



# **Brownfield Concession of Aged Infrastructure Facilities for Sustainable Development**

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# **The current status and future prospect of aged infrastructure facilities in Korea**

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- **Since the mid-1970's, Korea has enjoyed a rapid economic growth, leading to a great increase in the supply of major infrastructure facilities.**
  
- **In particular, during the period of 1970-1990, the infrastructure facilities such as roads, railroads, bridges, harbors, dams, industrial complexes, tunnels, and water and sewage facilities have been excessively delivered**
  
- **This situation leads us to be faced with three serious problems:**
  - ① **this disrupts the growth of national economy;**
  - ② **this leads to poor living standard of the lives of the people;**
  - ③ **this endangers the health and safety of the people.**

## Major aged infrastructure facilities and their safety grade

**<Table 1> Major aged infrastructure facilities and their safety grade**

Grade	A	B	C	D	E	Unknown	Total
Bridges	31	314	207	8	0	0	550
Tunnels	8	65	54	0	0	1	128
Harbors	1	41	10	1	0	0	53
Dams	59	120	129	8	0	1	317
Buildings	53	341	130	3	0	5	532
River facilities	64	209	55	7	0	188	523
Water and sewage	47	107	17	0	0	1	172
Retaining walls	18	82	9	0	0	1	110
Excavated slopes	0	0	1	0	0	0	1
Total	281	1,279	612	27	0	197	2,396

Source: Kang, S. and Y. Lee (2013), *An Understanding of an Infrastructure Report Card of the Advanced Countries and its Implication in the Korean Infrastructure Policy*, Construction and Economy Research Institute of Korea (CERIK).

# **The problems that need to be solved in the Korean construction industry**

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- **Due to the rapid increase in the number of aged infrastructure facilities, we need to solve two major problems for maintaining a sustainable economic growth**
  - ① **how to solve the problem of endangering the health and safety of the people by rehabilitating and/or redeveloping aged infrastructure facilities;**
  - ② **how to solve the problem of establishing management authority to effectively and efficiently operate, maintain, and manage these aged infrastructure facilities.**
  
- **In this paper, we will focus on the solution of the first problem only.**
  
- **In particular, we will provide a set of solutions of rehabilitation and/or redeveloping aged infrastructure facilities by utilizing private funds in the form of brownfield concessions through public-private partnership (PPP).**

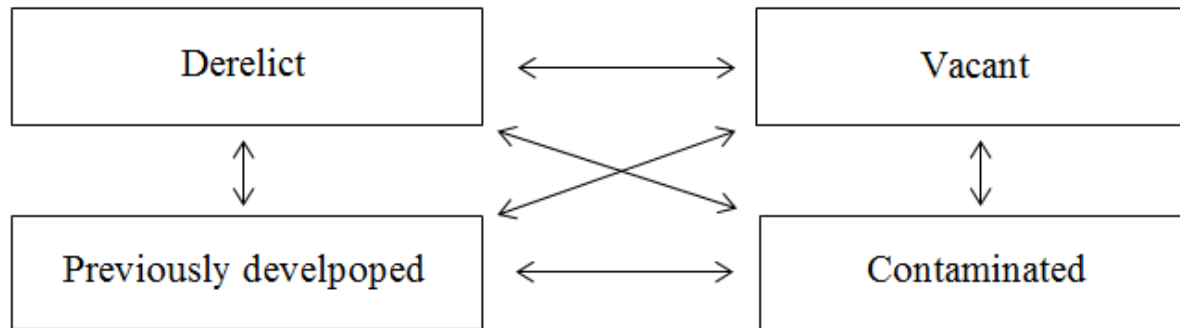
# Definition of brownfield concessions (I)

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## ● Terms associated with brownfield:

- ① derelict;
- ② contaminated;
- ③ vacant;
- ④ previously developed.

<Figure 1> Terms associated with brownfield



Source: Alker, S., Joy, V., Roberts, P. and N. Smith (2000), “The definition of brownfield”, *Journal of Environmental Planning and Management*, Vol. 43, No. 1, p. 56.

# Definition of brownfield concessions (II)

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## ● Criteria within the definition of brownfield

