



Study of the Integrated Rail-Property Development Model

IN HONG KONG



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Study of Integrated Rail-Property Development Model in Hong Kong - Executive Summary

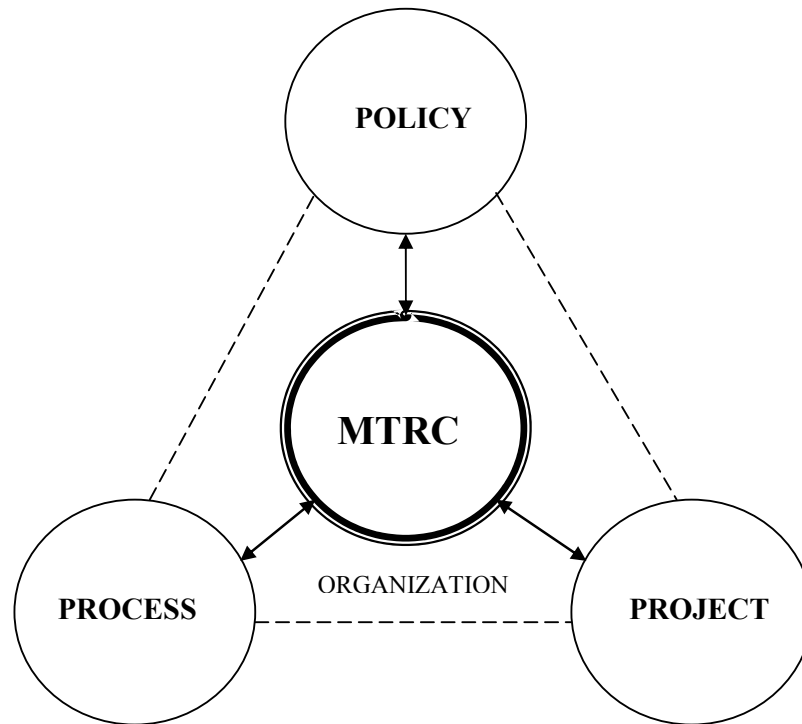
Background

1. In September 2003, the MTR Corporation (MTRC) approached the Research Centre for Construction & Real Estate Economics of The Hong Kong Polytechnic University with a request to undertake a study of an essential element of its business operations known as the ‘integrated rail-property development model’. The MTRC wants the study to ascertain, from both theoretical and empirical perspectives, the impacts and benefits generated by this development model.
2. The main objectives of this study are to:
 - (a) explore how the MTR integrated rail-property development model has effectively contributed to the urban development of Hong Kong;
 - (b) examine the critical success factors and conditions conducive to the implementation of this model in Hong Kong; and
 - (c) determine how this unique model can be successfully replicated elsewhere, especially in the Mainland Chinese cities.
3. This is the Final Report of the study. It contains seven sections. Sections 1 and 2 are background chapters. Section 1 provides the study objectives, study framework, scope of study and key research questions. Section 2 gives a brief outline of the key business characteristics and operations of the MTRC.
4. Sections 3 to 6 contain the study findings. Each section begins with an ‘Introduction’ which spells out the specific research questions to be examined there. It ends with a sub-section entitled ‘Conclusions’ that provides the answers to those questions. Section 7 summarizes and concludes the study.
5. This Executive Summary highlights the key conclusions in this study, in the format of Questions and Answers.

What is the ‘integrated rail-property development model’?

6. An integrated rail-property development model represents a unique approach of the MTRC in handling the relationship between railway and land development.
7. It is more than a simple combination of railway and property. It is *not* the same as the integrated railway and property development projects above stations; these are only the *outcomes* of the model.
8. The model has four principal elements (Figure 2.3) :

Figure 2.3
MTRC Integrated Rail-Property Development Model: Key Elements



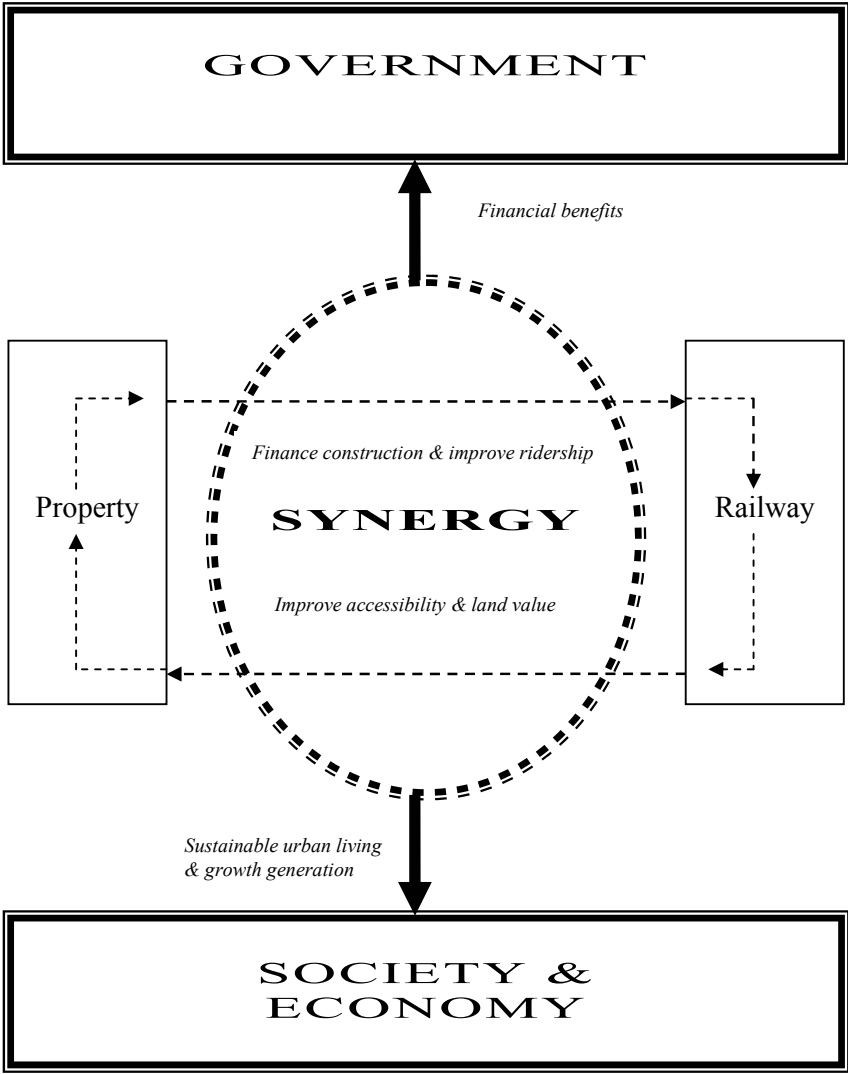
Source: Authors

- (a) *Policy*: Favourable government policy support in terms of its exclusive land grant to the MTRC and its commitment in mass transit railway as an essential mode of public transport.
- (b) *Process*: Superb planning, management and control procedures and effective development processes that seek to maximize the synergy between railway and property from the stages of project inception to completion.
- (c) *Project*: Development of high-quality real estate projects that contain high development density, appropriate land use diversity and attractive layout design and integrate well with the railway facilities at the appropriate locations and at the right timing.
- (d) *Organization*: A well-experienced and efficiently managed company that is committed to providing world class railway services and developing top-quality property development projects in order to enhance the quality of life in Hong Kong.

What are the benefits generated by the synergy of integrating railway and property development?

9. An integration of railway and property development is expected to generate the following key social and economic benefits (Fig. 3.1):
 - (a) *Railway* - Urban rail transit will significantly improve the land value around the stations. By capturing these values through property development and other means, the railway operator can finance the construction of the urban railway.
 - (b) *Property* - Intensification of development density of the land around railway stations will improve the ridership of the railway and hence its operational viability.
 - (c) *Government* - The government can receive financial gains in terms of the land premiums generated from property development of the station sites, a higher level of rates from private properties with improved accessibility and other monetary returns on railway operations (if owned by the government). Furthermore, the government is not required to subsidize the operations of the railway if it is financially sustainable.
 - (d) *Society & Economy* - Society at large achieves a more sustainable form in terms of the compactness of urban development, more efficient use of scarce urban space, more open space, less urban sprawl, fewer roads, reduced air pollution from cars, and improved pedestrian-friendly environment. All these features can enhance the overall quality of urban life characterized by improved health, better convenience, greater diversity of life style and more time saving. The economy will equally be benefited as a result of the improved efficiency in transport and human activities.

Figure 3.1
Synergy of Integrated Railway and Property Development Model



Source: Authors

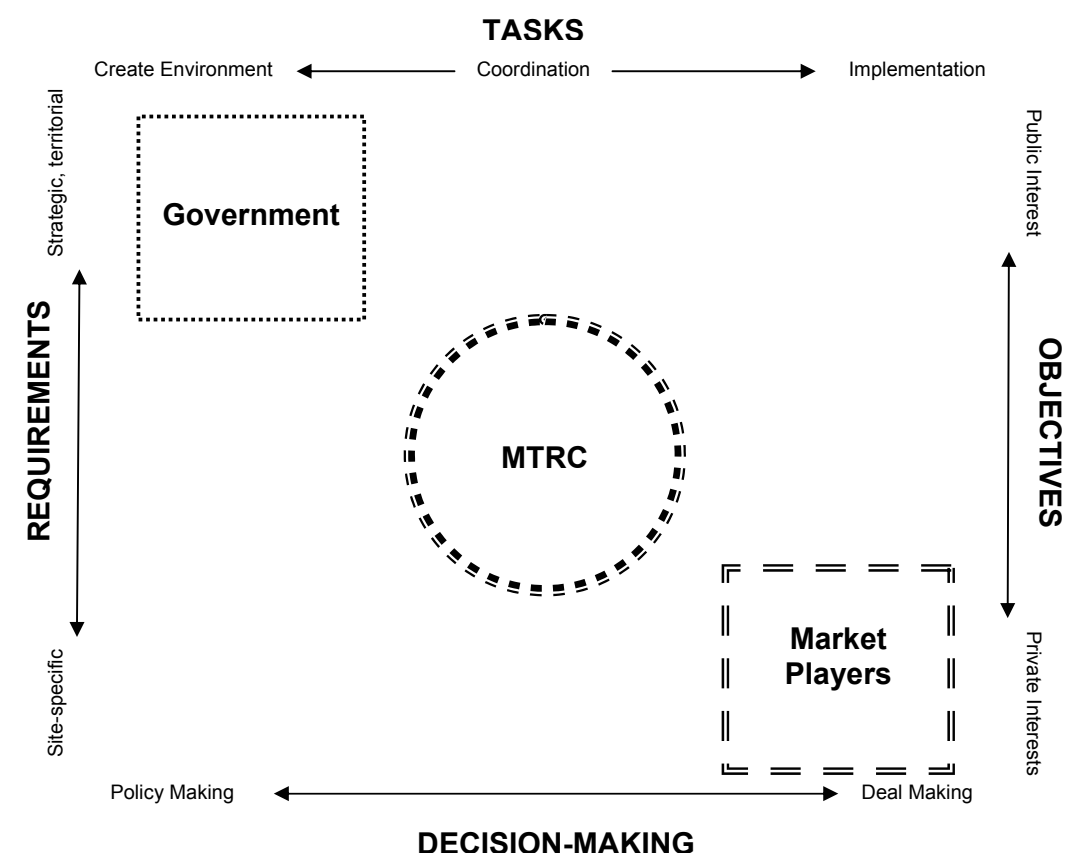
Why, in theory, should the ‘integrated rail-property development model’ be implemented by a single entity like the MTRC?

10. New institutional economics provides the most appropriate theoretical framework in addressing this question. It recognizes that market transactions between the contracting parties are not cost-free. High transaction costs exist in land development activities and reduce efficiency. Implementation by the MTRC as a single entity helps to reduce the high transaction costs because:
 - (a) *Asset Specificity*: MTR station and its above-station property development are intimately linked in many aspects such as site footage, civil works, and ancillary services. It is extremely costly and difficult to disentangle and divide all these activities into separate contracts if they are not planned, supervised and managed by a single entity like the MTRC.
 - (b) *Imperfect Knowledge*: The MTRC has accumulated lots of specialized experience in planning and developing integrated railway-property development. This can decrease the negotiation, monitoring, enforcement and search costs of all the contracting parties in undertaking the development activities.
 - (c) *Reducing Uncertainty*: The MTRC has the organizational flexibility and capability to adjust to the unforeseeable market changes in the development environment. The corporation is disciplined by the financial market, the property development industry and the government in operating efficiently on prudent commercial principles.
 - (d) *Internalizing & Enhancing Value*: Given the exclusive rights of planning and developing the landed property of its stations, the MTRC has the *incentive* to protect, enhance and capture the value of its assets. It is in a strong position to delineate all the rights of the contracting parties to benefit from the land and hence maximize the synergistic effects associated with the integration of railway and adjoining property development, e.g. their timely completion.
 - (e) *Value Protection*: The MTRC has well-defined corporate missions, objectives and tasks, which are widely known to the public, the government departments and the developers. The incentive structure for the MTRC is such that it has an interest to constrain opportunistic behaviour, cheating and non-compliances of the involved parties such as the developers and the contractors.

What is an alternative approach in implementing the integrated rail-property development project? Why is it not preferable to the MTRC model?

11. An alternative approach refers to the government disposal of individual land parcels separately (a) for property development by the developers, and (b) for railway construction by a transport agency.
12. This represents government planning, assignment, attenuation, and restrictions of private individual rights over the use of land resources in and near railway stations. This institutional form of land use governance involves public-sector decision making, statutory framework and third-party regulation and enforcement by the government.
13. Under this approach, the statutory town plans, land lease documents, the government land sale programmes, and the government policies and regulations provide the principal coordinating mechanisms in bringing together all the key players in developing the sites. Project implementation relies mainly on the interactions between the railway operators, developers and various government departments, their interpretations of the many government policy regulations and contracts, and their compliance with the conditions imposed upon them.
14. This coordinating mechanism is not preferable because, in theory, it will lead to higher transaction costs and lower efficiency, and in practice, it cannot generate the desirable development outcomes provided by the MTRC model.
15. The success of the MTRC model lies in the proper alignment of the institutional role of the corporation with its objectives, tasks, requirements and decision-making environment (Fig. 3.9).
16. Eliminating the MTRC within this institutional setup implies either:
 - (a) an expansion of the government and private developers into areas and functions which they are neither good nor proper at performing; or
 - (b) leaving a gap between strategic policy objectives and detailed implementation at the site level, between policies and deals, and between balancing public and private interests.

Figure 3.9
Institutional Functions of Different Organizations: Four Dimensions



Source: Authors

What are some examples of applying the MTRC model in achieving better development outcomes?

17. The MTRC model provides better development outcomes as illustrated in the following examples:
- (a) By improving the original government planning and design of the Tung Chung above-station development, the MTRC approach has delivered a landmark development project that receives wide public applause and maximized its returns by capitalizing on the full seaview potential of its land resources.
 - (b) The MTRC approach reacts responsively and flexibly to meet the current market needs by proposing a change of the land uses of the town centre at Tseung Kwan O station, the initial planning proposal of which was prepared some 14 years ago.
 - (c) The MTRC model allows all development options to be evaluated at the planning stage before implementing a final, optimal scheme. Maritime Square at Tsing Yi station – characterized by ‘seamless’ space integration and maximum convenience to all – demonstrates how the synergistic effects between railway and property are maximized and enhanced through this process.
 - (d) By means of ‘Development Agreements’, the MTRC will ensure compliance of the developers in implementing the adopted master plan proposals of the station development. This is better than subsequent separate negotiations between the railway operator and the adjoining property owners, which often produce second-best and remedial outcomes. Examples include the new underground pedestrian links between Pacific Place and Admiralty MTR station, and between Times Square and Causeway Bay MTR station.
 - (e) Real estate interests and transport objectives are not necessarily compatible. Separate considerations may lead to conflicts, diseconomies and inefficiency to both parties. Example refers to the congested interface areas between KCRC Sha Tin station and the New Town Plaza.

What is the position of the Hong Kong government about the MTRC model?

18. The government has been highly supportive of this model. It considers that the grant of exclusive property development rights of the station areas to the MTRC is an essential part for achieving the benefits of the integrated rail-property development projects in Hong Kong.

What are the respective roles of the government, the MTRC, and the developers under the MTR integrated rail-property development model?

