all cases with various aspects of effectiveness. These measures which include financial performance, economical efficacy and social effectiveness are selected through the multivariate approaches or LISREL
  - Use these measures to evaluate the effectiveness or the level of success in our case studies by applying multi-criteria approaches such as TOPSIS or ANP

Case Studies

➢ Timeline of PPP mega rail projects



Case Studies: Taiwan High Speed Rail

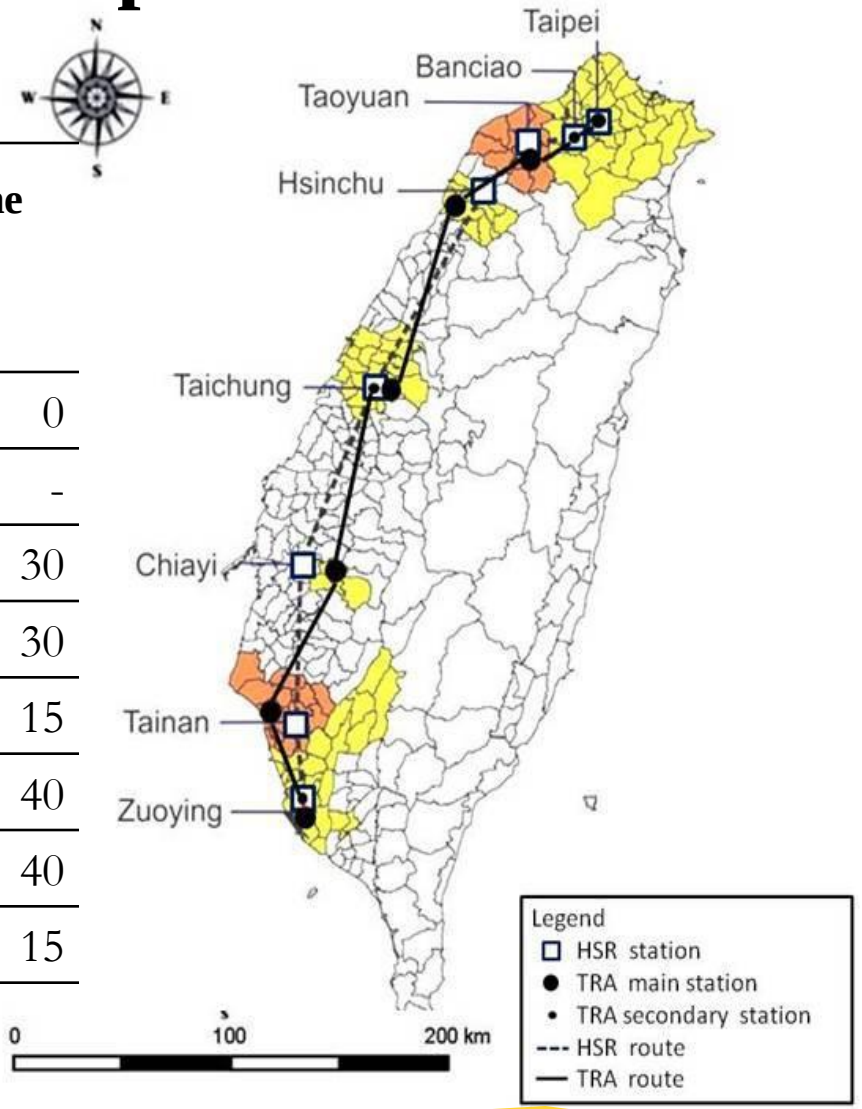
- First BOT project in Taiwan
- Largest BOT infrastructure project in the world

台灣高鐵
TAIWAN HIGH SPEED RAIL

Taiwan HSR Hsinchu Station

Case Studies: Taiwan High Speed Rail

station	Metropolitan population (million)	Access time to CBD by car	Access time by public transport
Taipei	6.7	0	0
Banciao	6.7	-	-
Taoyuan	1.9	20	30
Hsinchu	0.8	20	30
Taichung	2.3	25	15
Chiayi	0.3	30	40
Tainan	1.2	30	40
Kaohsiung	2.7	20	15