### - In the present,

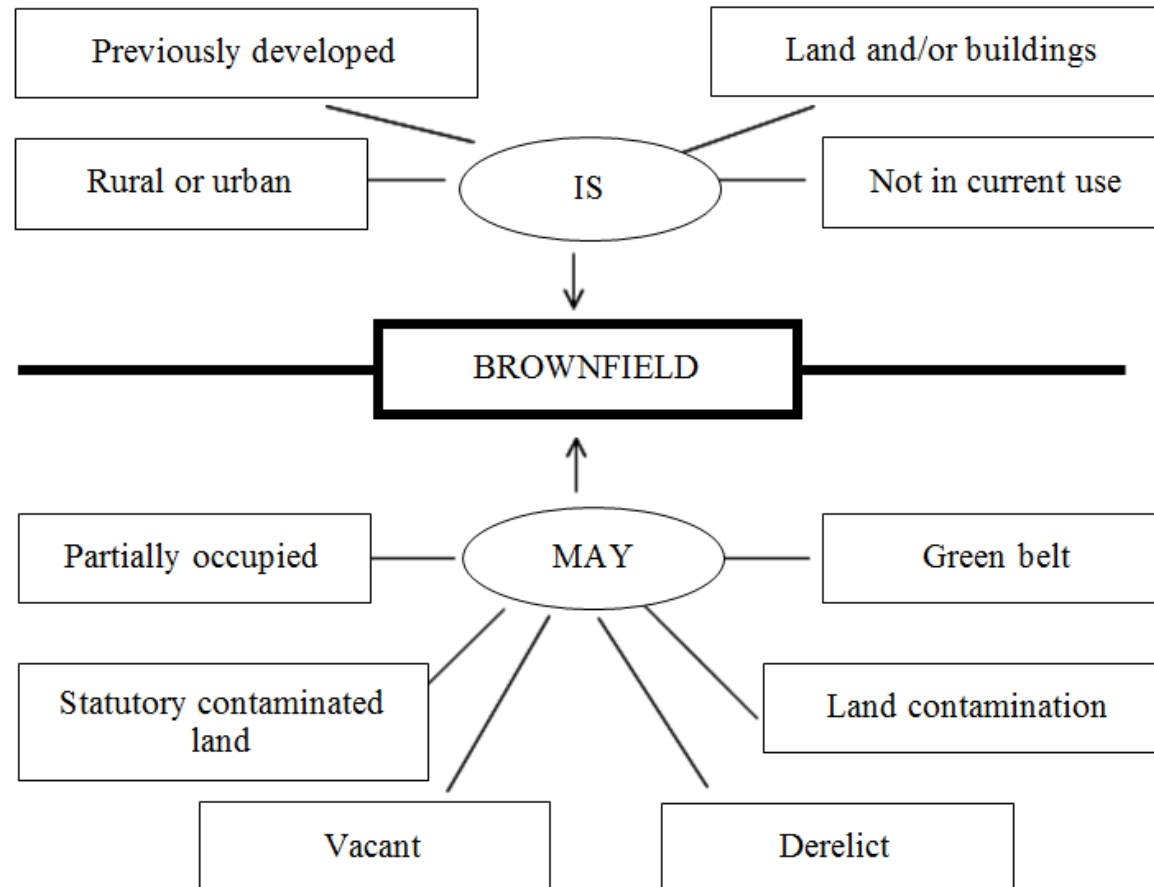
- ① previously developed;
- ② rural or urban;
- ③ not in current use;
- ④ land and/or buildings.

### - In the future,

- ① vacant;
- ② derelict;
- ③ partially occupied;
- ④ statutory contaminated land;
- ⑤ green belt;
- ⑥ land contamination

# Criteria within the definitions of brownfield

<Figure 2> Criteria within the definition of brownfield



Source: Alker, S., Joy, V., Roberts, P. and N. Smith (2000), "The definition of brownfield", *Journal of Environmental Planning and Management*, Vol. 43, No. 1, p. 63.



# Brownfield concessions through TOT in China water market

## ● Diverse forms of PPPs in China water market:

- Management contracts;
- Leasing contracts;
- BOT(build-operate-transfer)/BOO(build-own-operate)/BOOT(build-own-operate-transfer);
- TOT(transfer-operate-transfer)/ROT(rehabilitate-operate-transfer)/BROT(build-rehabilitate-operate-transfer);
- Divestiture or full-scale privatization.