19. The government creates a favourable incentive and constraint environment, sets major policy objectives of strategic and territorial nature that take into account the public interest in connection with the joint development of the mass transit railway and station property.
20. The property developers are responsible for implementing the projects subject to the site-specific requirements and the deals agreed in connection with the joint development.
21. The MTRC acts as the intermediary between the government and the developers for coordinating the implementation of the joint development projects, converting strategic objectives into site-specific requirements, transforming policies into deals and balancing possible conflicts between public and private interests.

What are the study findings about MTR achievements in urban development in Hong Kong?

22. This study has the following key findings:
 - (a) MTR is a key transport service provider and its network has extensive spatial coverage in the territory. Over 2.78 million people (over 41% of the total population) and over 1.34 million workers (over 41% of the territory total) live within 500 m of an MTR station.
 - (b) Over 43% and 20% of the housing units in Hong Kong lie within 500 m and 200 m, respectively, of an MTR station.
 - (c) MTR takes up a market share of over 24% of the total public transport ridership.
 - (d) MTR provides a major transport function for the working population during the morning peak hours by connecting the housing areas with the employment districts. During the evening peak period, MTR provides essential transport services for the purposes of return-home trips and other off-business hours social activities in the existing urban districts.
23. This study confirms the positive relationship between property development and MTR as follows:
 - (a) High concentrations and densities of both population and employment are associated with high MTR station ridership. It is estimated that every single unit of public housing unit and of private housing unit within 500 m of an MTR station account for about 1.97 and 1.62 passengers, respectively, using the station as an origin on a typical day.
 - (b) These figures will increase for housing units within 200 m of an MTR station. The clustering of private housing units around MTR stations tends to exert a greater impact on the ridership than public housing.

- (c) Mixed land uses, compact environment, exciting street-level activities in the existing old urban districts promotes MTR patronage.
- (d) Integrated rail-property development projects in the new development districts, comprising good layout, attractive design, well-managed shopping facilities and efficient pedestrian connections with the surrounding district context, enhances MTR ridership. Successful development normally includes extensive pedestrian connections that are convenient, direct, safe and pleasant.
- (e) Integrated rail-property development projects tend to give higher property values. The analysis of some sample housing estates indicates that the additional premium ranges between HK\$98 and HK\$280 per sq. ft. gross floor area.
- (f) MTR affects urban development activities and encourages land owners to redevelop their land for higher-value uses.

How is the financial performance of the MTRC?

24. This study confirms the economic benefits of financial synergy and risk diversification generated from integrating railway and property development by the MTRC. It has the following key findings:
 - (a) Railway investment is not financially viable on its own. MTR achieves virtually zero rate of market return on its railway. Property development has been the only source of return of the company to meet the investors' demand for market return.
 - (b) The MTRC has much higher proportion of property revenues, lower debts and higher profitability than many of its private Japanese counterparts which jointly operate railway and property development business.
 - (c) The financial performance of the MTRC compared less favourably to that of the Kowloon Motor Bus (KMB) within the study period. This was largely due to the construction of public roads by the government instead of KMB, other contextual reasons (e.g. franchise and taxation privileges granted to the KMB) and the inherently different nature of the transport business (e.g. flexible adjustment of spatial coverage of bus routes versus fixed railway tracks).
25. If the MTRC were allowed to expand its railway network, or simultaneously provide franchised public bus services under the same policy terms and conditions granted to the KMB, the financial synergy arising from public transport and property could be much higher.

What are the external benefits generated by the MTR to the society?

26. Mass transit railways also create external benefits, which are values generated by the projects to the community but have not been internalized by the railway companies, including travel time saving, employment gains, environmental health benefits, property value increases and so on.
27. A recent MTRC study concludes that the proposed West Island Island/South Island Line project could generate an annual benefit of between HK\$2.6 and 3 billion per year. The existing MTR network of over 87 km obviously generates enormous external benefits to the society as a whole as it passes through the densely populated districts, major commercial and employment centres and carries large passenger loads.

What does the research literature tell us about the relationship between transit railway and property development in other parts of the world?

28. The research literature indicates that the impact of rail transit on property development and performance have mixed results in different cities. Local circumstances and property market conditions will affect whether railway can positively influence the property values and land use changes.
29. On the other hand, the positive influence of land uses on transit ridership appears to be less controversial in the research literature. Many research studies indicate that master-planned, high-density, mixed use and compact development can lead to higher transit ridership.

What are the 10 selected cities reviewed in this study? What are the key lessons from the review of their implementation of joint railway and property development?

30. This study has reviewed the experiences in 10 cities including Toronto, Washington, D.C., New York, London, Stockholm, Guangzhou, Shanghai, Beijing, Singapore and Tokyo.
31. The key lessons are:
 - (a) All railway operators in these cities (except Tokyo) are public bodies which are functionally, operationally and financially linked with the public authorities and the local governments. Tokyo stands as an exception with its privately run railway companies.
 - (b) Almost all of them operate other modes of public transport, e.g. public buses, in addition to metro railways. This has often made them the principal providers of mass transit services in the cities.
 - (c) Mass transit railway is unlikely to be self-financing on its own. Almost all of them have to rely on government subsidies. Japanese railway

companies rely on the profits from real estate to subsidize its railway operations, in addition to the generous government subsidies.

- (d) Property development is not normally their core business in other cities, except in Tokyo.
- (e) Strong economic growth and buoyant real estate markets are essential to support the construction of mass transit railway in the cities.
- (f) Government favourable policy support and the business strategy and acumen of the railway operators are important elements in determining whether they will be active and successful in engaging in property development business.

What are some key differences of the MTRC when compared with the experiences in these cities?

32. In comparison with international experiences, the MTRC model contains some unique features including:
- (a) The MTRC does not operate other modes of public transport, except the mass transit railway, making it a more focused transport company.
 - (b) The MTRC engages actively in property development and investment activities. However, unlike the case in Tokyo, it is not privately owned.
 - (c) The MTRC does not rely on government's subsidies to support its daily operations on a regular basis.
 - (d) Property related incomes play an important contribution to the MTRC operations.
 - (e) Operating on prudent commercial principle, the MTRC's market-oriented business strategy and approach ensures that it will only pursue financially viable projects (avoid purely public welfare projects) and set appropriate fare levels.
 - (f) Government grant of exclusive property development rights of the station sites to the MTRC and the arrangement of land premium payment by property developers eliminate the land holding costs of the corporation. These relieve a major financial burden on the MTRC in the process of land banking and acquisition.

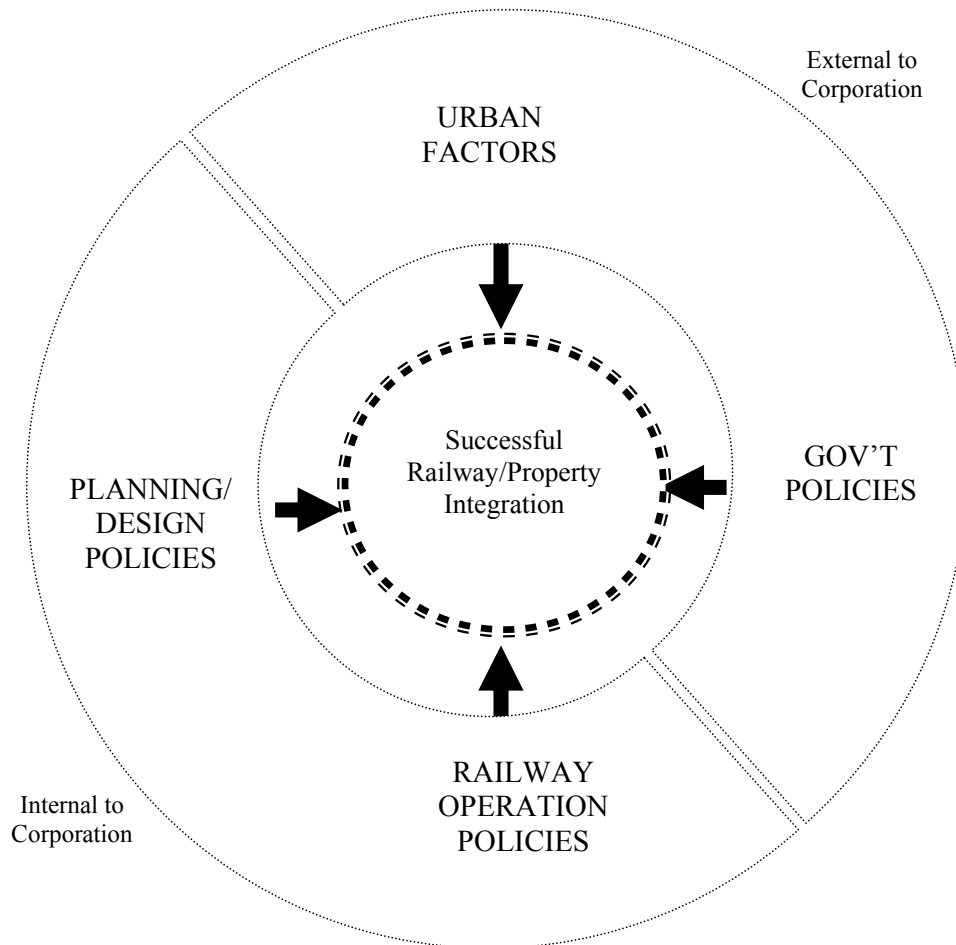
What implications can this study draw on the Linear City concept recently proposed by the KCRC?

33. This study has raised some concerns about the Linear City concept which proposes the development of ‘single’ types of land use nodes and their spatial separation by railway stations because:
- (a) Mixed land use development on and around transit stations is an important element contributing to railway ridership. Single land use development works against the concept of transit-oriented developments (TODs).
 - (b) High-density development is another crucial success factor. The proposed development of community facilities, entirely on its own, would not enable the railway operators to fully capture the land value associated with improved accessibility to the land around stations.
 - (c) Development of a single type of land use around stations does not increase railway ridership. It underutilizes the railway, creates undesirable one-way flow of traffic and generates inconvenience to the riders.
 - (d) There is a need for an extensive transport network that provides efficient feeder service to the railway.
 - (e) A good transportation system is to ‘minimize unnecessary transportation’. People should not be ‘forced’ to travel on the railway more than absolutely necessary especially because the facilities are deliberately not being located within their easy reach.

What are the critical factors and conditions conducive to the successful implementation of integrated rail-property development?

34. The benefit of integrated rail-property development does not come about naturally. It requires an appropriate institutional framework for successful implementation. This framework covers issues that are external and internal to the railway operator.
35. An institutional model (Fig. 7.2) is proposed that highlights the critical success factors to achieve such integration. The success factors are:
 - (a) Urban Factors
 - Healthy growth urban economy, especially a strong property market
 - The public is generally receptive to compact, high-density development and the use of public transit
 - (b) Government Policy Support
 - Supportive government policies in regional planning, land grant, high-density zoning around railway stations and urban growth management
 - Complementary public transport policies in controlling other alternative modes of transport such as automobile ownership, vehicle and taxation, parking, competing public bus services, transit subsidies, and so on.
 - (c) Railway Operations
 - Provision of safe, convenient and reliable transport service commensurate with its fare
 - Top-class management of railway services in terms of train frequency, transfer between different modes, cleanliness and security management.
 - (d) Property Planning & Design
 - High development density around stations
 - Attractive property/station design and land use mixes

Figure 7.2
Institutional Model: Successful Integrated Railway and Property Development



Source: Authors

Can the MTRC integrated rail-property development model be replicated in other cities?

36. Replicating the MTR above-station property development *projects* in other cities does not necessarily achieve the benefits of the integrated rail-property development model. Importantly, the model is not the same as the project; the model contains the policy, process, organization and finally the project.
37. Some external urban factors and complementary government policies are essential institutional factors in contributing to the success of the model.
38. The extent in which the success of the MTRC model can be replicated depends on whether all these essential components are in place.

Overall, what are the socio-economic benefits generated by the MTR integrated rail-property development model in Hong Kong?

39. The model generates the following social and economic benefits in Hong Kong:
- (a) Increase MTR ridership, reduce road traffic and thus lessen the need for more road construction (and reclamation)
 - (b) Enable comprehensive planning and development of the station site and increase its overall property values
 - (c) Concentrate land development and urban activities around the stations and reduce urban sprawl
 - (d) Promote walking with the provision of safe, direct, efficient, convenient, weather-free and pleasant pedestrian connections with the stations
 - (e) Enhance diversity of land uses and urban life
 - (f) Enable travel time saving and road safety benefits
 - (g) Create positive impacts on property values within the railway catchment
 - (h) Generate financial gains to the government in terms of increasing property rates, taxes and land premiums
 - (i) Achieve financially sustainable railway development and operation without the need of public subsidy
 - (j) Enhance environment health benefits in terms of reduction in roadside pollution (as a result of less road traffic), decrease in government medical expenditure and productivity gains (due to healthier workforce)
 - (k) Encourage rejuvenation and redevelopment of the older urban areas along railway catchment
 - (l) Provide possible increase in employment opportunities

- End of Executive Summary -

1. Introduction

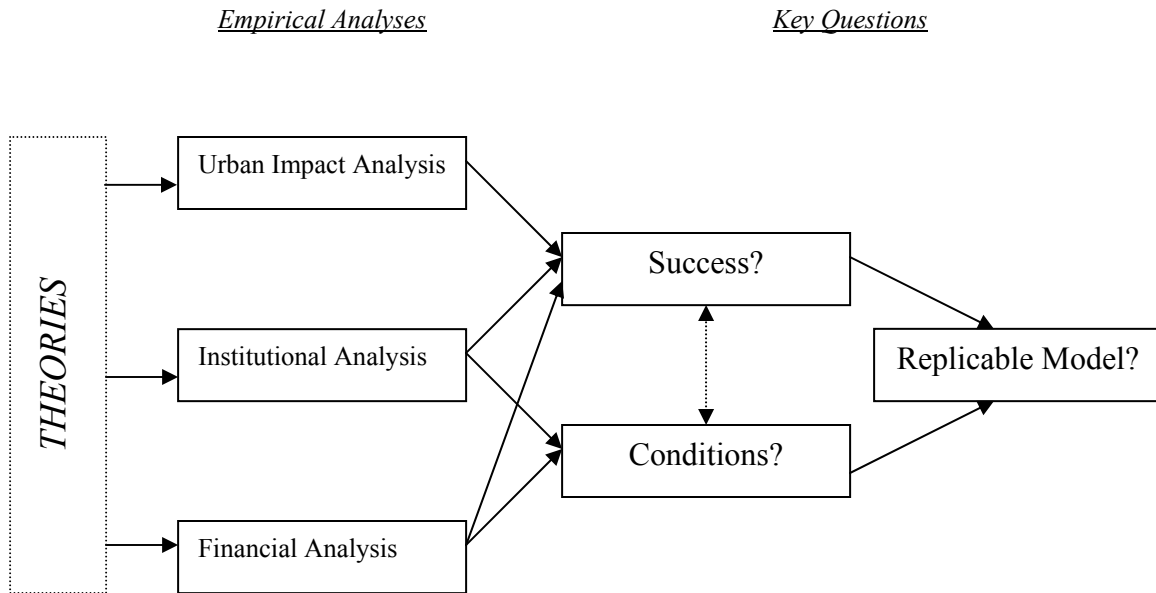
Background

- 1.1 In September 2003, the MTR Corporation (MTRC) approached the Research Centre for Construction & Real Estate Economics of The Hong Kong Polytechnic University with a request to undertake a study of an essential element of its business operations. This element is referred to as the ‘integrated rail-property development model’, which entails an integration of urban mass transit railway and high-density property development at the station areas. This unique Hong Kong model has achieved high regard internationally. Many Mainland Chinese cities have shown a keen interest in adopting this model for building their urban mass transit systems.
- 1.2 The study formally commenced on 24 September 2003. It was completed by the end of May 2004.

Study Objectives & Framework

- 1.3 The MTRC wants this systematic study to ascertain the impacts and benefits generated by this development model. Specifically, the main objectives of this study are to:
 - (a) explore how the MTR integrated rail-property development model has effectively contributed to the urban development of Hong Kong;
 - (b) examine the critical success factors and conditions conducive to the implementation of this model in Hong Kong; and
 - (c) determine how this unique model can be successfully replicated elsewhere, especially in the Mainland Chinese cities.
- 1.4 The apparent success of the MTR integrated rail-property development model can be examined from both theoretical and empirical perspectives. Figure 1.1 illustrates diagrammatically the study framework. The idea is that, if the MTRC model is a replicable model, it should demonstrate how it works in theory, in what way it has been successful and the conditions under which its desirable outcomes can be made possible.