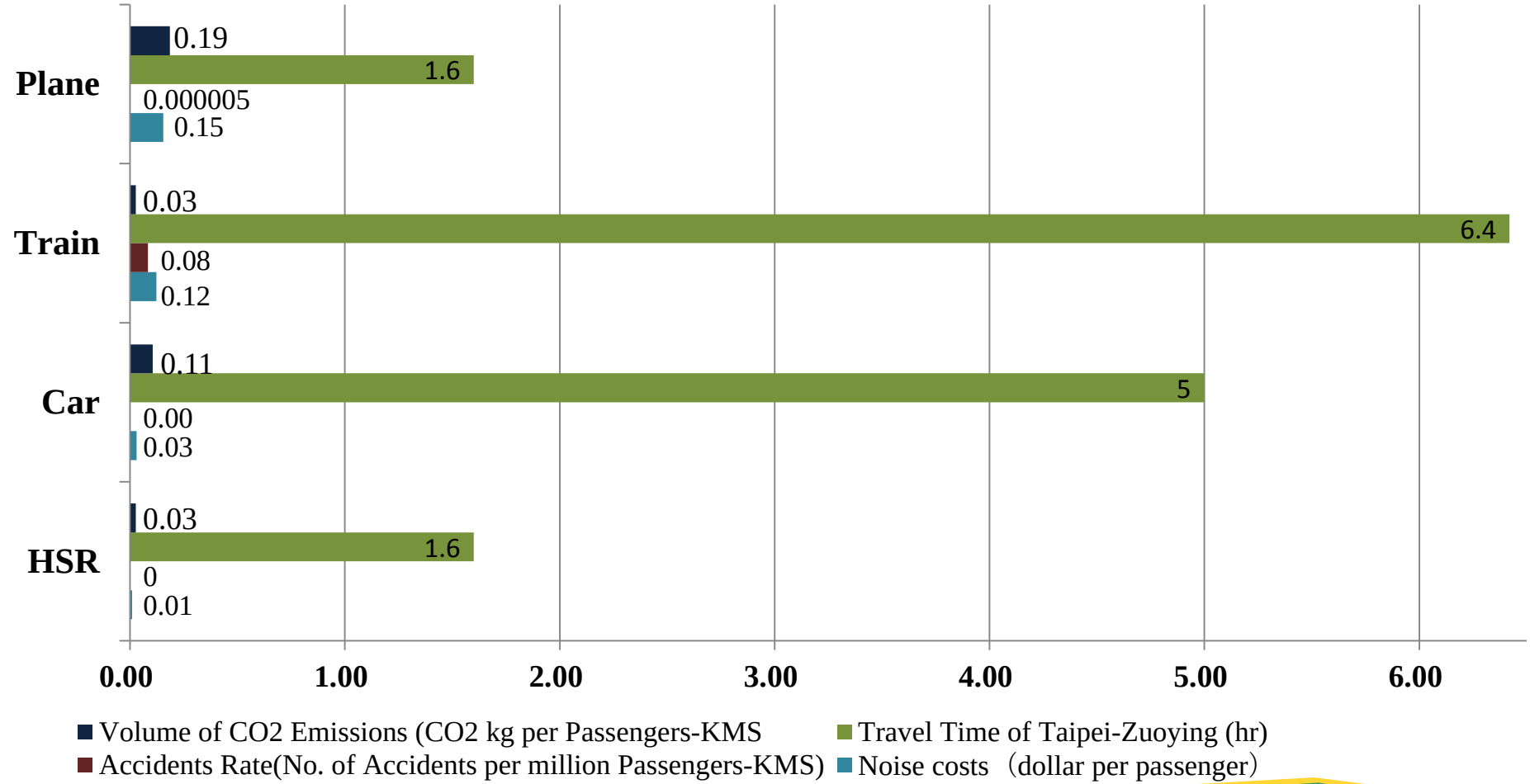
Case Studies: Taiwan High Speed Rail

- **The Good**
  - Most efficiently managed mega project ever
  - Zero accident rate
  - High service quality
  - Contributed to 0.19% of GDP

Construction Period		Budget (Billion NTD)	
Planned	Actual	Planned	Actual
2000.03~2007.03	2000.03~2006.12	426.6 B	442.1 B