<Table 2> Current status of diverse PPP projects in China's water market

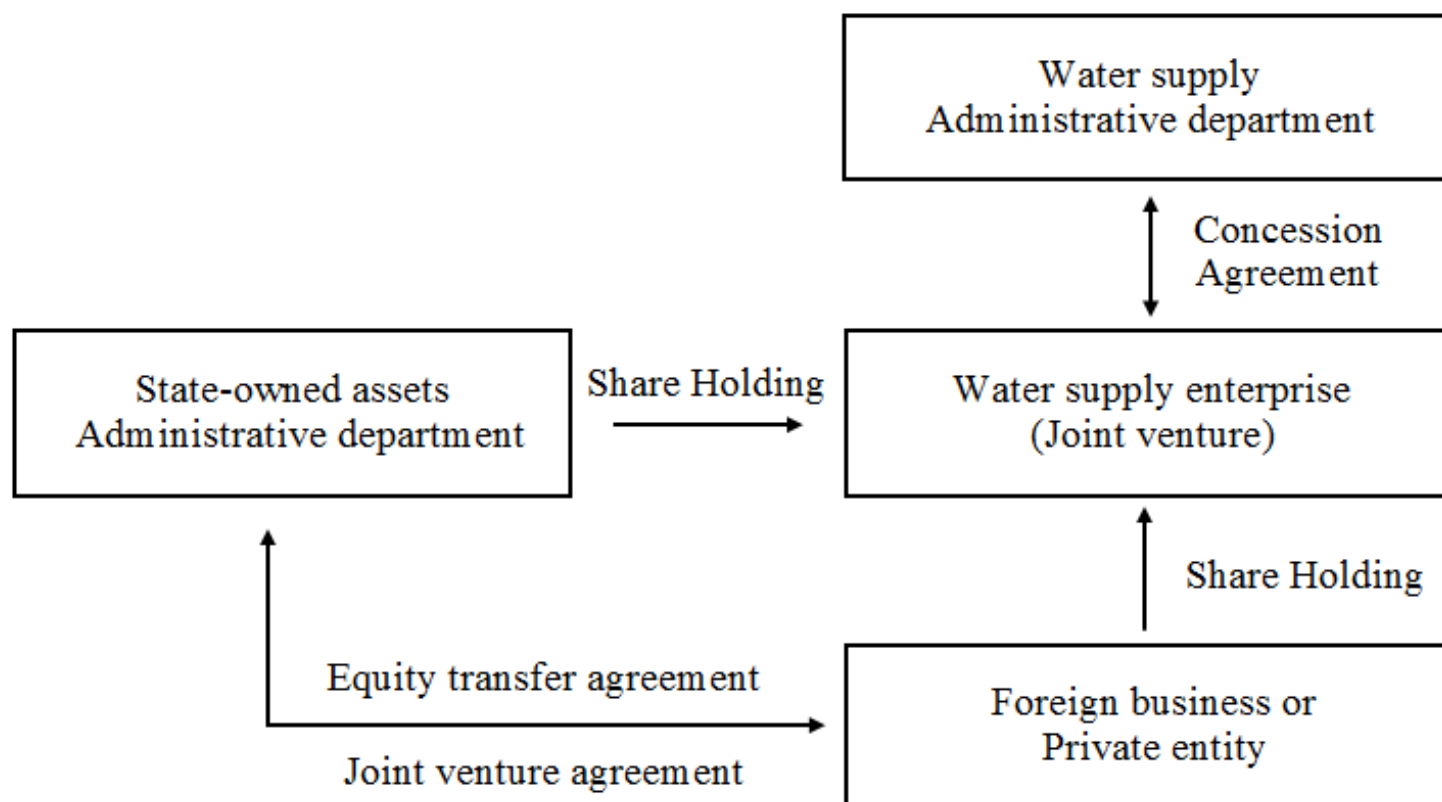
PPP business models	Ownership (equity transfer)	Operation	Investment	Risk	Period (years)
Management contract	Public	Private	Public	Public	3-5
Lease	Public	Private	Public	Shared	8-15
BOT/BOO/BOOT	Public/private <sup>1)</sup>	Private	Private	Private	20-30
TOT/ROT/BROT	Public	Private	Private	Private	20/30
Divestiture	Public/private	Shared	Private	Shared	25-50 <sup>2)</sup>

Note: <sup>1)</sup>Choice varies upon contract or local regulation; <sup>2)</sup>Also called time-bound divestiture as the contract is valid during the contract period.

Source: Jang, W., Lee, D. and J. Choi (2014), "Identifying the strengths, weaknesses, opportunities and threats to TOT and divestiture business models in China's water market", *International Journal of Project Management*, Vol. 32, No. 2, p. 300.

# Structure of TOT concessions in China water market

<Figure 3> Relationship between key stakeholders in TOT scheme



Source: Meng, X., Zhao, Q. and Q. Shen (2011), "Critical success factors for transfer-operate-transfer urban water supply projects in China", *Journal of Management in Engineering*, Vol. 24, No. 4, p. 244.