Fig. 1.1
Study Framework



Scope of Study & Research Questions

1.5 This study is focused on three major aspects:

- (a) **Urban Impact Analysis** – This part of the analysis examines some key interrelationships between land use changes and MTR in Hong Kong. It addresses the following questions: (i) how the mass transit system influences urban land development; (ii) how the land use characteristics benefit ridership of the mass transit railway; and (iii) how the synergy is created through the integration of railway and property in terms of social and economic benefits. The study findings in these aspects will help to identify and quantify some of the key impacts of the MTRC on urban development of Hong Kong.
- (b) **Institutional Analysis** – Due to different institutions, the empirical implications of the urban railway system remain varied in different cities. ‘Institutions’ refer to the contextual factors, the agency interests, the formal rules of the game and informal practices in influencing human and organizational behaviour in the society. Informed by the new institutional economics theories, this part of the analysis will emphasize, amongst others, the importance of property rights systems and government regulatory framework in creating and capturing values in social and economic transactions. Specifically, the study has examined the prevailing institutional

arrangements of the MTRC in relation to the aspects and processes of land leasing, joint development with the private developers and co-operative planning with the government. It has expanded the review of the experiences in selected overseas and Mainland Chinese cities. The objective is to identify the essential public policy elements and action framework for planning and property development, which constitutes the unique MTRC model in Hong Kong, and the results of not having such an integrated approach.

- (c) Financial Analysis – Property and transport are the two key elements in financing the operations of the MTRC urban rail development model. This study has examined the financial aspects of the company, illustrated how the mass transit railway and property development/investment have been contributing to its value, competitiveness and profitability, and identified the synergy when integrated railway and property business are carried out by one single entity, the MTRC.

Report Structure

1.6 Following this Introduction, this report is divided into six sections:

- (a) Section 2 provides a brief outline of the key business characteristics of the MTRC, its property development process, the government's relevant policy setting and the essential components of the integrated rail-property development model in Hong Kong.
- (b) Section 3 introduces the theoretical justifications behind the integrated rail-property development model.
- (c) Section 4 identifies some major beneficial impacts of the MTR's model in urban development of Hong Kong.
- (d) Section 5 discusses the financial performance of the MTR.
- (e) Section 6 reviews the literature about similar experiences internationally and examines such development in 10 selected cities in other parts of the world.
- (f) Section 7 concludes the study, summarizes the key benefits of the model and identifies the essential institutional factors leading to its successful operation and implementation.

2. MTRC: Background

Company Background

- 2.1 The MTRC is a highly reputable and profitable company. In 2003, its net profits reached HK\$4,450 million, an increase of 24.3% over 2002 (MTRC, 2004), and its credit ratings have consistently achieved the investment grades. Established since the mid-1970s, the MTRC has carried out its missions of constructing and operating, on prudent commercial principles, a mass transit railway, which now constitutes an integral part of the public transport system in Hong Kong. The Hong Kong Special Administrative Region (HKSAR) Government was the sole owner of the MTRC until October 2000, when about 23% of its shares have been privatized and traded in the stock exchange. Hong Kong MTR is undoubtedly one of the most successfully built-and-operated infrastructure projects by the world standards.
- 2.2 The HKSAR Government has committed to maintain not less than 50% shareholding in the Company for at least 20 years from the date of the initial public offering in October 2000. The MTRC shall continue to be perceived by the capital market as a public company. The risk premiums demanded by the debt investors should not be more than what is commensurate with the sovereignty risk of the SAR itself. The company was the first in Hong Kong to obtain international credit ratings, and has since then enjoyed the same ratings as the Government itself from Moody's, Standard & Poor's and R&J.
- 2.3 Opened since the late 1970's, the MTR has significantly transformed the intra-urban travel patterns in the territory. With a total route length of over 87 km, the MTR connects the airport and the densely populated corridors in the urban area (Fig. 2.1). In 2003, it carried over 2.24 million passengers during an average weekday. This patronage took up around 24.3% (second to bus services) of the total market share within the franchised modes of public transport in Hong Kong (MTRC, 2004).
- 2.4 Apart from railway operations, the MTRC has also engaged in property development. Real property is expected to contribute to the business of the MTRC in two ways. First, it provides an important source of income to finance the construction of the railway projects¹. Second, the completed property development creates immediate population catchment areas that contribute to the patronage of the railway. In joint venture with the private developers, the MTRC has been undertaking development of many high-density residential estates and up-market commercial projects in the territory (Table 2.1 and Appendix I). It has established a track record not only for planning but also managing the property development process on railway station areas.

¹ According to Gold (1976), the MTRC initially planned to use property to add 25% to the railway revenues.

Figure 2.1
MTR System Map



2.5 The MTRC is holding some of the completed property developments for long term investment and it also provides property management services². The total value of its investment properties amounted to about HK\$14.2 billion and its net rental income reached HK\$684 million in 2003 (MTRC, 2004). The company has now become an established prominent player in the local property market.

Table 2.1
Property Development Overview: Summary (as at April 2004)

Line	Current Development Status	Residential (no. of units)	Commercial / Shops G.F.A. (sq.m.)	Office G.F.A. (sq.m.)	Hotel/Service Apartment G.F.A. (sq.m.)	Government Institution & Community Area (sq.m.)	No. of Carparks
Urban Lines	Fully completed*	29,045	369,396	153,139	-	122,092	5,045
Airport Railway	Partly completed	28,960	307,880	611,968	291,722	N.A.	N.A.
Tseung Kwan O Lines	Partly completed	29,144	135,814	103,130	N.A.	N.A.	N.A.

* Notes: Except Choi Hung Station Development which involves one residential block.

Data Source: MTRC

² As at 31 December 2003, this property portfolio included over 174,700 sq.m. of commercial and office space and about 4,190 car parking spaces. The company was providing management services for some 46,915 housing units and 558,796 sq.m. of commercial and office floor space (MTRC, 2004).

Profits & Achievements

- 2.6 Property development and investment have made significant contributions to MTRC's profits. Table 2.2 below shows that the portion of operating profits from property development has increased from 30% in 1998 to nearly 60% in 2003.

Table 2.2
MTRC Operating Profits

	1998	1999	2000	2001	2002	2003
Total Operating Profit (\$ m)	4720	5523	7290	7301	7769	9116
Operating Profit from Railway and Related Operations (% of Total)	70	63	54	56	52	41
Operating Profit from Property Development (% of Total)	30	37	46	44	48	59

Source: *MTRC Annual Report*, various issues.

- 2.7 The MTRC has thus been engaging in three core business activities: (a) the provision of mass transit railway (including its design, construction and maintenance), (b) property development, and (c) property investment and management. The first two core activities are particularly capital intensive. It is therefore not unexpected that the company has quickly become the 10th largest stock in the Hang Seng Index after its initial public listing on the Hong Kong Stock Exchange since October 2000³.

MTRC Property Development Process

- 2.8 A special, if not unique, feature of the firm is that it is “operating on commercial principles and financing on its own terms”⁴. To make this a reality, the company has to rely heavily on the property-related sources of revenue. In other words, property development is used to subsidize construction and development of the railway.
- 2.9 According to MTRC (2000), the typical development process normally involves the MTRC to plan the alignment of the railway line with the government and assess the construction costs. The company will then discuss with the government the related property development opportunities that enhance the rate of return on the overall investment. The project agreement between the MTRC and the government for the construction of the railway line typically contains the undertakings from the government to grant land for property development at identified sites along the

³ Its market capitalization, as at 31 December 2003, amounted to HK\$54,209 million (MTRC, 2004).

⁴ In a study conducted by the Legislative Council of Hong Kong (Liu, *et al.*, 1996) on the mass transit systems in six cities (Osaka, Seoul, Toronto, London, Singapore and Hong Kong), only Singapore and Hong Kong were found to be “operating on commercial principles”. Further, unlike Singapore where the construction cost was borne by the government, the mass transit system here is “financing on its own terms”. According to the international surveys done by Barron *et al.* (2001), Hong Kong is the ‘lone exception’ that government capital grants do not cover a major portion of its capital costs. The government only injects equity capital and requires a market return on the MTR operations.

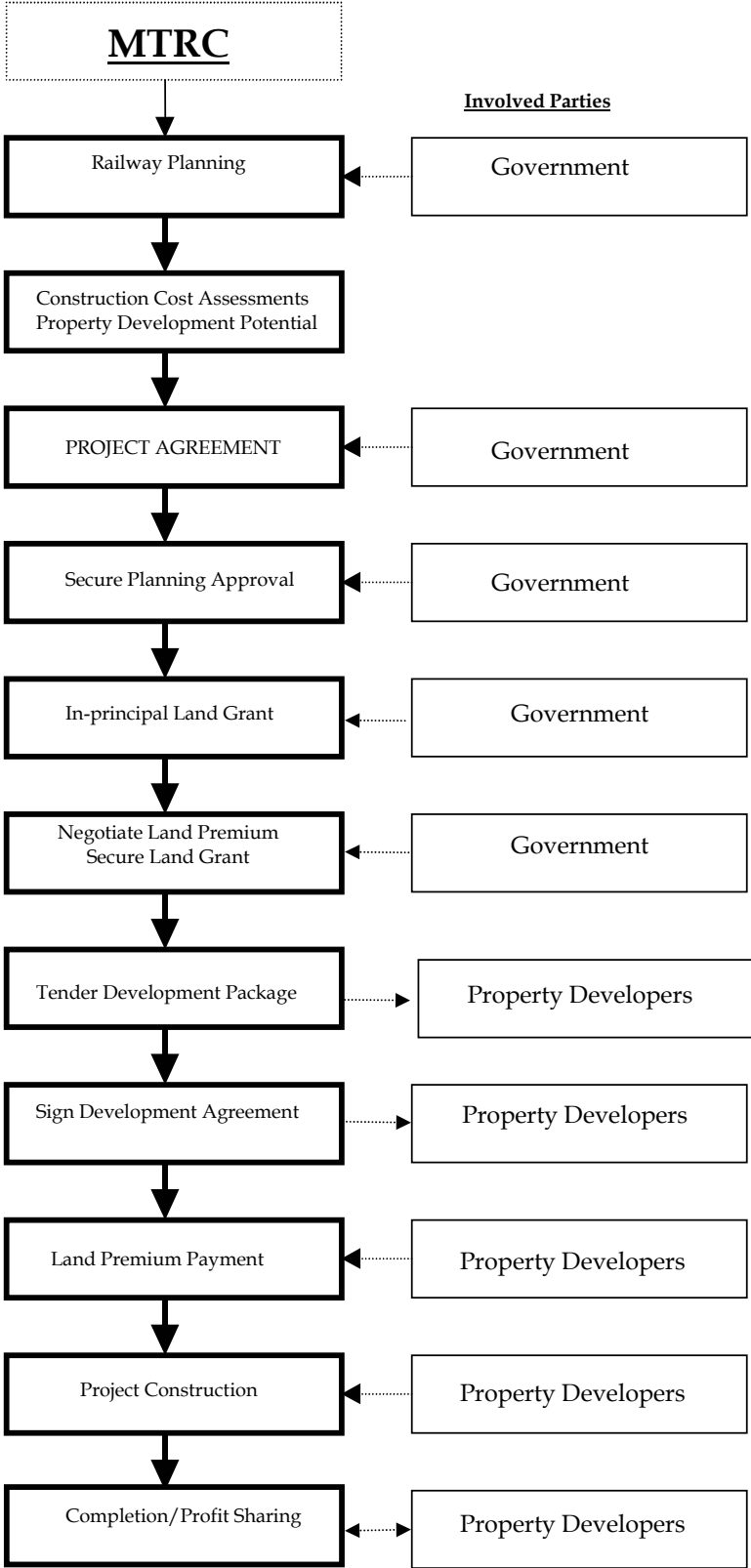
alignment. The company will apply for and obtain all the necessary statutory planning approvals for the developments and negotiate the terms of the land grants with the government.

- 2.10 Private developers are solicited by the MTRC as the partners in implementing the projects. The development packages are offered to the developers through public tenders. Tender packages normally contain a design scheme prepared by the company to assist developers to respond to the tender and, if awarded, to implement the development⁵. Successful private developers are responsible for the detailed design of an awarded development package in accordance with the specifications of the development agreement with the MTRC. The MTRC will carry out the civil works and enforced the technical control standards and requirements for interfacing between its railway premises and the property development⁶. The property developer is responsible for all development costs, including the land premiums, construction costs, finance costs, professional fees, marketing costs, and expenses related to the selling and leasing of the completed properties.
- 2.11 The MTRC derives economic benefit from property developments through profit sharing with the developers in agreed proportions of any cash profits from the sale or lease of the properties, the sharing of assets in kind, or through up-front payments from developers. A 'no cash, no risk' approach has been adopted in its joint venture partnership with the developers (Cheng, 1988). The MTRC will not allow the property interests to be used as collateral by the developers to seek finance. Equally, the MTRC will not be liable under the joint venture agreement to any losses arising from the development. The developers have to take up all the losses.
- 2.12 Figure 2.2 summarizes the key aspects of the above typical development process in a graphical form.

⁵ Typically, there are four broad stages in the development award process: (a) Shortlisting stage: Interested parties are invited to submit, for evaluation, an expression of interest together with the details of their corporate structure, development experience, marketing and management abilities. The MTRC will then draw up a short-list of developers. (b) Consultation stage: Short-listed developers are then briefed on the details of design and master layout plan and any interface between the railway and property development works. (c) Tender invitation: Short-listed developers are further invited to submit tender proposals for the development packages. The selected tenders are then invited to submit offers. (d) Award: Following the completion of the tender process, the terms and conditions of the development agreement will be finalised and a property development contract is entered into between the company and the successful developer.

⁶ The MTRC, being the grantee of the land, remains primarily responsible for the fulfilment of all the conditions and obligations under the land grant for the development. Such conditions and obligations include the type and quality of the development that must be built, the government facilities to be provided, the completion date of the project and the payment of the land premium (for which developers are responsible under the terms of a typical development agreement).

Figure 2.2
MTRC Property Development Process: Key Aspects



Source: Authors

Government Position about MTRC Property Development Rights

2.13 The government's grant of exclusive property development rights of the station areas to the MTRC is an essential part for implementing integrated rail-property development projects in Hong Kong. In defending this policy, the government has put forward the following reasons and arguments about the benefits of this approach (Transport Bureau, 1999):

- (a) The government considers it necessary, for planning, safety and technical reasons, to allow property development above railway stations and depots, and on land adjacent to the railway, as an integral part of the railway development.
- (b) The 25-year of MTRC experience in designing and constructing property above railway station presents the most effective use of resources.
- (c) Most optimal planning, development and utilization of the station site is possible under a coordinated approach that ensures the timely and efficient completion of the necessary infrastructure and property enabling works such as foundations, utilities trenches and internal roads.
- (d) With a single entity managing both the property development and the railway, a clear definition of responsibilities can safeguard the safety and operational aspects of the railway and a proper management of the interface between property development and the railway.
- (e) The MTRC's involvement in sharing the profits from property development helps to discipline the corporation financially and enables it to fund and operate the railway system on a commercially prudent principle without the need for government subsidy⁷.
- (f) An alternative approach that involves separate government disposal of the property development sites to the developers could have a depressing effect on the land premium bids because the developers may factor into their bids additional costs relating to the coordination with and possible

⁷ Transport Bureau (1999:2) states that 'property development right is not a form of subsidy to MTRC. A subsidy consists of either Government expenditure or revenue foregone. The grant of property rights to MTRC, on the other hand, does not come into any of these categories as full market premium for the land is charged.' These statements are not, strictly speaking, correct. To obtain the development rights, the MTRC is required to pay the government a land premium based upon the current market value or the resumption costs incurred by the government, whichever is the higher. A favourable government policy is laid down for land premium assessment for the MTRC property projects. Under this policy, the amount of land premium payable by the MTRC would be assessed on a full market value basis, however, ignoring the presence of the railway for the first land grants for property development rights in relation to each new railway project. This implies that the additional land value embedded in the improved railway accessibility to the development has been waived by the government. This is a kind of potential government revenue foregone. However, it is fair to say that, in order to capture this additional value, the MTRC is required to carry out careful planning and development of its property projects, especially the integration with the railway.