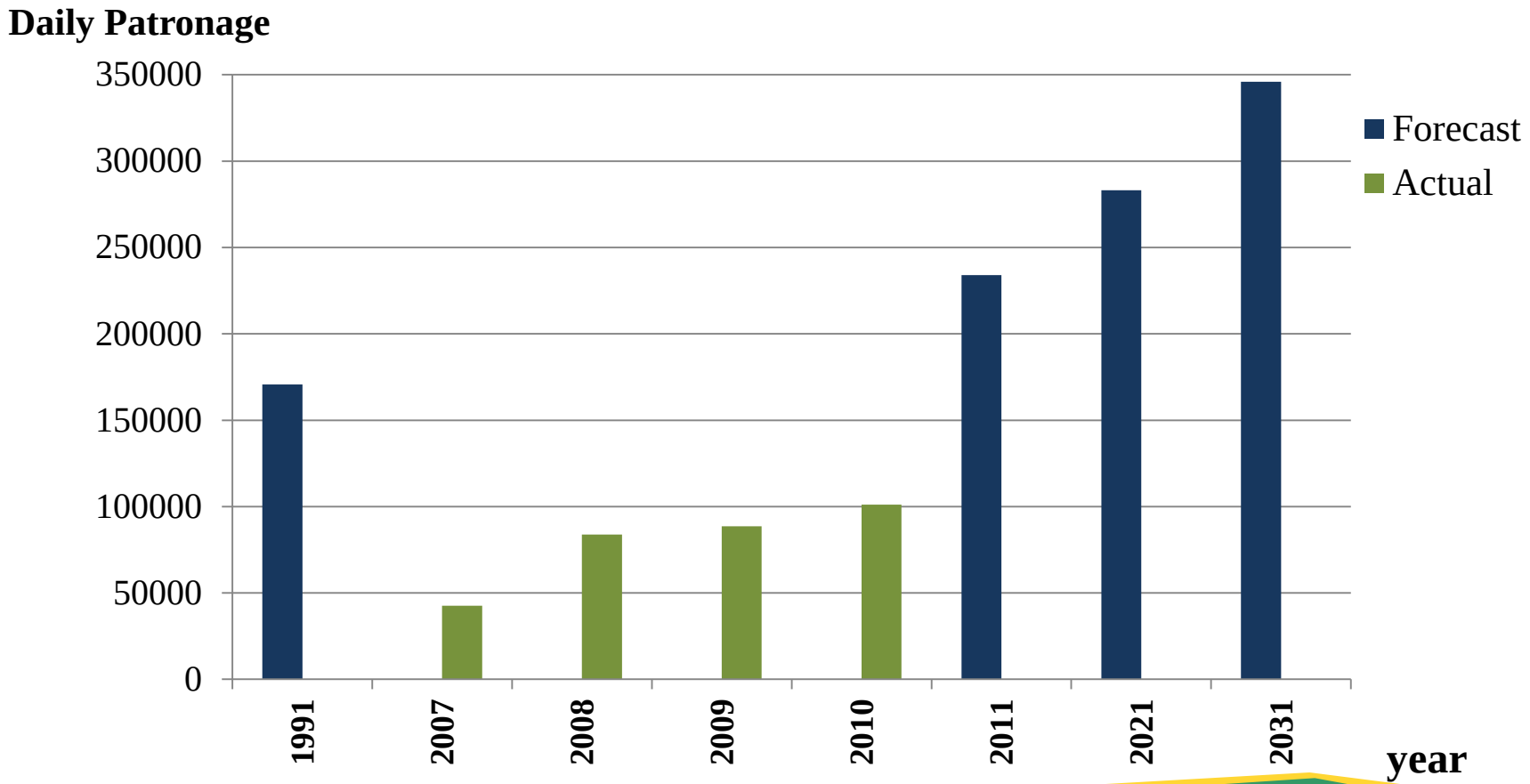
Case Studies: Taiwan High Speed Rail

- Significant reduction of CO_2 emission and noise



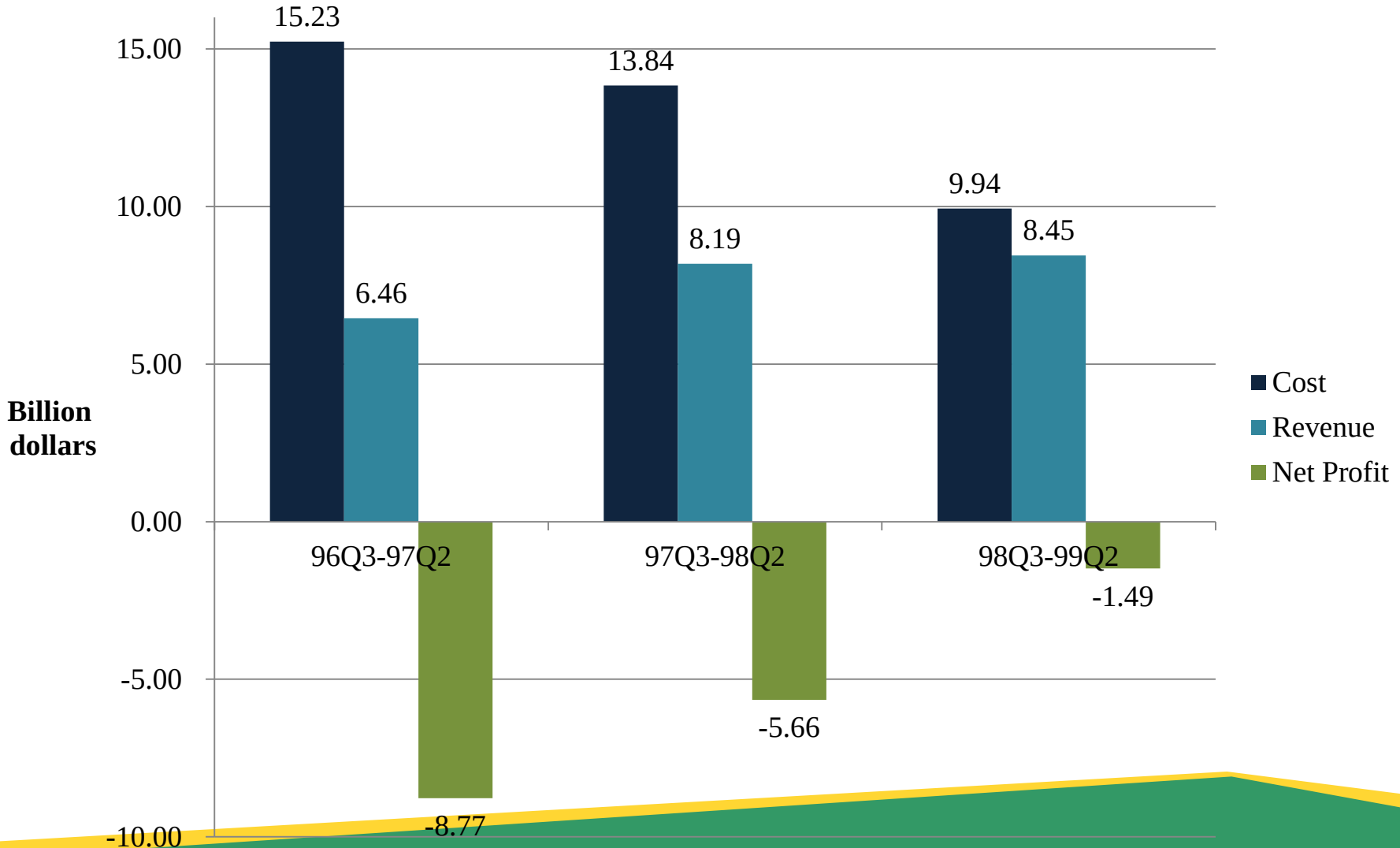
Case Studies: Taiwan High Speed Rail

- **The Bad**
  - ➢ Highly Over-estimated demand

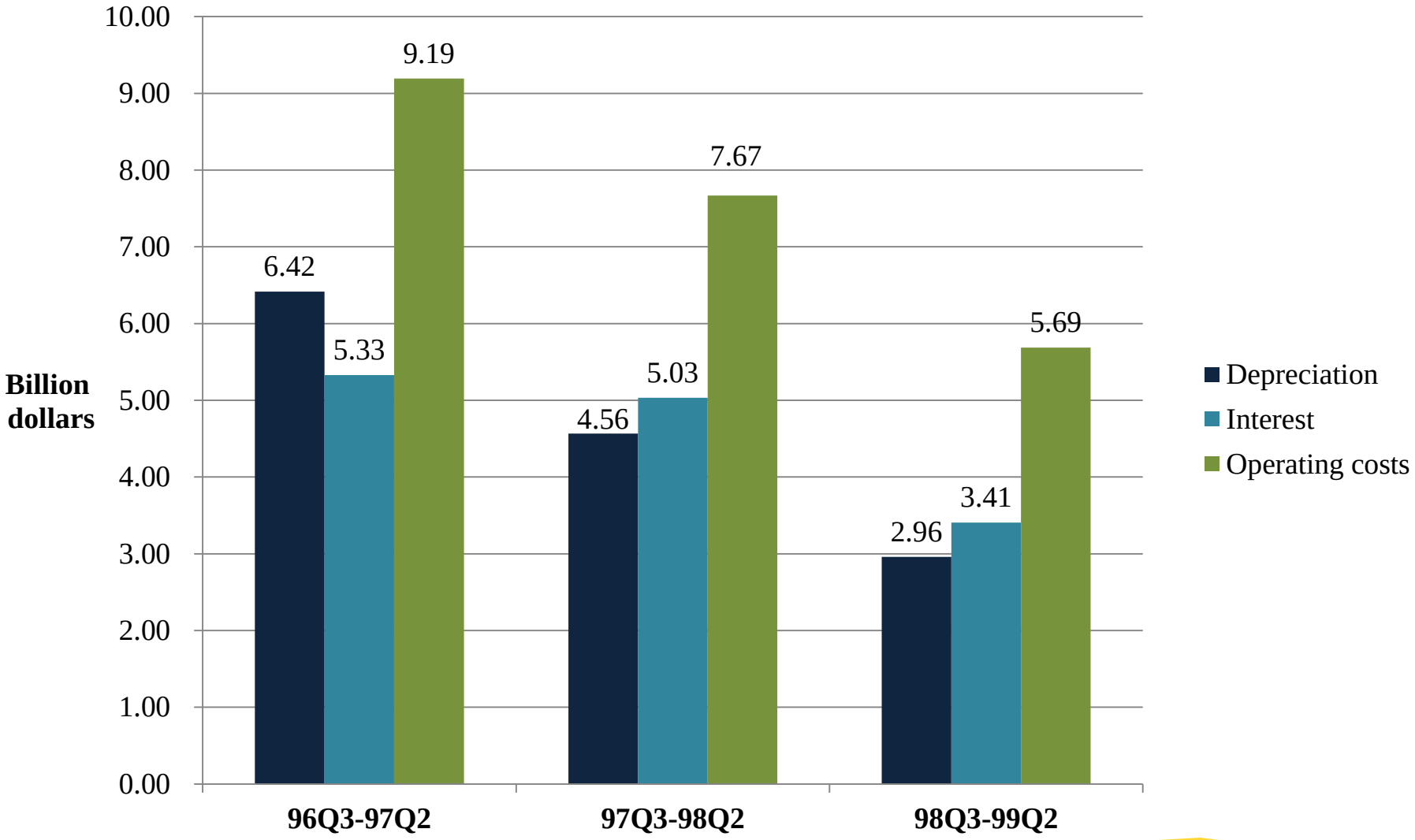


Case Studies: Taiwan High Speed Rail

- High Debt/Asset Ratio



Case Studies: Taiwan High Speed Rail



Case Studies: Taiwan High Speed Rail

- **The Ugly – Causes of Over-estimated Demand**

  - Bad Locations
    - New stations failed to promote new town development
  - Industry Migration
    - Thousand of firms moved from Taiwan to China
  - Poor Accessibility
    - Access time to CBD is about 30 minutes for some stations