# Critical success factors (CSFs) of TOT concessions

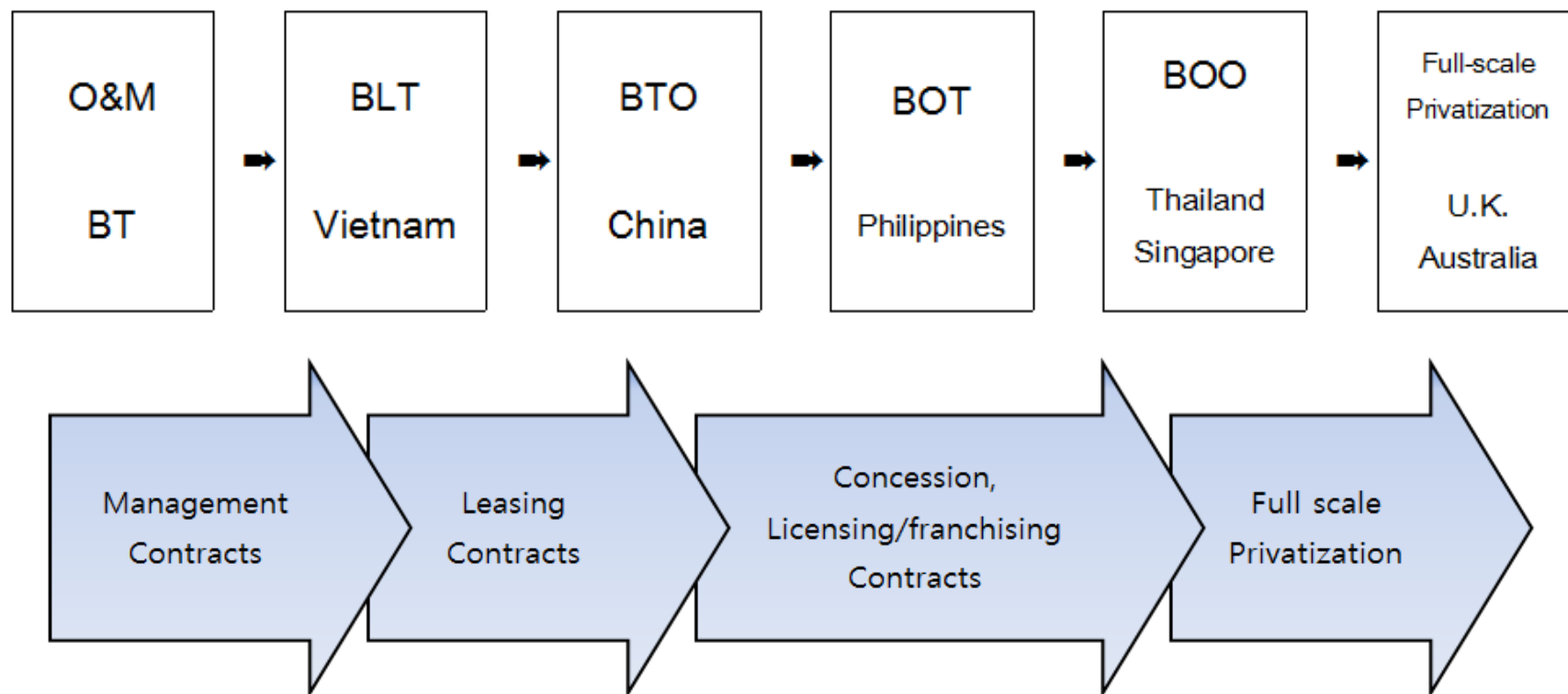
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## ● Eight (8) identified CSFs for TOT projects and their priority;

- ① project profitability;
- ② asset quality;
- ③ fair risk allocation and risk sharing;
- ④ competitive and transparent tendering;
- ⑤ internal coordination within government;
- ⑥ employment of professional advisers  
(design/engineering/legal/accounting/project management);
- ⑦ corporate governance;
- ⑧ government supervision.

# Spectrum of PPP models

<Figure 4> Spectrum of PPP models



Source: The World Bank Institute, <http://www.worldbank.org>.

# Utilization of private funds for brownfield concessions

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## ● Formation of a joint venture

- On the basis of the concept of TOT concessions in China, foreign and/or private company forms a joint venture with the concerned public authority.
- This joint venture rehabilitates and/or redevelops aged infrastructure facilities, or sometimes newly builds some infrastructure facilities to enhance the operational efficiency, with funds from the private sector based on a brownfield concession agreement between the joint venture and the government, and operates and maintains them for a certain period of time as specified in the concession agreement.

## ● Full-scale privatization

- Using one form of divestiture by transferring all equity of the public sector for the aged infrastructure facilities to the private sector with the private sector's funds.
- On the basis of transferred ownership for the aged infrastructure facilities, the private company rehabilitates, operates and maintains them during their life-time.

## **Suggestions for brownfield concession policy direction**

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- **In order to activate the private sector's investment for the rehabilitation and/or re-development of aged infrastructure facilities for maintaining a sustainable economic development, the government needs to provide a favorable environment for involving the private sector in the infrastructure sector, whether it is economic infrastructure or social infrastructure.**
- **The government needs to establish a kind of special laws and regulations for the activation of brownfield concessions, leading to a favorable legal and regulatory framework for brownfield concessions.**
- **The government needs to arrange some supporting measures to attract private and/or foreign investors. One of the most thinkable ways is tax exemption or government subsidy in order to raise the internal rate of return (IRR) or return on investment (ROI) of the private and/or foreign investors.**
- **The government needs to create a favorable atmosphere for people to feel a sense of closeness for private participation in infrastructure facilities, whether they are aged or new.**