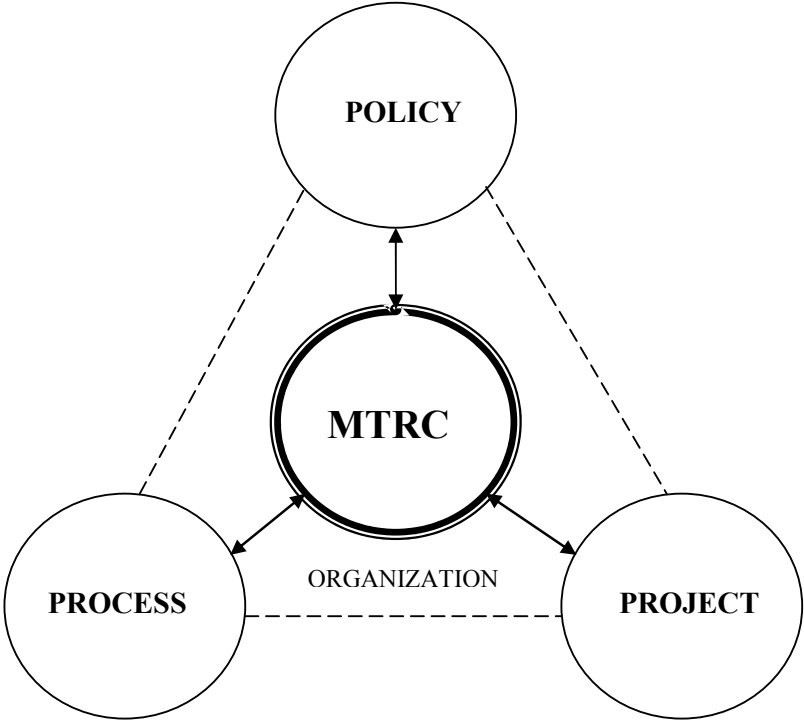
claims from the railway operator. This approach does not necessarily secure a higher land premium bid than that of the current MTRC approach.

- (g) Should the government be required to follow this alternative approach of separate land disposal and then earmark the sale proceeds for the specific purpose of the MTRC railway projects, such kind of funding provision would amount to a hypothecation of the General Revenue and this would contradict the statutory principles laid down in the Public Finance Ordinance.

Conclusions: MTRC Integrated Rail-Property Development Model

- 2.14 Thus, an integrated rail-property development model is more than a simple combination of railway and property. Importantly, it is *not* the same as the integrated railway and property development above stations; these are only the *outcomes* of the model. Instead, this study argues that the model represents a unique approach in handling the relationship between railway and land development.
- 2.15 Based upon the above background, there are four principal elements that make up the MTRC's approach of implementing integrated rail-property development project successfully in the context of Hong Kong (Figure 2.3). These four elements include:
 - (a) Policy: Favourable government policy support in terms of its exclusive land grant to the MTRC and its commitment in mass transit railway as an essential mode of public transport.
 - (b) Process: Superb planning, management and control procedures and effective development processes that seek to maximize the synergy between railway and property from the stages of project inception to completion.
 - (c) Project: Development of high-quality real estate projects that integrate well with the railway facilities at the appropriate locations and at the right timing.
 - (d) Organization: A well-experienced and efficiently managed company that is committed to providing world class railway services and developing top-quality property development projects in order to enhance the quality of life in Hong Kong.

Figure 2.3
MTRC Integrated Rail-Property Development Model: Key Elements



Source: Authors

3. Theories & Applications

Introduction

3.1 This section addresses three questions. These are as follows:

- (a) What is the theoretical basis that explains the benefits associated with the integration of railway and property development?
- (b) Why, in theory and practice, should the ‘integrated rail-property development model’ be implemented by a single entity like the MTRC?
- (c) Why is this preferable to an alternative approach in which the integrated development project is implemented separately by government disposal of individual land parcels for property development by the developers and for railway construction by a transport agency?

Benefits of Integrated Development Model

3.2 It is nothing new to say that urban land uses and transport facilities should be integrated. From a theoretical perspective, an integrated railway and property development model is expected to generate the following key social and economic benefits:

- (a) *Railway* - Urban rail transit will significantly improve the accessibility of the land around the stations and hence increase its values. By capturing these values through property development and other means, the railway operator can finance the construction of the urban railway.
- (b) *Property* - Intensification of development density of the land around railway stations provides a large amount of floor space to support more residents and higher intensity of urban activities, which will in turn improve the ridership of the transit railway and its operational viability.
- (c) *Government* - The government can receive financial gains in terms of the land premiums generated from property development of the station sites, a higher level of rates from private properties with improved accessibility and other monetary returns on railway operations (if owned by the government). Furthermore, the government is not required to subsidize the operations of the railway, if the latter can be financially sustained by a large pool of transit riders within the catchment areas.
- (d) *Society & Economy* - Society at large achieves a more sustainable form in terms of the compactness of urban development, more efficient use of

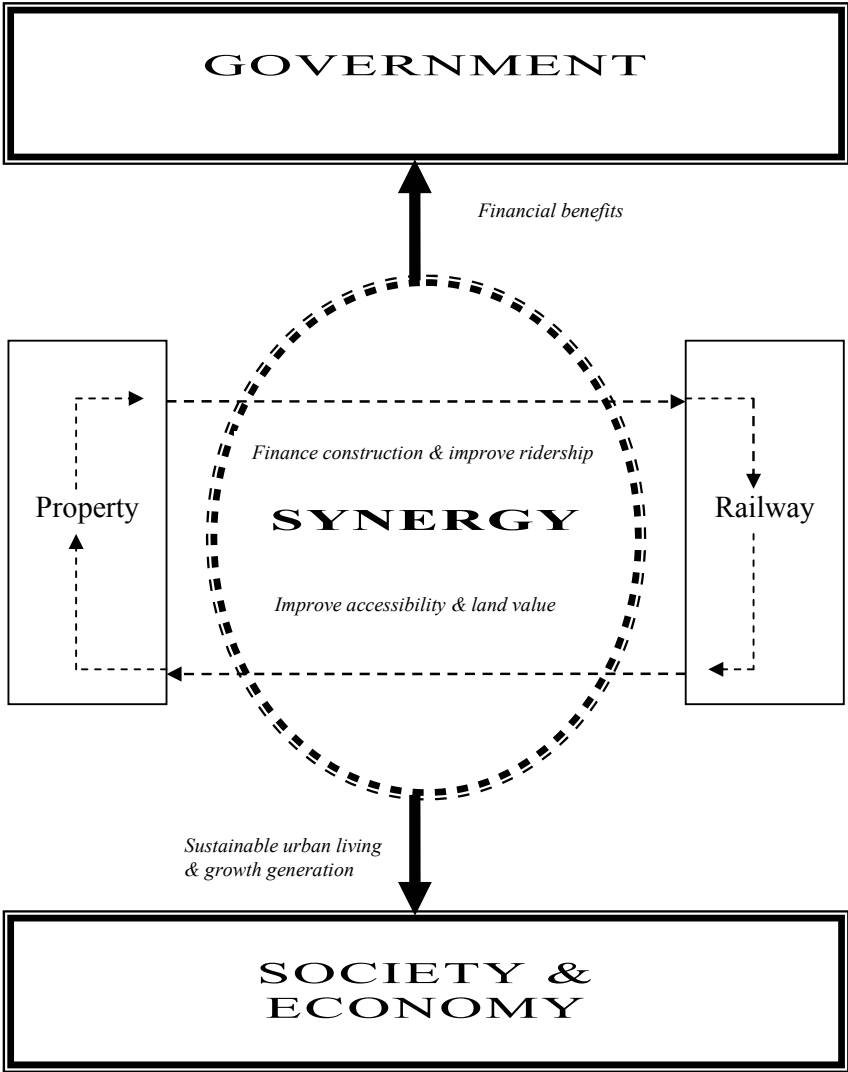
scarce urban space, more open space, less urban sprawl, fewer roads, reduced air pollution from cars, and improved pedestrian-friendly environment. All these features can enhance the overall quality of urban life characterized by improved health, better convenience, greater diversity of life style and more time saving. The economy will equally be benefited as a result of the improved efficiency in transport and human activities.

- 3.3 The benefits of this model, resulting from the synergy of the integration between mass transit railway and property development, are graphically illustrated in Figure 3.1.

Synergies between Transport & Real Estate

- 3.4 Under land economics perspective, accessibility provides the fundamental concept underlying the positive relationship between transportation and land use. When accessibility is improved by more efficient transport facilities, movement of goods and people becomes less costly in terms of time and money, and thus the costs of transport decline. The development of a railway line improves accessibility to the land within its service corridor relative to other areas and hence increases its locational advantage. Economic location theories suggest that, when other factors remain the same, social and economic activities will shift towards the nodes along the railway service corridors and such shift will tend to increase their land values (Harvey, 1996; O' Sullivan, 1996).
- 3.5 Higher land values will encourage intensification of development densities. According to the economic theory of substitution, higher prices of a resource will lead to a reduction of its consumption and encourage an increased use of its substitute. In the context of land development, when the price of land increases, the less of it will be used in proportion to other factors such as capital. Landowners and property developers will seek to use the same amount of land more intensively in order to compensate for its higher per-unit land cost. This implies the development of more floor space (higher floor area ratio) and/or higher-value land uses (such as office and commercial) on the more expensive sites. Thus, transport investment is expected to generate some impacts on urban form.

Figure 3.1
Synergy of Integrated Railway and Property Development Model



Source: Authors

- 3.6 The private market has never been slow to exploit the opportunities arising from the synergistic interaction between transport and real estate. For instance, according to Bernick and Cervero (1997: 38) :

‘real estate syndicates built most of America’s early electric streetcar lines. Trolleys and real estate projects were often bundled together. Transit itself was usually a loss leader that allowed huge windfall profits from land sales. Many rail lines were overextended in pursuit of speculative profits, leaving streetcar operators with huge debt loads and unprofitable services. Frequently, public utilities companies acquired streetcar systems from real estate syndicates in the 1910s and 1920s, seeking to monopolize the market for electricity sales. These electric traction companies, however, were often forced by the local authorities to extend lines to sparsely populated areas that could not support transit and to charge low fares, often a nickel. Many were unable to withstand the economic pressures brought on by the Great Depression and antitrust rulings that forced public utilities to divest themselves of streetcar holdings. From 1929 to 1934, streetcar operations folded in some 250 U.S. cities.’

- 3.7 While the performance of integrated real estate and transit rail development in the US may appear lackluster, such integration has borne fruit in some other western cities such as Stockholm, Singapore, Toronto and Tokyo (see section 6). For instance, according to Bernick and Cervero (1997: 307-329), private large consortiums have built and operated nearly all suburban rail lines in Tokyo. These consortiums began their business in railway and then moved into other related businesses including real estate, bus transport, electricity supply, construction, department stores, entertainment and education. Rail operations generate very modest returns to these consortiums. Most profits came from real estate development. For instance, the largest rail-based consortium in Japan, the Tokyu Corporation recorded 59% of its profits from real estate (only 26% of the total revenue) and 47% from railway (35% of revenue) in 1990 (Bernick & Cervero, 1997:314). These consortiums have demonstrated the full exploitation of increasing land value opportunities from the integration between railway and real estate. Such integration enables the Japanese consortiums to finance the rail investments and promote rail ridership that sustains the railway operations in the long run.

Value Capture as Financing Mechanism

- 3.8 ‘Value capture’ is the mechanism that seeks to re-capture some of the windfall benefits from rail transit stations and re-direct them to finance the construction and operations of the rail system. It rests on the logic that increased traffic volume and improved accessibility generated by a rail system enhances the value of the land by virtue of its location. As the windfalls so conferred upon the land come from social investment rather than individual effort, ‘society has a principled right to its claims’ (Batt, 2001:218). When the ‘unearned increment’ of land value is captured by the public authority and channeled to public uses, this will help reduce the corresponding public expenditures in transit investment (Callies, 1979).
- 3.9 In the light of the heightening government budget constraints, Batt (2001) argues that value capture provides a ‘painless opportunity’ and ‘promising approach’ to finance

capital infrastructure such as public transit development, and recurrent fee revenues should then be used to recover operating expenses and environmental costs. It is suggested that land values may rise as much as 25% due to public transit for land within walking distance to stations (typically ¼ mile in the US), and may be even higher if allowing greater development density. Re-capturing these added values by the public authority could be in the form of ‘rents’ to service the debts or to fund the operating expenses of the railway. By levying a tax on the windfall gains from the surrounding private land owners, this is considered administratively simple, efficient and compatible with all sound taxation principles. Land value capture techniques can take many different forms, ranging from charges on benefiting private properties, joint venture with the private sector, user charges and marketing and merchandising approaches (Johnson and Hoel, 1985). Table 3.1 provides a list of these different forms and the techniques.

Joint Development

- 3.10 Joint development, which represents one of the value capture techniques, is particularly appealing to urban planners and policy makers. Joint development, as defined by Cervero (1994a) in the US context is:

‘any formal, legally binding arrangement between a public entity and a private individual or organization that involves either private-sector payments to the public entity or private-sector sharing of capital or operating costs, in mutual recognition of the enhanced real estate development potential or higher land values created by the siting of a public transit facility’ (Cervero, 1994a: 83-4)

- 3.11 Joint development is operated on the principle of ‘quid pro quo’. (Landis et al., 1991:432). Developers obtain the right to develop station land for private property by contributing to the costs of developing the transit facility or making direct payments to the transport operators. In the US, their payments can be in the form of one-off capital contributions, annual lease incomes and/or impact fees. Connecting land uses with transit facilities in a joint development is regarded as a win-win deal for transit operator, transit riders, private developer and public authority¹.
- 3.12 By enabling public-private partnership, joint development does not only allow a possible recovery of the transit capital costs (Cervero, 1984), but it also provides the opportunities for implementing a comprehensively master-planned land development project that improves urban design and quality of life, promotes economic growth, enhances infill redevelopment and ultimately achieves a sustainable urban environment (Urban Land Institute, 1979).

¹ According to Landis et al. (1991), the concept of joint development in the US was used to help fund federal highway projects in the 1950s. Initially, the ‘joint’ idea was intended for the integration between different federal programmes, not between private and public sectors. It was the Reagan regime that expanded this concept with a view to implementing budget cuts and reducing reliance on federal operating subsidies for transit investment.

Table 3.1 Typology of Value Capture Techniques

Category	Technique	Description
Charges on Benefiting Properties	Connector Fees/ Service Charges	Charges to neighbouring owners for connection to the transport facilities
	Negotiated Investments	A negotiated sum from developer contributing towards public improvement that benefits his property
	Special Benefit Assessment Districts	A tax or charge levied on the property within a defined district that receives direct benefit from public transport investment
	Tax Increment Financing	To fund public projects by increases in property tax revenue
	Transit/Traffic Impact Requirements	Requirements imposed on developers to mitigate or compensate for his development that generates additional public transport investment
Joint Ventures with Private Sector	Land/Air Rights Leasing	Transit operator to lease land-based rights to developers
	Donations	Contributions from private sector
	Cost Sharing	Developer to share the capital and/or operating costs of transport facilities in exchange for development rights
User Charge	Motor Vehicle Taxes and Fess	Fees and taxes on vehicles
	Tolls	Charges on use of transport facilities
	Commercial Parking Taxes	Taxation on parking lot owners
	Taxes on Motor Fuels	Gasoline taxation
Marketing and Merchandising Approaches	Advertising/Marketing	Leasing of space for advertising uses
	Concessions	Provision of manned retailed outlets within transport system and/or mechanical devices e.g. telephone booths.

Source: Johnson and Hoel (1985).

- 3.13 The model of joint private-public development is expected to facilitate the implementation of a new form of urban development, known as ‘new urbanism’ or ‘smart growth’, which opposes reckless and excessive expansion of the built-up areas into greenfield sites. Renne and Newman (2002) argue that financing is the main obstacle to achieving a sustainable urban development form, which comprises pedestrian-friendly, denser and mixed land uses served by efficient transit rail. Value capture, according to them, provides the means for the public authority to generate revenues from a transit-oriented development. Public authority also plays an instrumental role to expedite the time of approval and hence reduce the risks of the private developers. They thus conclude that:

‘The potential to tap land development funds for transit systems is enormous and can provide a missing link for the smart growth movement.’ (Renne & Newman, 2002: 28).