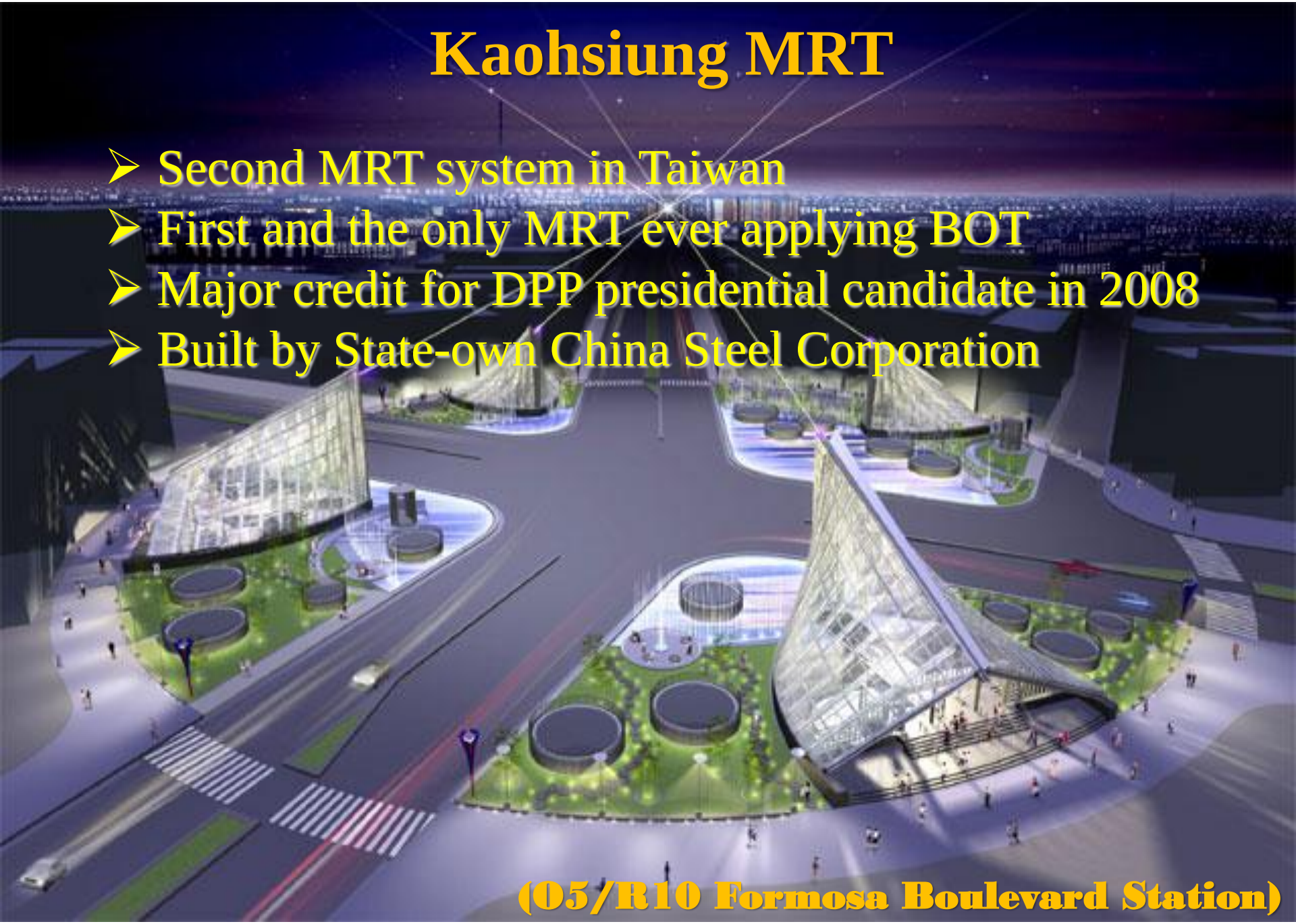
Case Studies: Taiwan High Speed Rail

- **Possible Solutions for THSR Financial Problem**

  - Extending the depreciation and concession period on the basis of regular facility renewal
  - Reducing debt/asset ratio by increasing shares of the stockholders from private and public sectors
  - Increasing revenues by effective promotion strategies and land development
    - Price elasticity $|e_p| > 1$
  - Improving accessibility to CBD

Kaohsiung MRT

- Second MRT system in Taiwan
- First and the only MRT ever applying BOT
- Major credit for DPP presidential candidate in 2008
- Built by State-own China Steel Corporation



(O5/R10 Formosa Boulevard Station)

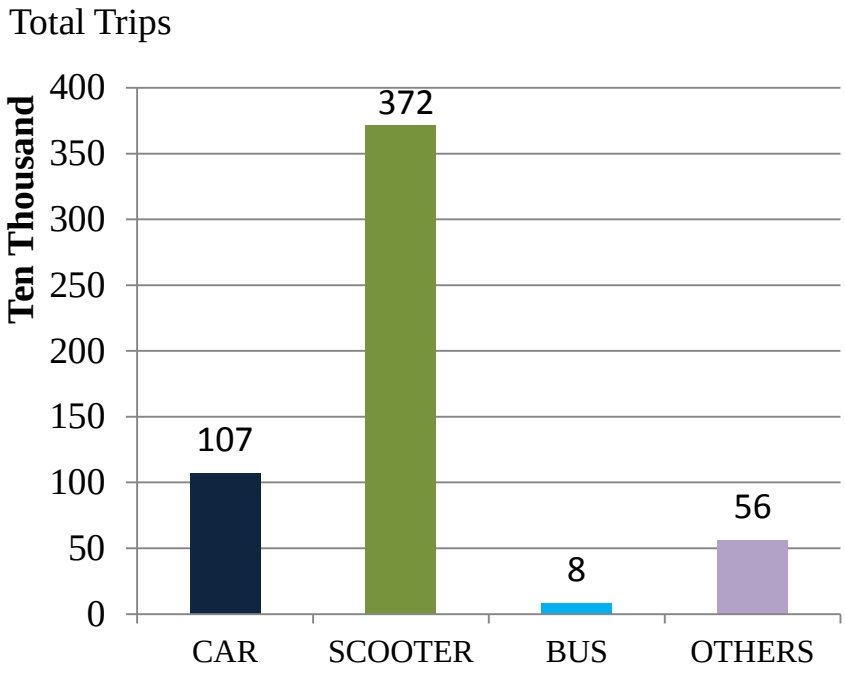
Case Studies: Kaohsiung MRT System

- **The Good**
  - Very efficient in construction management
  - Zero accident rate
  - High service quality
  - Contributed to 10% increase in public transit patronage

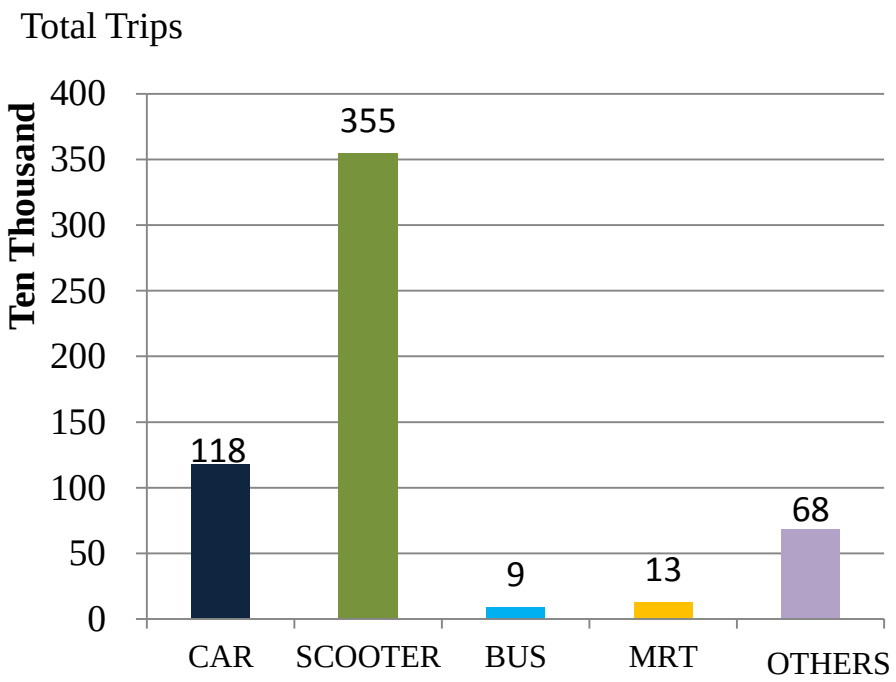
Construction Period		Budget (Billion NTD)	
Planned	Actual	Planned	Actual
2001.10~2007.10	2001.10~2008.09	195.2 B	181.4 B

Case Studies: Kaohsiung MRT System

Before the opening of KMRT (2008)



After the opening of KMRT (2010)



Other modes include bike, taxi, and ferry

Case Studies: Kaohsiung MRT System

- **The Bad**

  - Highly Over-estimated Demand
    - Projected daily patronage: 180,000~200,000
    - Average daily patronage: 120,000~130,000 in 2010
  - High Debt/Asset Ratio

Date	Value of Asset (A)	Debts (D)	D/A (%)	Total Loss
2010.03	42.8 B	29.237 B	68.31%	37.8 B

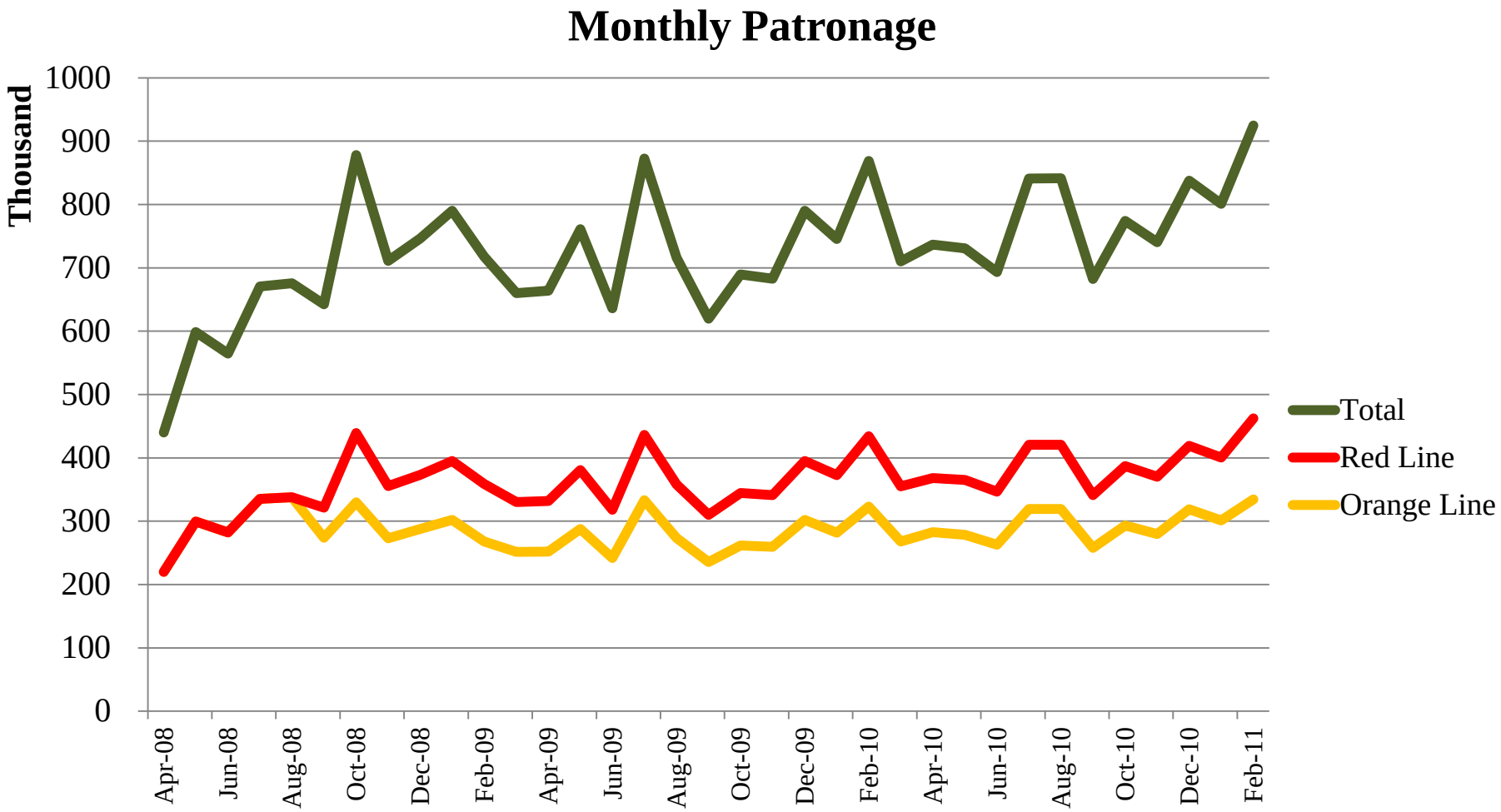
Case Studies: Kaohsiung MRT System

- **A Tale of Two Cities**

MRT	Taipei	Kaohsiung
Number of Routes	9	2
Number of Stations	89	36
Total Length (km)	101.9	42.7
Daily Ridership	1507,771	123,385
Population city/urban	2.6 / 6.7 (million)	1.5 / 2.8 (million)
Area city/urban (km^2)	272 / 2265	153 / 1004

2008 Presidential Election		
KMT	Y. J. Ma	Taipei City Mayor (1998~2006)
DPP	Frank Hsieh	Kaohsiung City Mayor (1998~2006)

Case Studies: Kaohsiung MRT System



Case Studies: Kaohsiung MRT System

- **The Ugly – Causes of Over-estimated Demand**

  - Bad Locations
    - New stations failed to promote transit-oriented development
  - Industry Migration
    - Thousand of firms moved from Taiwan to China
  - Poor Network Integration
    - Transfer times to other transit modes are about 15 minutes
  - No Incentives for the Use of MRT
    - Not competitive to cars and scooters