Towards Sustainable Urban Form & Living

- 3.14 The current movements towards ‘new urbanism’, ‘compact city’ and ‘smart growth’ in many western cities reflect an increasing dissatisfaction of the people about the existing relationship between transport technology and urban form. According to Schaeffer and Sclar (1975), the earliest urban settlement began as a ‘walking city’ dominated by walking and compact land use development, gradually evolved to become ‘tracked city’ in which rail transit facilitated development along the radial corridors, and finally ‘the rubber city’ in which automobile travel became popular and hence supported rapid urban sprawl and further expansion.
- 3.15 Many major world cities, like New York, Chicago, Philadelphia, London and Paris, all grew up with fixed-rail commuting. In the US, construction of electric streetcar lines in the early 1900s led to suburbanization and massive spatial decentralization in many US cities such as Boston, the San Francisco Bay Area, and southern California (Warner, 1962; Vance, 1964; Fogelson, 1967), physical separation between living places and workplaces and spatial segregation of social classes (Schaeffer & Sclar, 1980; Middleton, 1967). American mass transit sector has experienced its ups and downs during the twentieth century. Rising household income, massive growth of car ownership and changing lifestyles during the 1920s and 1930s led to the emergence of auto-oriented suburbs to replace transit-oriented ones. The role of mass transit in the US is under threat as a result of deregulation, rising fares, public disinvestment and spatial decentralization of activities (Cervero, 1998)².

² According to Bernick and Cervero (1997 :40), increasing popularity of car ownership and preferences for middle-class lifestyle since the 1920s threatened the financial viability of US rail transit systems. In 1964, under the Kennedy administration, the federal government was brought in for injecting fund to support the municipalities to purchase the transit systems and upgrade them over 10 years. As a result, the public ownership of mass transit services in the US increased from 28 per cent in 1950 to 70 per cent by 1970. In 1970, new federal money was injected to expand the systems under the Nixon administration. The deficit-ridden transit sector was able to secure capital assistance, financial subsidies and political support from the Washington government throughout 1970s. However, the Reagan administration since the late 1970s began to slash federal financial aids, and shifted the responsibilities to the local governments.

- 3.16 Nowadays, environmental awareness and energy concerns are causing the public, urban planners and policy makers to re-think seriously about the drawbacks of auto-oriented cities. Increasing traffic congestion, despite massive public investment in highways construction and building of roads, is encouraging a renaissance of transit rail commuting (Bernick and Cervero, 1997: 15-72). It is timely to re-visit Lewis Mumford's (1963: 235) warning about the increasing surge of highways and use of automobiles in cities:

‘What’s transportation for? The purpose of transportation is to bring people or goods to places where they are needed and to concentrate the greatest variety of goods and people within a limited area, in order to widen the possibility of choice without making it necessary to travel. **A good transportation system minimizes unnecessary transportation.**’ [Emphasis added.]

- 3.17 This provides the philosophical basis in supporting the intensification of development around transit railway stations. Similarly, Kelly (1994:143) explains the need for a sensible, comprehensive integration of transport and land uses:

‘... too many of us spend too much time stuck in traffic. Clearly, building more highways will not solve that problem in a growing metropolitan area. Part of the solution must include a reduction of the automobile dependence of cities. That can only happen with **truly comprehensive planning** that creates neighbourhoods as well as metropolitan areas suited to the use of multimodal transportation systems, and that simultaneously creates attractive and efficient multimodal transportation systems to serve the people living there.’ [Emphasis added.]

- 3.18 Transit-oriented development (TOD) is regarded as a desirable built form in contemporary cities. According to Calthorpe (1993), TODs are mixed uses, pedestrian friendly development located within walking distance of transit stations. Similarly, Bernick and Cervero (1997: xi) define TOD (or transit village) as ‘the organizing principle for creating places – built environments, social environments, and economic environments – that embrace and evolve around mass transit systems’. It therefore brings together ‘the disciplines of urban design, transportation and market economics’ in order to create a built environment that encourages more public transit ridership, enhances mobility, promotes public safety and civic pride, and possibly revitalizes the neighbourhood (Bernick & Cervero, 1997: 5-7).

- 3.19 TODs are places that best exploit the synergies between railway and property. According to Bertolini and Spit (1998: 35-43), they are ‘urban exchange complexes’ which concurrently deal with both transport and urban development uses; which satisfactorily manage the conflicts between ‘node-based’ and ‘place-based’ activities between people moving and people staying respectively; and which turn the transit station into a ‘place to be’ rather than ‘a place to pass through’.

- 3.20 Bringing all these TODs together at the city level achieves what Cervero (1998) call a ‘transit metropolis’. According to him, a transit metropolis represents ‘a built form

and a mobility environment at the city-wide level where transit is a far more respectable alternative to traveling than currently' and 'an environment where transit and the built environment harmoniously co-exist, reinforcing and enhancing each other in the process' (Cervero, 1998: 4).

New Institutional Economics

- 3.21 All the above discussion illustrates that the concept of integrating real estate and mass transit railway development is theoretically sound, socially desirable and economically attractive. However, does it have to be implemented by a single entity like the MTRC in Hong Kong? Can the same results not be achieved by separate implementation agents?
- 3.22 New institutional economics provides the most appropriate theoretical framework in analyzing these questions, which depict two different institutional forms in organizing changes in the urban built environment. This school of thought is related to the work of the economic giants like Ronald Coase, Armen Alchian, Oliver Williamson, Douglas North and others who focus on the analysis of 'transaction costs', 'property rights' paradigm and 'institutional changes' in the society.
- 3.23 In essence, new institutional economics refer to the ideas of using neoclassical economic theories to explain economic and social institutions such as government, markets, firms, and urban planning. It is often thought of as closely associated with the Chicago School that use economic theories to explain the various social dimensions of human society and is the exact opposite of the old American Institutional School which seek to apply other social science theories into economic discipline (New School University, 2002).
- 3.24 A transaction is the basic unit of its analysis and it is defined as an exchange of resources, assets of economic values, or reciprocal promises and action between the contracting parties in society (Dixit, 1996). Hence, transactions can take place in the public or private sectors, and in the economic or political markets.
- 3.25 When this concept is applied to property development, the question of property rights becomes evident and pivotal. Land is an immobile asset. The subject matter of property transactions refers to the 'portable' bundles of property rights attached to the land assets (Seabrooke et al., 2004). Whether value can be created and captured through sensible use and development of the land asset is dependent on the property rights system. In this respect, new institutional economics informs us that the existence of private property rights is a pre-requisite of market transactions that seek to maximize economic efficiency and hence result in the best allocation and use of resources.
- 3.26 A private property rights system refers to the conditions in which the owners are protected by law to have the following rights:
 - (a) Exclusive right to physically possess and use the asset

(b) Exclusive right to derive income from the asset

(c) Exclusive right to transfer or dispose the asset

3.27 In reality, the exclusive rights of private property are never complete. However, in a market economy, the above ownership rights are largely intact and the conditions under which the owners can exercise their rights are generally transparent. Given a clear, enforceable definition and delineation of property rights in land assets, individual owners will have an *incentive* to protect them, enhance their values through deliberate improvements and capture the benefits generated from their timely investment and transactions with others. Voluntary negotiations and exchanges between the individual parties will lead to an optimal use of the resources and ultimately maximize the welfare to the society as a whole³.

3.28 Another reason why a private property rights system is a critical component in contributing to the protection, enhancement and possible capture of the asset values is because it will exert a *constraint* on the opportunistic action of others (Klein et al., 1997)⁴. This, of course, depends on the enforceability of the property rights system. As an example, common resources like the public parkland and rivers, if left unprotected by the public authorities, will quickly go depleted. Their values are said to be ‘dissipated’ under competitive, free-riding opportunistic actions. While the new institutional economics suggests that privatization and market transactions of these common resources may help to resolve the problems, it also points out that the presence of high transaction costs (e.g. difficulty in enforcing the contracts) may prevent desirable market outcomes and/or market exchanges to happen.

3.29 In other words, new institutional economics recognizes that market transactions between the contracting parties are not cost-free. This is particularly true in the case of property development, even in a free market economy which is generally open and transparent. High transaction costs are commonly represented in the following aspects (Alexander, 2001a; 2001b; Seabrooke et al., 2004; Hong, 1998):

(a) *Asset specificity* refers to the complex situations under which the assets, resources and decisions are interdependent. Real estate development is often a lumpy investment and cannot be infinitely redeployed, easily divisible and substitutable.

³ The famous ‘Coase Theorem’ has demonstrated, given a clear delineation of property rights, the power of market forces in reaching an amicable solution for conflicting use of resources. Put it simply, the Theorem argues that market negotiations and transactions between the parties can resolve any externality problems (such as pollution and/or misuse of land resources), irrespective of the initial property rights entitlements of the resources being traded. In other words, how the assignment of the property rights is initially assigned will not affect the efficiency of resource allocation. The results will be identical in which the private parties will ‘internalize’ the externalities in the transactions. However, this outcome depends on the condition of zero transaction costs.

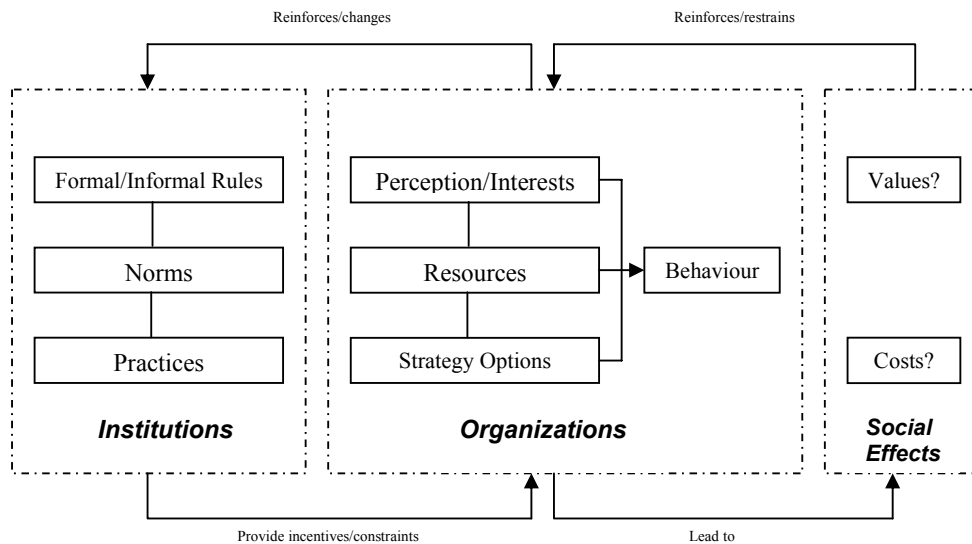
⁴ Klein et al. (1997: 2) give this example: ‘Property rights tell you, not what you may or may not do with your property, but rather what *others* may or may not do with your property. What prevents you from filling in a swamp on your land is a regulation. What prevents others from trespassing to hunt ducks on your land is a property right.’ (Italics original)

- (b) *Imperfect knowledge* about the conditions of the development sites and the contracting parties tends to increase the monitoring, enforcement and search costs.
- (c) *Uncertainty* about the changing economic conditions will increase the development risks and the costs of delineating all the rights of the contracting parties to benefit from the land.
- (d) A *lengthy time period* in completing the whole development will increase the uncertainty and the overall project risk.
- (e) *Negotiation, enforcement and administration costs* will increase as a result of the need to constrain opportunistic behaviour, cheating and non-compliances of the involved parties.

Institutions as Coordinating Mechanism

- 3.30 Given that there are high transaction costs in property development activities, this is equivalent in saying that there are ‘frictions’ in the economic system. The next logical step is about how to eliminate or reduce such ‘frictions’ in order to improve the functioning of the system and enable a better use of the resources. This relates to the institutions of the society in addressing the problems.
- 3.31 Institutions are constructed by the human society to govern our relations with each other. In a broad sense, institutions comprise both formal and informal rules, norms and practices that influence perception, knowledge, resources and interests of the actors and hence structure the patterns of their interactions in daily life (Fig. 3.2). Such arrangement governs the relationships between the stakeholders in the process of economic and social transactions. In essence, the institutions provide the systems of incentives and constraints which influence and frame the organizational behaviour. A property rights system is part of the institutions.
- 3.32 ‘Markets’ and ‘firms’ are two different institutions in handling transactions and coordinating the use of resources in an economy. In short, markets represent a decentralized form of transactions whereas firms correspond to a centrally planned, hierarchical form of directing the allocation of resources. In a seminal paper, Coase (1937) asked an important question: ‘why do we still need a firm if the market can coordinate resource allocation most efficiently?’ He comes to the conclusion that firms, and other non-market economic institutions, are justified in the presence of transaction costs and they exist because they are useful in minimizing transaction costs. In other words, they can be considered as the ‘lubricants’ in coordinating resource allocation and facilitating transactions in an economy.

Figure 3.2
Institutions & Organizations: Theoretical Perspectives



Source: Authors

- 3.33 Following this line of thought, transaction cost theory suggests that there are other possible institutional forms of governance for the production of urban built environment (Alexander, 1992a, 1992b, 1994, 2001a, 2001b). In other words, to be effective, urban planning and land development do not necessarily have to be carried out exclusively by the government. There are other feasible forms of land use governance which can also reduce transaction costs, depending on the attributes of the transactions in the land development process. Indicative planning, contract zoning, private-public partnership, voluntary contractual covenants are some examples of the bilateral type of governance structure. Transaction cost theory therefore rejects the dichotomous contrast between planning and market (Alexander, 1992b) and suggests a blurred boundary between public and private sector planning for land development.

Alternative Institutional Forms of Governance

3.34 Returning to the two scenarios put forward in paragraph 3.1, they in fact represent two alternative institutional forms in governing and coordinating the transformation of urban space for railway and adjoining properties (Fig. 3.3):

(a) Model A – the government planning and land disposal model

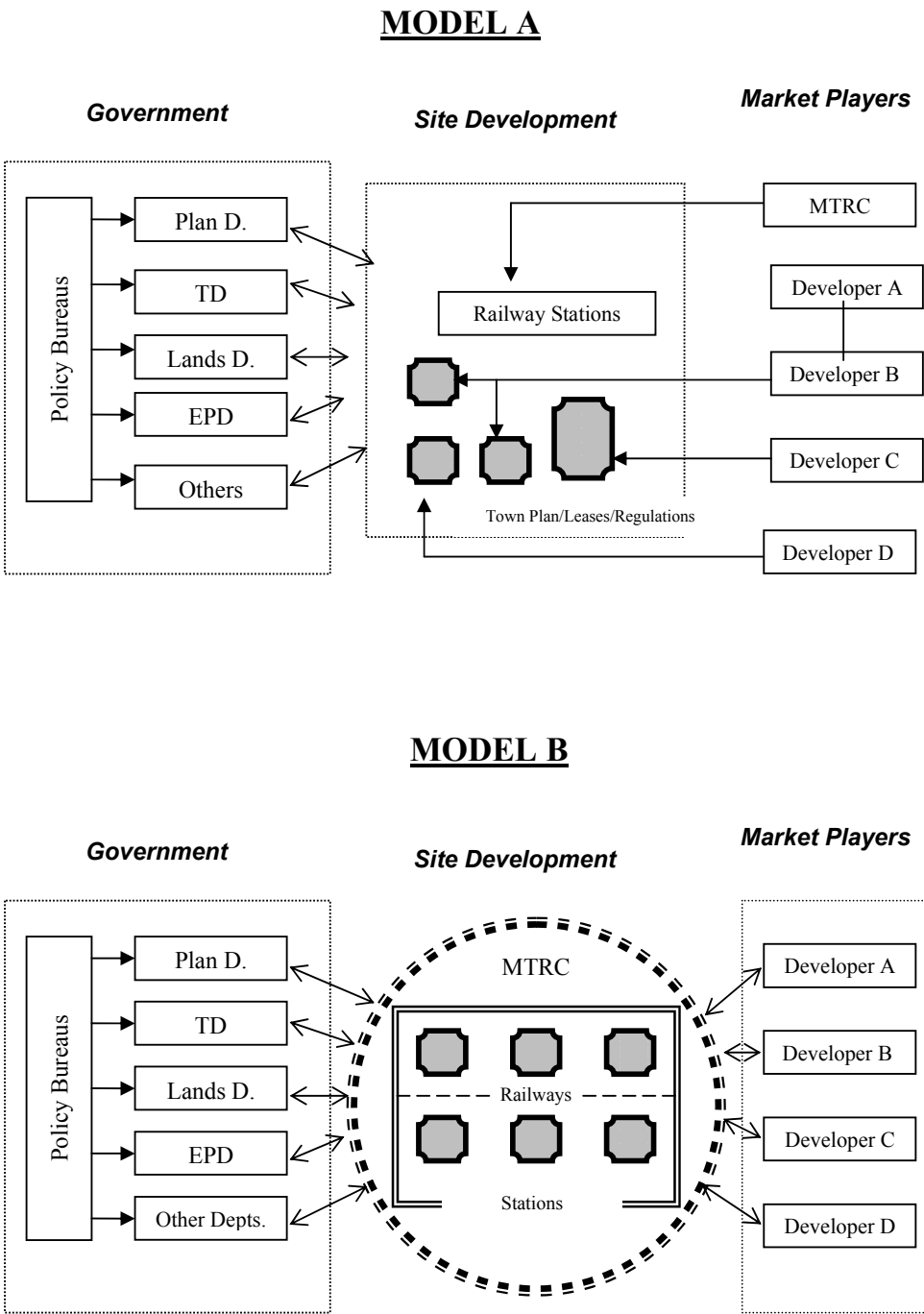
(b) Model B – the MTRC integrated planning and development model

3.35 Model A represents government planning, assignment, attenuation, and restrictions of private individual rights over the use of land resources in and near railway stations. This institutional form of land use governance involves public-sector decision making, statutory framework and third-party regulation and enforcement by the government. Under this approach, the statutory town plans, land lease documents, the government land sale programmes, and the government policies and regulations provide the principal coordinating mechanisms in bringing together all the key players in developing the sites. MTRC is one of many other developers and is primarily assigned with a limited role of constructing the railways and the stations only. Project implementation relies mainly on the interactions between these market players and the various government departments, their interpretations of the many government policy regulations and contracts, and their compliance with the conditions imposed upon them.

3.36 Model B provides an alternative institutional approach, which puts MTRC at the central stage in planning and coordinating development of the station sites. This approach does not obviate the need for statutory town plans, land lease documents, government policies and regulations, but unlike the previous model, they only frame rather than dictate all the development particulars. The site development details are expected to be worked out by the MTRC in negotiation and consultation with the government departments and the developers. Exclusive development rights for the station sites are granted to the MTRC and this provides an incentive for the corporation to plan and develop the sites in such a way as to maximize the values of its entire development projects and ‘internalize’ all possible external benefits generated from railway and property development. The MTRC provides the platform for the resolution of conflicting interests of all the relevant parties in connection with the site development.

3.37 The central thesis of transaction cost theory is that the appropriate institutional form of governance for spatial transformation – whether through government hierarchies and public sector planning like Model A, or through integrated private sector planning by MTRC like Model B – is dependent on which form seeks to minimize the transaction costs in undertaking the activities. The characteristics of the activity in question, the attributes of the type of transaction and the specific circumstances in history all play a role in determining the actual use of the institutional form (Ball et al., 1998: 105-134).

Figure 3.3
Government, MTRC and Developers: Two Institutional Models



Source: Authors

Applications

- 3.38 The following discussion gives several examples to illustrate how Model B is capable of creating better development outcomes than Model A.

Improving Public Sector Planning & Urban Design: Examples

- 3.39 Based upon new institutional economics and transaction cost theory, a major strength of the MTRC approach is that it does not only contain the incentives for the corporation to maximize the returns from its land resources by means of good planning and design, but it also provides the appropriate means to implement the development schemes. The alternative government approach, more often than not, lacks both the incentives and the meticulous means to ensure successful implementation of the proposed schemes.
- 3.40 The government is not subject to the same degree of financial discipline as in the case of a private corporation like the MTRC. Although the government is also obliged to make the most appropriate use of land resources, this is only a general principle. The government has to address and balance it with numerous competing social, economic and political objectives, other than the prudent commercial principle as in the case of the MTRC. Furthermore, different government departments have their separate missions and policy considerations. Their different policy instruments have varying strengths and weaknesses.
- 3.41 For instance, government town planning in Hong Kong is most effective in terms of regulating land use disposition, development intensity and certain elements of the built form including building height, number of storeys and site coverage. It is strong in development control but is notoriously weak in the areas of urban design, project initiation and scheme implementation. Furthermore, marketability of the development projects has never been the main concern of the government planners as a development regulator. This is often considered as a matter of the private sector. Indeed, it is perhaps not inaccurate to say that all government regulations are intended to be ‘satisfying’, i.e. setting the minimum acceptable standards and requirements, rather than ‘maximizing’, i.e. prescribing all the details and leaving minimal flexibility. This is certainly a prudent way of public administration in a small government-large market scenario.
- 3.42 Tung Chung Station is a case in point. It forms an integral part of Tung Chung new town and is expected to become the commercial and residential hub supporting the permanent and transient community associated with the nearby Chek Kap Kok International Airport. Furthermore, it has a strong potential to stand as Hong Kong’s landmark gateway for those visitors arriving at the airport. We are given to understand that the initial land use planning proposal for this station by the government was found to be unsatisfactory from the perspective of the MTRC.
- 3.43 The MTRC planners subsequently put forward their proposals in revising the urban design and land use planning of the Station area. What they did was to arrange the array of high-rise residential towers in a curvilinear pattern to take full advantage of

the spectacular sea and mountain views (Fig. 3.4). This creates a visually stunning identity to complement Hong Kong's landmark gateway (Fig. 3.5). The low-rise housing complexes are located on the seaward side in a generously landscaped open space. The commercial complex is strategically designed to bridge across the North Lantau Expressway and Airport Express Link and provides the first impressions of Hong Kong for in-bound visitors.

- 3.44 This example illustrates how the MTRC approach has not only maximized its returns by capitalizing on the full potential of its land resources, but it has also delivered a masterpiece that receives wide public applause. If the original government planning proposals were to be implemented through the separate land disposals, it would have ended up in another mediocre development project incongruent with its strategic location.

Fig. 3.4 Tung Chung Development: Comparison of Master Plans

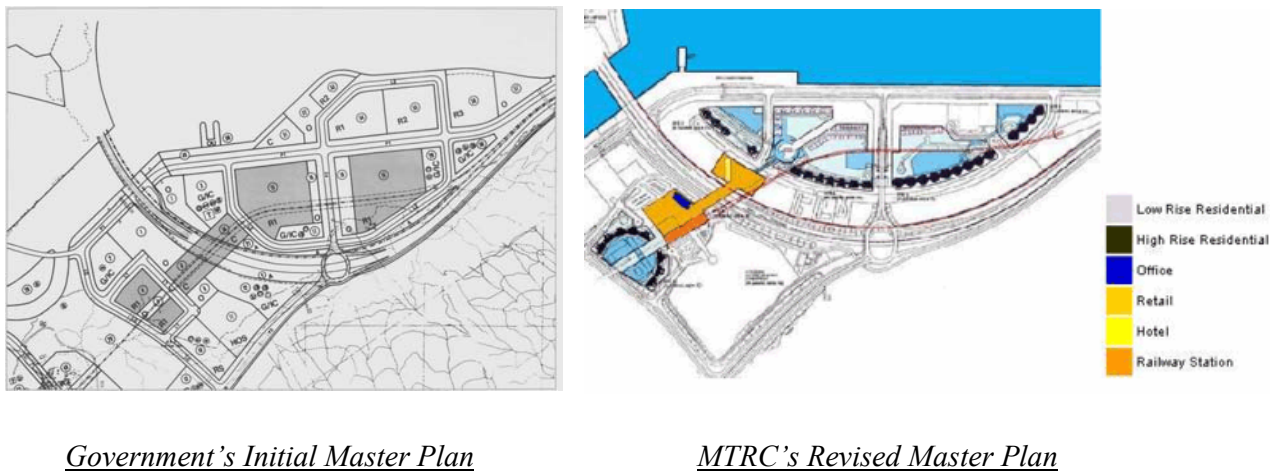


Fig. 3.5 MTR Property Development at Tung Chung



Responding to Imperfect Information & Uncertainty: Examples

- 3.45 The MTRC model provides a sound institutional mechanism in addressing the possible problems of uncertainty and imperfect information associated with most real estate transactions. Property development is a lengthy process. Unforeseeable changes in economic and market conditions can happen that make the initial planning proposals obsolete.
- 3.46 Government institutions, by their very nature, are inept in reacting to swift market changes. For instance, the government bureaucracy is not necessarily familiar with private market operations, as it is rightly not commercially-oriented. There is likely to be a time lag in the government responses to the corresponding changes in market environment and the best timing is then lost. In this respect, government land supply is a classic example in Hong Kong.
- 3.47 The MTRC has the organizational flexibility and capability to adjust to the market changes primarily because its performance is closely linked with the market conditions. This is because under the current institutional setup:
- (a) The corporation is disciplined by the financial market to operate on prudent commercial principles. Its management performance will have an important bearing on its credit ratings, costs of borrowing and hence financial results.
 - (b) The corporation is disciplined by the developers who choose to participate as its development partners in implementing the property projects. Developers agree to offer a sharing of their profits from the above-station development projects, when the MTRC invites them for tender. The MTRC is required to shoulder both development as well as financial risks in this process as the profit sharing is highly sensitive to the market conditions.
 - (c) The corporation is required to pay full market premiums to the government for the property development rights. The market premiums are levied on the property developers who are susceptible to the market environment.
- 3.48 The MTRC therefore has the incentives to make sure that planning and implementation of its property development packages will meet the market needs. The corporation has to closely monitor the market sentiments before offering its tender invitations to developers. All these enhance the practicability and marketability of the development projects so that they must fall within the acceptable risk levels of the corporation. Unlike other private developers, the MTRC is not prepared to take up highly risky and speculative development schemes on their stations.
- 3.49 The current Tseung Kwan O (TKO) Station development is a case in point. Under the original planning proposal, two office towers above four levels of retail uses were proposed at the station site, integrating with the partially underground TKO MTR station with a public transport interchange and carparks (Fig. 3.6). On the current

TKO statutory Outline Zoning Plan (OZP), the subject site is zoned ‘Other Specified Uses – OU’ annotated ‘Commercial Development with Public Transport Interchange’.

Fig. 3.6 Tseung Kwan O Town Centre Development: Initial Master Plan



Fig. 3.7 Tseung Kwan O Town Centre Development: Revised Master Plan



- 3.50 The site has been identified for ‘pure’ office and retail uses based upon the recommendations in ‘Tseung Kwan O Feasibility Study of Opportunities for Further Development’ which was completed some time ago in May 1990. The development of TKO has come a long way since then. The MTRC has found these planned uses obsolete and unsuitable for the town centre site.
- 3.51 In 2003, the MTRC submitted a planning application to the Town Planning Board requesting for a change of land uses to residential and hotel uses (Fig. 3.7). Some of the planning justifications put forward by the MTRC included ‘impracticability of office development in TKO’, ‘increasing demand for medium tariff hotel rooms at convenient secondary locations’, ‘decreasing demand for shopping centre in view of the oversupply nearby’, and ‘the need for flexible and responsive changes to the rapidly evolving development conditions in TKO’.
- 3.52 This example reflects the merit of the MTRC approach in reacting responsively and flexibly to the problems of imperfect information and market uncertainty associated with planning for property development.

Internalizing Externalities & Maximizing Synergy: Examples

- 3.53 A key advantage of having a single entity like the MTRC to manage the joint development of railway and above-station property development is that it allows comprehensive planning and implementation of the projects. All possible development options can be evaluated at the planning stage before adopting and implementing a final, optimal option. This mechanism will help to enhance and maximize the synergistic effects between railway and property.
- 3.54 Maritime Square, which is a MTRC showcase, is a case in point. It is a shopping centre planned and managed by the MTRC at part of the development of Tsing Yi Station. It is not only the largest in Tsing Yi, (over 46,000 sq.m. of retail space), but has been carefully designed to ensure that its theme, quality and provision will become the focal point of the community for both the local residents and commuters. One special design consideration is to promote an apparently 'seamless' space integration between the railway station and the shopping centre so that a maximum degree of convenience is provided to the residents, passengers, visitors and shoppers (Photo 3.1). The shopping centre is also fully integrated with the above-station residential development alongside extensive landscaped open space and other recreational facilities (Fig. 3.8). The residents can basically enjoy a 'weather-free' environment for their daily activities within the station development (see section 4).

Photo 3.1 Maritime Square and its Excellent Connection with Tsing Yi MTR Station



Fig. 3.8 Tsing Yi Station Development: Master Plan



- 3.55 All these benefits are made possible because the opportunities of land use integration were fully evaluated at the master planning stage by the MTRC. Furthermore, by means of 'Development Agreements', the MTRC will control, monitor and supervise implementation of the adopted master plan proposals of the station development by the developers which have won the subject tender. The Development Agreements stipulate, in great details, the conditions, responsibilities and duties to be fulfilled by the developers as the implementation agent of the MTRC. It is understood that most developers describe the conditions of Development Agreements as very 'harsh'. Nonetheless, the Development Agreements perform an important function in ensuring that good quality development product will come out in the end.
- 3.56 The question arises as to whether the same extent of land use integration between railway station and property development could equally be achieved, not by a single management entity like the MTRC, but through separate private negotiations between the railway operator and the adjoining property owners. The answer is in the negative because:
- (a) The connection between the railway station and the property development is likely to be a remedial action, which is often second-best option. Examples include the new underground pedestrian links between Pacific Place and Admiralty MTR station (Photo 3.2), and between Times Square and Causeway Bay MTR station. These two links have been constructed and opened for use long after the completion of the stations. An afterthought in land development is unlikely to have exploited the best opportunities, including timing, resources and design.
 - (b) Sometimes, it may not be entirely feasible from a physical perspective to establish the connections once all the committed development has been built.
 - (c) The costs of negotiation between the railway operator and the property developers are likely to be prohibitively high, resulting in project delays and/or failure.

Photo 3.2 Remedial Connection between Admiralty MTR station & Pacific Place



- 3.57 A fundamental reason why a single management entity like the MTRC is most suitable to achieve the benefits of land use integration is because the corporation can delineate all the rights of the involved parties to benefit from the land. By ‘internalizing’ all the otherwise ‘external’ benefits to the separate parties, the MTRC can maximize the synergistic effects between railway and property.
- 3.58 Real estate interests and transport considerations are *not* necessarily compatible. Likewise, property planner and transport planner have different objectives and they do not necessarily agree with each other. For instance, property planners want to retain the shoppers within a shopping mall. They would therefore favour the layout design of the public corridors so as to channel the pedestrian flows to go past as many shops as possible. Transport planners, however, want a direct access of the passengers to the station facility and an efficient pedestrian flow for the sake of safety and convenience purposes. If these two parties work for separate organizations, their own considerations become ‘external’ to the other. It becomes very costly, if not impossible, for them to resolve their conflicts through private negotiations in order to allow the synergy of property and transport to take full effect.
- 3.59 Sha Tin KCRC station is a case in point. The nearby privately developed New Town Plaza seeks to maximize the shopping space at the expense of the public circulation space. On the other hand, the railway operator seeks to open as wide a station entrance area as possible to the shopping mall in order to attract or disband train passengers in an efficient manner. As a result, during the peak times, pedestrians and shoppers are often clogged at the interface areas between the KCRC station and the New Town Plaza shopping mall (Photo 3.3). Such congestion causes discomfort to both the shoppers and the passengers. This is an example of how separate considerations are causing diseconomies and inefficiency to external parties.

Photo 3.3

Congested Interface Area connecting New Town Plaza & Sha Tin KCR Station



- 3.60 Such conflicting objectives can be more effectively resolved when the decisions are put under a firm hierarchy. What this actually does, is to turn a possible ‘zero-sum game’ between two separate parties into a ‘trade-offs’ decision within one single firm. A single management entity like the MTRC can weigh the relative costs and benefits of these competing options, achieve a delicate balance of these apparently incompatible considerations, and come up with an optimal solution. The transaction costs in reaching a settlement within a firm are much lower than between separate companies. The decision so reached will maximize the full synergy between transport and property and minimize their harmful interface effects.