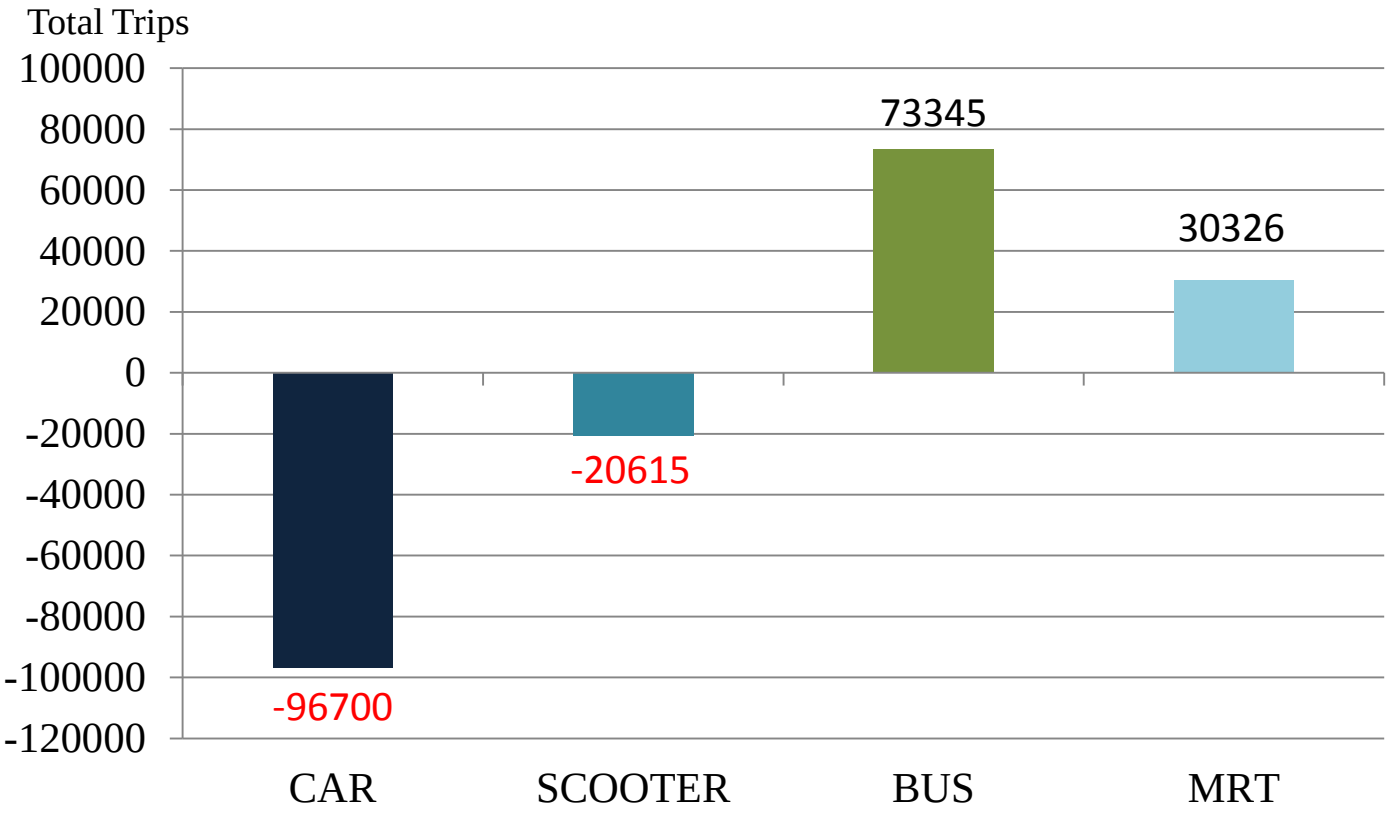
Case Studies: Kaohsiung MRT System

- **Possible Solutions for KMRT Financial Problem**
  - Extending the depreciation and concession period on the basis of regular facility renewal
  - Reducing debt/asset ratio by increasing shares of the stockholders from private and public sectors
  - Increasing revenues by effective promotion strategies and transit-oriented development
  - Improving network efficiency and coverage
  - Applying new fuel fee collection mechanism

Case Studies: Kaohsiung MRT System

- **Application of New Fuel Fee Collection Program**

Proposed Program : Collection of 5 NTD per Liter of Gasoline



Case Studies: Other Rapid Transit Projects

Project	Contract Period	PPP Model	Budget (Billion NTD)	Private Sector
Under Construction				
Taichung MRT WWB Line	2015 | ?	OT	51.39	NA
Taipei MRT Circular Line Phase I	2015 | ?	OT	49.77	NA
Under PPP process				
Kaohsiung Mass Rapid Transit	38 years (Including construction)	BOT \ OT	12.201	NA

Case Studies: Other Rapid Transit Projects

Project	Contract Period	PPP Model	Budget (Billion NTD)	Private Sector
Under Revision				
Tainan City Light Rail Transit System	NA	BOT \ OT	3.635	NA
Contract Terminated				
Alishan Forest Railway	33 years (Including construction)	BOT \ OT	1.829	Hungtu Construction Co., LTD
Taoyuan International Airport MRT Line	30 years (Including construction)	BOT\OT	2.80	Chang Sheng International Development Co.

Final Remarks

- **Questionnaire Survey from Public and Private Partners of KMRT**

Ten Principles for Successful Public / Private Partnerships	Fulfillment		Agreement	
	Average	Standard Deviation	Average	Standard Deviation
1. Prepare Properly for Public / Private Partnerships	3.914	0.658	4.297	0.507
2. Create a Shared Vision	3.742	0.816	4.212	0.689
3. Understand Your Partners and Key Players	3.714	0.788	4.276	0.743
4. Be Clear on the Risks and Rewards for All Parties	3.657	0.725	4.425	0.683
5. Establish a Clear and Rational Decision Making Process	3.571	0.777	4.361	0.568
6. Make Sure All Parties Do Their Homework	3.657	0.591	4.170	0.564
7. Secure Consistent and Coordinated Leadership	3.542	0.780	4.361	0.640
8. Communicate Early and Often	3.514	0.817	4.319	0.593
9. Negotiate a Fair Deal Structure	3.342	0.764	4.170	0.731
10.Build Trust as a Core Value	3.457	0.780	4.297	0.622

Final Remarks

What lessons can be learnt from the planning, appraisal, construction, and operation of the mega rail projects?