Conclusions

- 3.61 It is generally agreeable that, in theory, the integration of railway and land use development can bring enormous social and economic benefits to the cities (see paragraph 3.2). In essence, urban railway can improve the accessibility of land around its stations and hence increase its value. By capturing the increased land values through property development above and around stations, the railway company can finance the construction of the railway without relying entirely on government subsidies. Furthermore, property development above and around stations improve the potential ridership of the railway and improve its operating performance.
- 3.62 The government receives financial gains in terms of increasing land premiums, property taxes and rates as a result of land and property development associated with the railway. The financial burden on the government is also reduced when the railway is self-financing on its own. The society and the economy at large will improve as a result of achieving a greater efficiency in transport, sustainable urban form, higher economic growth and better quality of life.
- 3.63 The question lies in whether such integration of railway and property development should be implemented by a single entity, like the MTRC, or by separate bodies. This study argues that, from both theoretical and empirical perspectives, Model B (i.e. MTRC integrated rail-property development model) is more preferable because it helps reduce the notoriously high transaction costs in real estate development activities (as outlined in paragraph 3.29) as follows:
- (a) MTR station and its above-station property development are excellent examples of *asset specificity*. They are intimately linked in many aspects such as site footage, civil works, and ancillary services. It is extremely costly and difficult, if not impossible, to disentangle and divide all these activities into separate contracts if they are not planned, supervised and managed by a single entity like the MTRC.
 - (b) The MTRC has accumulated lots of local experience in planning and developing integrated railway-property development. Such valuable, specialized experience helps to reduce the problems of *imperfect knowledge* about the conditions of the development sites and the contracting parties. This will decrease the monitoring, enforcement and search costs in undertaking the development activities.

- (c) The MTRC model provides a better institutional mechanism in addressing the possible problems of *uncertainty* caused by changing economic conditions. The MTRC has the organizational flexibility and capability to adjust to unforeseeable changes. The alternative model (i.e. Model A) that relies on detailed public sector town plans, land leases and government policies is likely to be too rigid in reacting to rapid market shifts. Bureaucratic inertia to changes will also increase the development risks.
- (d) Given the exclusive rights of planning and developing the landed property of its stations, the MTRC has the *incentives* to protect, enhance and capture the values of its assets. The corporation is in a better position, than the many government departments, to delineate all the rights of the contracting parties to benefit from the land. This implies that, by 'internalizing' the otherwise external benefits to the separate parties under Model A, the MTRC can maximize the synergistic effects associated with the integration of railway and adjoining property development. For instance, to ensure timely completion of the station property and the railway line is one way of realizing the benefits of such integration.
- (e) A *lengthy time period* in completing the whole railway development will increase the overall risk of the project and the formation of an integrated firm like the MTRC is an appropriate mechanism to better weather the property cycles.
- (f) The MTRC has well-defined corporate missions, objectives and tasks, which are widely known to the public, the government departments and the developers. Model B puts the MTRC as the focal point that rallies all the interested parties in implementing railway station site development. This will substantially reduce the *negotiation, enforcement and administration costs* in comparison with Model A. The incentive structure for the MTRC is such that it has an interest to constrain opportunistic behaviour, cheating and non-compliances of the involved parties such as the developers and the contractors.

3.64 Suffice it to say, from a theoretical perspective, the MTRC is likely to provide an institutional mechanism that gives lower transaction costs than the alternative government planning and land sale approach. The above points cover the key reasons in theory. Although transaction costs are difficult to measure in reality, it is nonetheless possible to observe and compare the effects of these two different approaches in actual situations.

3.65 The study has reviewed several empirical examples of successful MTRC experiences in integrating railway and property development. They lend empirical support to our theoretical justifications for having a single corporate entity to manage the process of implementing the integrated railway-property development model.

3.66 The success of the MTRC lies in the proper alignment of the institutional role of the corporation with its objectives, tasks, requirements and decision-making environment. Fig. 3.9 conceptualizes the role of the MTRC in relation to other organizations in that:

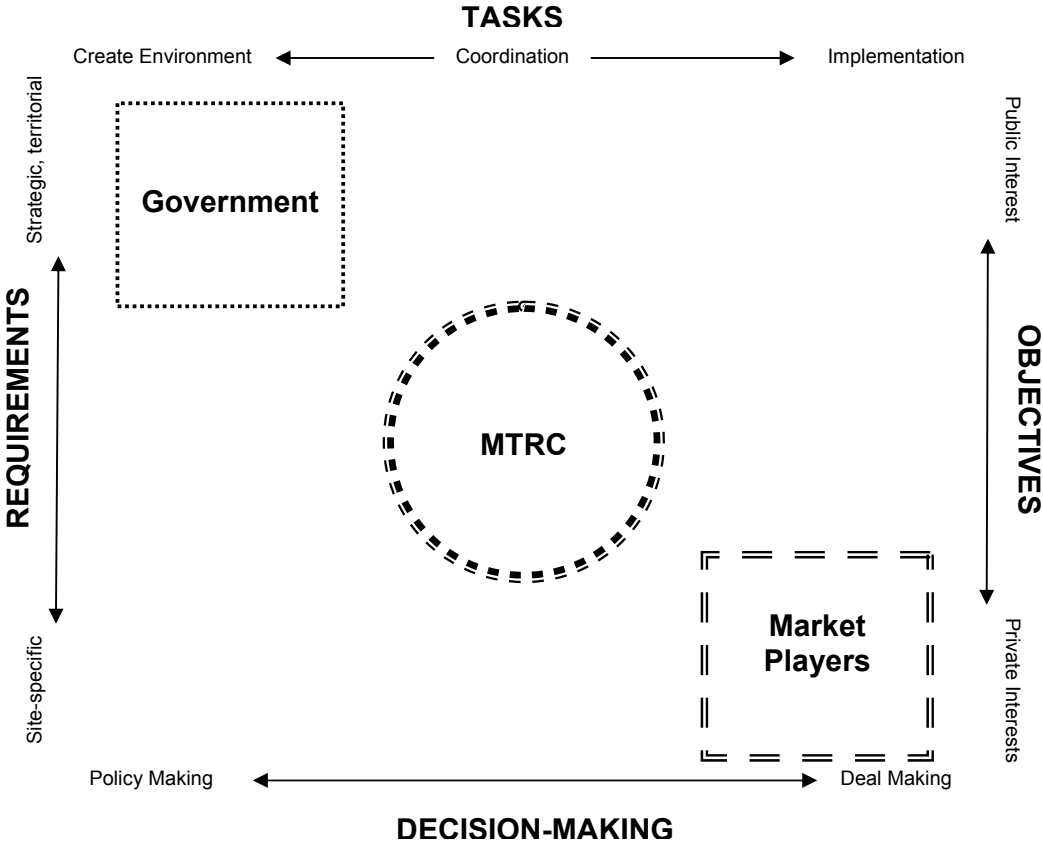
- (a) The government creates a favourable incentive and constraint environment, sets major policy objectives of strategic and territorial nature that take into account the public interest in connection with the joint development of the mass transit railway and station property.
- (b) The market players such as property developers in pursuing their private interests, are responsible for implementing the projects subject to the site-specific requirements and the deals agreed in connection with the joint development projects.
- (c) The MTRC acts as the intermediary between the government and market players for coordinating the implementation of these joint development projects, converting strategic objectives into site-specific requirements, transforming policies into deals and balancing possible conflicts between public and private interests.

3.67 Eliminating the MTRC within this institutional setup implies either:

- (a) an expansion of the two remaining organizations into areas and functions which they are neither good nor proper at performing; or
- (b) leaving a gap between strategic policy objectives and detailed implementation at the site level, between policies and deals, and between balancing public and private interests.

3.68 All these would only result in increasing inefficiency and additional costs to the economy. The whole society would then suffer from inferior land use integration between railway and property development.

Figure 3.9
Institutional Functions of Different Organizations: Four Dimensions



Source: Authors

4. MTR Achievements in Urban Development

Introduction

- 4.1 The objective of this section is to illustrate some key achievements and benefits of MTR's integrated rail-property development in Hong Kong. It examines the empirical interrelationships between land use and mass transit railway (MTR) development in the urban context. Based upon the theoretical framework outlined above, there are three major directions of research. They are as follows:
- (a) how the mass transit system influences urban property development and performance;
 - (b) how the land use characteristics benefit ridership of the mass transit railway;
 - (c) how the synergy is created through the integration of railway and property in terms of social and economic benefits; and,
- 4.2 The analysis has relied on a combination of both quantitative and qualitative study methods. The ridership data are provided by the MTR Corporation. The property and other socio-economic data are drawn from other public sources and by the measurements of the research team. The examples included here are based upon the information available through desktop research, selective case studies, several interviews with the MTRC officials, and the experiences of the team.

MTR Catchment & Ridership

- 4.3 The MTR is a major transport service provider in Hong Kong. Its railway alignments run through the most densely populated parts of the urban districts in the territory. In September 2000, the MTR Corporation estimated that about 2.5 million people were living within 500 m of the 44 stations of its five railway lines (i.e. Kwun Tong, Tsuen Wan, Island, Tung Chung Lines and the Airport Express) with a total route length of 82.2 km¹. This was equivalent to approximately 36% of the total population at the time.
- 4.4 The opening of the Tseung Kwan O Line has added another 5 new stations to the MTR network, extending its total route length to 87.7 km. Based upon the 2001 Population Census data and the study estimation, another 280,600 persons are further included within the MTR 500 m station catchment areas. This study therefore estimates that about 2.78 million people are now living within 500 m of

¹ MTR Corporation. (2000) *Hong Kong SAR Government MTR Privatisation Share Offer Prospectus*, 25 September. Hong Kong: MTRC.

an MTR station. This was equivalent to about 41.4 % of the total population in 2001².

- 4.5 Table 4.1 illustrates the estimations of the working population and the types of housing units located within the 200 m and 500 m catchment areas respectively of the MTR stations.

Table 4.1 MTR Station Catchment: As of 2001

MTR Station Catchment	Figure	Territory Total	% Territory Total
Working Population within 500m (Persons)	1,342,562	3,252,706	41.3%
Public Rental Units within 500m (Number)	285,215	624,349	45.7%
Subsidized Sale Housing Units within 500m (Number)	102,312	320,039	32.0%
Private Housing Units within 500m (Number)	452,059	1,007,415	44.9%
Total Housing Units within 500m (Number)	839,586	1,951,803	43.0%
Ratio: Public Rental vs Sale Housing within 500m	51%	47%	
Public Rental Units within 200m (Number)	119,155	624,349	19.1%
Subsidized Sale Housing Units within 200m (Number)	39,426	320,039	12.3%
Private Housing Units within 200m (Number)	231,120	1,007,415	22.9%
Total Housing Units within 200m (Number)	389,701	1,951,803	20.0%
Ratio: Public Rental vs Sale Housing within 200m	44%	47%	
Housing Concentration within 200m	46%		

Data sources: Estimations of the working population and housing data are based upon 2001 Population Census at street block level.

- 4.6 Assuming there have been minor changes during the past 3 years between 2001 and today, the following observations about the extensive coverage of the MTR network in Hong Kong can be drawn:

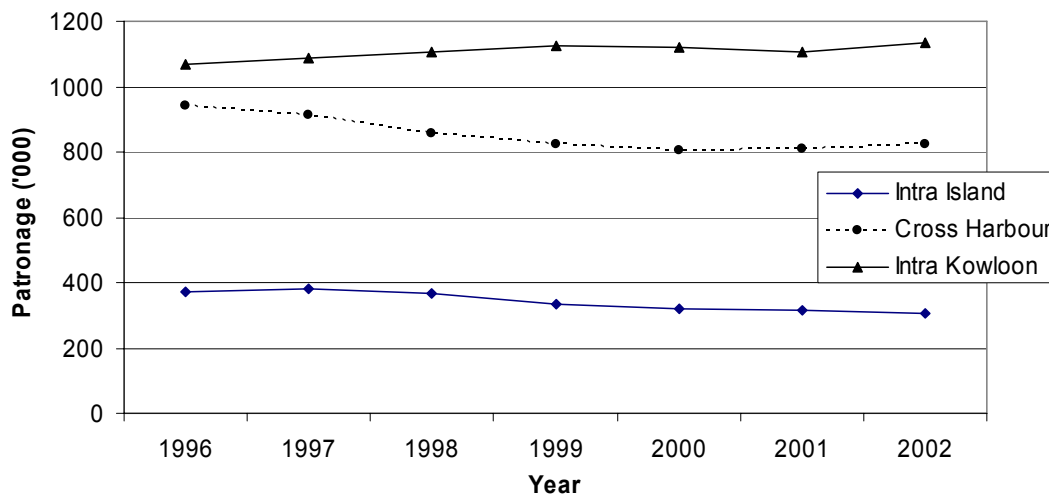
- (a) Around 41% of the working population and 43% of the housing units are located within 500 m of an MTR station.
- (b) About 20% of the housing units are located within 200 m of an MTR station.
- (c) There are far more private housing and subsidized sale housing units than public rental units within the 500 m MTR station catchment areas. The number of the former is about 2 times that of the latter housing category.

² According to the 2001 Population Census data published by the Census & Statistics Department in its website, the total population as of 2001 amounted to 6,708,389.

- (d) The proportion of private housing and subsidized sale housing units increases further within the 200 m MTR station catchment areas. On average, there are about 2.27 such units for every single public rental housing unit located within 200 m of an MTR station. This ratio is greater than the territorial average, indicating that the MTR stations are generally and overwhelmingly surrounded by private housing development.
- (e) The housing concentration ratio within the 200 m catchment areas is 46%. This implies that there are on average slightly more (about 54% of total) housing units located within the 'outer 300-m ring' (the area between 200 m and 500 m) than the 'inner ring' (within 200 m) of an MTR station. This also indicates that housing development is quite concentrated around the MTR stations.

4.7 In 2003, the total number of passengers using the MTR Lines (excluding the Airport Express) reached about 770.42 million and the average weekday amounted to about 2.24 million³. Figure 4.1 indicates that intra-Kowloon movements amounted to about 50% of the total average weekday trips and the remaining half was taken up collectively by cross-harbour and intra-Island movements.

Fig. 4.1
MTR Average Weekday Patronage



³ MTR Corporation. (2004). *Annual Report 2003*. published on the webpage [<http://www.mtrc.com.hk>]

- 4.8 MTR ridership is influenced by many factors such as competition of other transport modes, land use distribution, socio-economic changes and population growth. Table 4.2 indicates that the total weekday MTR patronage dropped 0.8% per annum between 1996 and 2002. The largest reduction came from intra-Island movements, followed by the cross-harbour movements. Intra-Kowloon movements witnessed an average increase of 1% per annum in ridership, despite an annual increase of 1.7% in fares during the period.

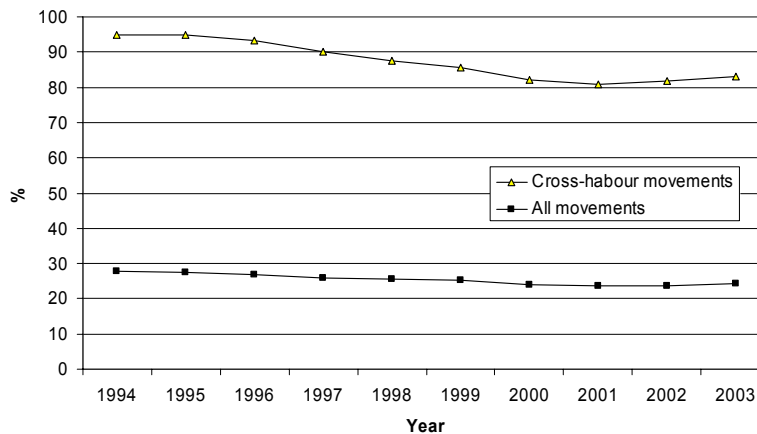
Table 4.2 MTR Average Weekday Patronage and Fare by Movement

Movement	Year		Change 1996-2002	
	1996	2002	Absolute	Per Annum
Intra Island ('000)	373	306	-18.0%	-3.2%
Cross Harbour ('000)	940	823	-12.4%	-2.2%
Intra Kowloon ('000)	1066	1133	6.3%	1.0%
Total ('000)	2379	2261	-5.0%	-0.8%
Fare				
Intra Island (\$)	4.440	4.601	3.6%	0.60%
Cross Harbour (\$)	8.576	9.612	12.1%	1.90%
Intra Kowloon (\$)	4.722	5.239	10.9%	1.70%
Total (\$)	6.201	6.743	8.7%	1.40%

Source: MTRC

- 4.9 Notwithstanding the above situations, MTR remains the backbone of the public transport services in the territory. Furthermore, its market shares in terms of all the franchised public transport boardings and specifically in the cross-harbour movements have both increased slightly between 2001 and 2003 (Figure 4.2).