- **The Good (construction & operation periods)**
  - All the completed projects are efficiently managed
  - The quality-of-services are highly rated by users
- **The Bad (planning & operation periods)**
  - Insufficient incentives lead to the cancellation of many public transport projects in median-size cities
  - Due to high D/A ratio new contracts may be required to extend operation period before the time of transfer

Final Remarks

Which of the above lessons are generic, and which are context specific?

- **The Ugly (planning & appraisal periods)**
  - **Generic**
  - Most of the risks have been transferred to banks which are mostly owned by the public sectors
  - Demand are highly over-estimated due to optimistic prediction on employment rate and economic growth rate
  - **Context Specific**
  - Bad locations are selected under the name of TOD and new town development
  - Poor coordination among public transport systems

Final Remarks

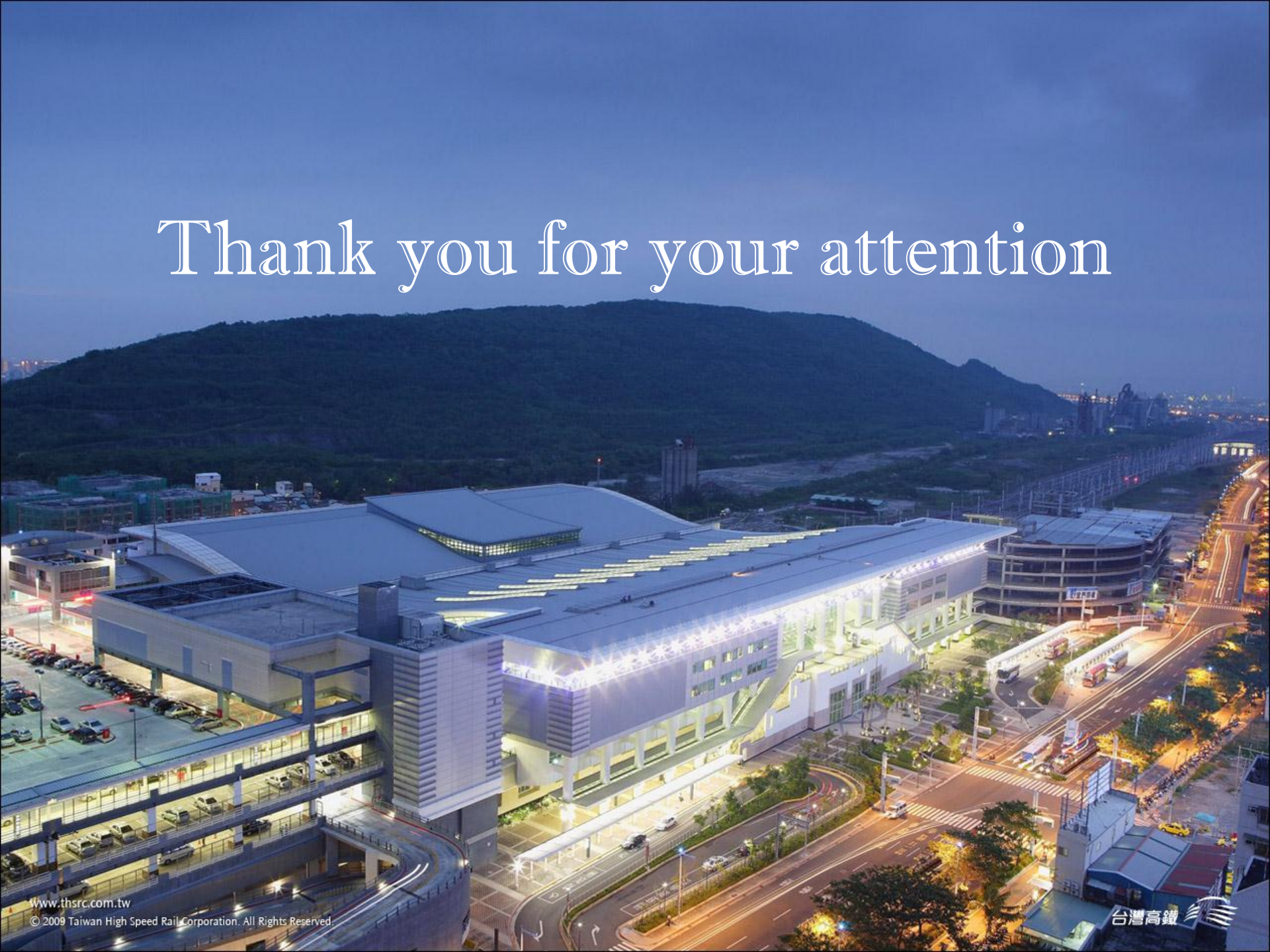
What guidelines can be written from the above research outputs?

- **Directions for future PPP rail projects in Taiwan**
  - A more comprehensive urban and regional transport planning is needed to integrate land use and housing policy and to cope with
  - The growth of knowledge-based firms
  - Innovations in freight transport
  - Ageing population
  - Low fertility rate
  - Global climate change

Final Remarks

What are the strategies or modifications needed for future PPP programs?

- **Directions for future PPP rail projects in Taiwan**
  - New projects are now more ‘realistic’ in terms of demand forecasting and financial assessment
  - Incentives for auto users to commute by rail and transit system should be provided through the implementation of sustainable transport policy such as
    - Air Pollution Tax
    - Congestion Toll
    - Supplemental ‘Fuel Fee’ on gasoline consumption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