Fig. 4.2
Market Share of MTR in Public Transport



Station Patronage & Land Use Characteristics

- 4.10 A preliminary assessment of the relationship between land use characteristics around MTR stations and the pattern of patronage has been undertaken. Based upon the data contained in the MTR Station Origin-Destination (O-D) Passenger Matrix for a typical weekday in November 2002, the 48 MTR stations are ranked, from highest to lowest levels of patronage, and grouped into four categories including:
- (a) High Patronage
 - (b) Medium-High Patronage
 - (c) Medium-Low Patronage
 - (d) Low Patronage
- 4.11 The objective of this exercise is to identify which stations attract relatively higher patronage and then examine the key characteristics of these stations and their surrounding land uses.
- 4.12 Tables 4.3, 4.4 and 4.5 show the ranking of the MTR stations for three different time periods: the weekday total, weekday morning peak and weekday evening peak periods, respectively. The average numbers of patronage in each category are also identified.
- 4.13 The following observations are made:
- 4.14 *Weekday Total Patronage:* Table 4.3 indicates clearly that each station patronage category contains largely the same list of 12 MTR stations in terms of both origins and destinations. In other words, if a station achieves a very high patronage as an origin, it is also likely to be a very busy station as a destination.
- 4.15 Four exceptions to this observation are evident. They are highlighted in Table 4.3. These four stations include Lai King, Quarry Bay, Tsing Yi and Wong Tai Sin stations. Their levels of origin and destination patronage fall into separate categories. Nonetheless, their respective station rankings in terms of origin and destination differ only marginally.
- 4.16 MTR stations of high patronage tend to have either one or several of the following land use and development characteristics:
- (a) They are the urban centres and are located within the old districts in Kowloon and on Hong Kong Island.
 - (b) They provide major transport interchanges (e.g. between KCR and MTR at Kowloon Tong station) or they are terminal stations (e.g. Tsuen Wan station).

- (c) They are located within the employment centres of the territory (e.g. Central, Kwun Tong, Kwai Fong, Sham Shui Po, Kowloon Bay stations).
- (d) High building density, compact environment, mixed land uses and vibrant urban activities at street level are some key district features (e.g. Mongkok, Causeway Bay, Wanchai, Jordan, Sham Shui Po, Wong Tai Sin stations).

4.17 Conversely, low usage MTR stations tend to have the following land use and development characteristics:

- (a) The stations are somewhat locationally detached from the existing urban districts (e.g. Kowloon, Olympic and Heng Fa Chuen stations).
- (b) MTR above-station property development is still under construction, or the surrounding land uses are not yet fully developed and occupied (e.g. Kowloon, Tiu Keng Leng, Tung Chung, Tseung Kwan O and Hong Kong stations).
- (c) The station's immediate catchment area is characterized by one single, dominant type of land use, such as private housing or public housing only (e.g. Heng Fa Chuen, Tai Wo Hau and Yau Tong stations).
- (d) Building density within the station's immediate catchment area is low (e.g. Tin Hau station).

Table 4.3 Weekday Total: MTR Station Ranking

Station Ranking	Origin	Destination
High Passenger Patronage	Kowloon Tong	Kowloon Tong
	Central	Tsim Sha Tsui
	Tsim Sha Tsui	Causeway Bay
	Causeway Bay	Mong Kok
	Mong Kok	Central
	Tsuen Wan	Wan Chai
	Wan Chai	Tsuen Wan
	Sham Shui Po	Sham Shui Po
	Kwun Tong	Kwun Tong
	Kwai Fong	Jordan
	Wong Tai Sin	Kwai Fong
	Jordan	Kowloon Bay
Average	89491	92648
Medium-High Patronage	Kowloon Bay	Prince Edward
	Prince Edward	Admiralty
	Sheung Wan	Yau Ma Tei
	Admiralty	Wong Tai Sin
	Yau Ma Tei	Tai Koo
	Tai Koo	Sheung Wan
	Lai Chi Kok	Lai Chi Kok
	Choi Hung	Choi Hung
	Chai Wan	Chai Wan
	Lam Tin	Lam Tin
	Cheung Sha Wan	Causeway Bay
	Tsing Yi	Quarry Bay
Average	53038	50778
Medium-Low Patronage	Diamond Hill	Diamond Hill
	Mei Foo	Tsing Yi
	Quarry Bay	Mei Foo
	Po Lam	Po Lam
	Hang Hau	Lok Fu
	Lok Fu	Hang Hau
	Kwai Hing	North Point
	Shau Kei Wan	Shau Kei Wan
	North Point	Kwai Hing
	Ngau Tau Kok	Ngau Tau Kok
	Fortress Hill	Fortress Hill
	Lai King	Heng Fa Chuen
Average	33851	33173

Table 4.3 (Con't) Weekday Total: MTR Station Ranking

Station Ranking	Origin	Destination
Low Patronage	Hong Kong	Hong Kong
	Tseung Kwan O	Shek Kip Mei
	Shek Kip Mei	Lai King
	Heng Fa Chuen	Tseung Kwan O
	Sai Wan Ho	Sai Wan Ho
	Olympic	Olympic
	Tung Chung	Tung Chung
	Yau Tong	Tin Hau
	Tiu Keng Leng	Yau Tong
	Tai Wo Hau	Tiu Keng Leng
	Tin Hau	Tai Wo Hau
	Kowloon	Kowloon
Average	19217	18997

- 4.18 *Weekday Morning Peak:* Table 4.4 indicates that MTR station patronage during the weekday morning peak period is very different with the weekday total. The list of MTR stations that achieve high usage as origins is entirely different from those as major destinations. These stations are highlighted in Table 4.4. This seems to reflect a one-way flow of MTR passenger traffic during the weekday morning peak period.
- 4.19 Origin stations of high patronage during the morning peak period tend to have either one or several of the following land use and development characteristics:
- (a) They provide major transport interchanges between different transport modes and/or terminal stations (e.g. Kowloon Tong, Chai Wan and Tsuen Wan stations).
 - (b) They are located within densely populated districts with high concentration with housing development and working population (e.g. Tsuen Wan, Wong Tai Sin, Choi Hung, Chai Wan, Tai Koo, Lam Tin, Kwun Tong and Sham Shui Po stations).
 - (c) The MTR stations are well integrated in terms of layout, design and connection with the above-station housing and commercial uses and the surrounding development (e.g. Tsing Yi, Tai Koo, Chai Wan, Lam Tin, Hang Hau, Po Lam and Diamond Hill stations).

- 4.20 Not surprisingly, origin stations with low usage consist of those locating within the employment districts (e.g. Admiralty, Wanchai, Tsim Sha Tsui and Hong Kong stations) and those in which a critical mass of housing development has not yet been fully developed (e.g. Tin Hau, Tiu Keng Leng, Olympic and Yau Tong stations).
- 4.21 Almost all the destination stations of high patronage during the morning peak are generally located within employment districts (e.g. Central, Wanchai, Tsim Sha Tsui, Admiralty, Quarry Bay, Lai Chi Kok, Causeway Bay, Kwun Tong, Sheung Wan, Kowloon Bay, Kwai Fong and Hong Kong stations). Clearly, MTR provides a major transport service for the work trips in the mornings.
- 4.22 Destination stations with low usage during the morning peak hours are those located within the districts dominated by housing uses (e.g. Tai Wo Hau, Tai Koo, Po Lam, Hang Hau, Tsing Yi, Lok Fu, and Tung Chung stations) or those which lack a considerable mass of development density (e.g. Kowloon, Tiu Keng Leng, Tin Hau and Yau Tong stations).

Table 4.4 Weekday Morning Peak: MTR Station Ranking

Station Ranking	Origin	Destination
High Passenger Patronage	Kowloon Tong	Central
	Tsuen Wan	Wanchai
	Wong Tai Sin	Tsim Sha Tsui
	Tsing Yi	Admiralty
	Tai Koo	Quarry Bay
	Choi Hung	Kowloon Tong
	Lam Tin	Lai Chi Kok
	Chai Wan	Causeway Bay
	Hang Hau	Kwun Tong
	Po Lam	Sheung Wan
	Sham Shui Po	Kowloon Bay
	Diamond Hill	Kwai Fong
Average	10792	13936
Medium-High Patronage	Kwun Tong	Hong Kong
	Mong Kok	Mong Kok
	Prince Edward	Ngau Tau Kok
	Shau Kei Wan	Tai Koo
	Mei Foo	Tsuen Wan
	Kwai Fong	Jordan
	Cheung Sha Wan	Chai Wan
	Kowloon Bay	Kwai Hing
	Lok Fu	Yau Ma Tei
	Tseung Kwan O	Fortress Hill
	Yau Ma Tei	Cheung Sha Wan
	Causeway Bay	Prince Edward
Average	6237	5343

Table 4.4 (Con't) Weekday Morning Peak: MTR Station Ranking

Station Ranking	Origin	Destination
Medium-Low Patronage	Sai Wan Ho	Sham Shui Po
	Lai King	Olympic
	North Point	North Point
	Jordan	Mei Foo
	Kwai Hing	Wong Tai Sin
	Heng Fa Chuen	Diamond Hill
	Central	Lai King
	Sheung Wan	Heng Fa Chuen
	Fortress Hill	Shau Kei Wan
	Shek Kip Mei	Choi Hung
	Quarry Bay	Lam Tin
	Olympic	Tung Chung
Average	4002	2781
Low Patronage	Tai Wo Hau	Lok Fu
	Wanchai	Yau Tong
	Ngau Tau Kok	Tin Hau
	Tung Chung	Sai Wan Ho
	Tiu Keng Leng	Shek Kip Mei
	Tsim Sha Tsui	Tsing Yi
	Hong Kong	Hang Hau
	Admiralty	Po Lam
	Tin Hau	Tiu Keng Leng
	Yau Tong	Tseung Kwan O
	Lai Chi Kok	Tai Wo Hau
	Kowloon	Kowloon
Average	2377	1349

4.23 *Weekday Evening Peak:* The above morning patterns of passenger patronage may be expected to reverse during the weekday evening peak. Table 4.5 confirms these expectations, but not fully. Eleven out of 12 origin stations of highest usage during the evening peak hours are the same as the destination stations of highest patronage in the morning peak period (highlighted in Table 4.5). Obviously, the employment centres generate most of the MTR passenger traffic after the end of the typical office business hours.

4.24 The situations about the destination stations during evening peak appear less clear-cut. The morning origins would be expected to turn into evening destinations for the MTR passengers. Table 4.5 indicates that this is partly valid. Four out of 12 highly used morning origin stations fall into the high patronage category as destinations during the evening peak hours. These include Kowloon Tong (as transport interchange), Tsuen Wan, Sham Shui Po and Wong Tai Sin stations. The remaining 8 stations all fall within the second category, i.e. the 'medium-high destination stations' in the evening peak period. These stations are highlighted under the destination column in Table 4.5.

- 4.25 The most popular destination stations during the evening peak period comprise those located within the existing old urban districts. Their development characteristics comprise mixed land uses, high development density, compact environment and exciting street-level commercial activities. These include Mong Kok, Causeway Bay, Tsim Sha Tsui, Jordan, Prince Edward, Yau Ma Tei and Wanchai stations. We postulate that the motives of MTR evening peak passengers are probably more diverse. MTR provides a major means for commuting back home after work. Furthermore, it also offers passengers to engage in other off-business social functions such as shopping, meeting friends, home-away dining and entertainment activities.

Table 4.5 Weekday Evening Peak: MTR Station Ranking

Station Ranking	Origin	Destination
High Passenger Patronage	<i>Central</i>	<i>Kowloon Tong</i>
	<i>Tsim Sha Tsui</i>	Mong Kok
	<i>Kowloon Tong</i>	Causeway Bay
	<i>Wanchai</i>	Tsim Sha Tsui
	<i>Causeway Bay</i>	<i>Tsuen Wan</i>
	<i>Sheung Wan</i>	<i>Sham Shui Po</i>
	Mong Kok	Jordan
	<i>Lai Chi Kok</i>	Prince Edward
	<i>Admiralty</i>	<i>Wong Tai Sin</i>
	<i>Kwun Tong</i>	Kwai Fong
	<i>Kwai Fong</i>	Kwun Tong
	<i>Kowloon Bay</i>	Yau Ma Tei
Average	12206	11036
Medium-High Patronage	Tsuen Wan	Wanchai
	Quarry Bay	<i>Tai Koo</i>
	Sham Shui Po	Kowloon Bay
	Jordan	<i>Tsing Yi</i>
	Prince Edward	<i>Lam Tin</i>
	Yau Ma Tei	<i>Diamond</i>
	Tai Koo	<i>Choi Hung</i>
	Hong Kong	<i>Po Lam</i>
	Kwai Hing	Cheung Sha Wan
	Chai Wan	<i>Hang Hau</i>
	Ngau Tau Kok	Central
	Cheung Sha Wan	<i>Chai Wan</i>
Average	5694	5989

Table 4.5 (Con't) Weekday Evening Peak: MTR Station Ranking

Station Ranking	Origin	Destination
Medium-Low Patronage	Wong Tai Sin	Lok Fu
	Choi Hung	Mei Foo
	Mei Foo	Admiralty
	Diamond Hill	North Point
	Fortress Hill	Shau Kei Wan
	North Point	Sai Wan Ho
	Lam Tin	Tsuen Kwan O
	Tsing Yi	Shek Kip Mei
	Olympic	Fortress Hill
	Shau Kei Wan	Sheung Wan
	Lok Fu	Heng Fa Chuen
	Tung Chung	Quarry Bay
Average	3027	3751
Low Patronage	Heng Fa Chuen	Lai King
	Hang Hau	Olympic
	Lai King	Kwai Hing
	Po Lam	Lai Chi Kok
	Shek Kip Mei	Tin Hau
	Yau Tong	Ngau Tau Kok
	Tsuen Kwan O	Tung Chung
	Sai Wan Ho	Hong Kong
	Tiu Keng Leng	Tai Wo Hau
	Tin Hau	Tiu Keng Leng
	Tai Wo Hau	Yau Tong
	Kowloon	Kowloon
Average	1808	1960

4.26 In summary, the following observations about the relationship between property development and MTR ridership can be drawn, based upon the ranking analysis of station patronage:

- (a) High concentrations and densities of both population and employment are associated with high MTR station ridership.
- (b) Mixed land use development, compact environment and exciting street-level activities in the existing old urban districts promote MTR patronage.
- (c) Integrated rail-property development in the new developed districts, with good layout, attractive design and efficient connections with the surrounding district context enhances MTR ridership.
- (d) MTR provides an attractive and popular transport means to connect the population districts with the employment centres.

- 4.27 This study has examined how certain land development characteristics, such as the working population level, the different types and number of housing units and the locational concentration of housing, affect the patronage of MTR stations. The MTR ridership data are provided by the MTRC. The land development data are from the 2001 Population Census and the measurements of the research team. Table 4.6 presents the land use data set. The findings and interpretations are presented below.
- 4.28 Correlation Analysis: A correlation test between land use and ridership data is performed for all the 48 stations. (Correlation measures the degree to which two variables are associated with or relate to each other. It does not, however, provide a test of their causal relationship.)
- 4.29 Table 4.7 highlights the correlation coefficients that illustrate the statistically significant relationships⁴. The findings are consistent with expectations:
- (a) Daily ridership has no statistically significant relationship with the total number of housing units around the stations. This confirms the earlier arguments in paragraph 4.26 that land use diversity contributes positively to overall MTR patronage.
 - (b) Similarly, the level of patronage for origin station during the morning peak has no relationship with that for morning peak destination station. This implies the one-way flow of morning passenger traffic generated from the population centres. There is no relationship in patronage between evening peak origin and morning peak origin.
 - (c) The patronage level for origin stations during morning peak is found to positively correlated with working population, the amount of housing units within 500m, and the station patronage for destination during evening peak. This confirms the earlier observation that the MTR provides a key transport means for working trips.
 - (d) Morning peak destinations are likely to be employment centres. Hence, negative relationship between such patronage and the amount of housing units around the stations is identified. However, there is strong positive correlation in the level of station patronage between morning destination and evening origin. An MTR station that attracts high

⁴ A correlation coefficient can take on any value between and including -1 and +1. These indicate the two extremes. A value of '-1' implies that the two variables move in opposite direction by the exact magnitude whereas a value of '+1' illustrates a positive movement by the same amount. A correlation coefficient of '0' indicates independent movement of the two variables.

usage as the morning destination (where the jobs are) is likely to record high patronage as the origin during the evening peak.

- (e) Evening peak origin ridership (where the jobs and non-housing uses are located) is found to correlate negatively with the amount of housing around the stations, but positively with evening destination ridership. This indicates that mixed land uses around these stations attract evening peak hour passengers.
- (f) Finally, evening peak destination is found to correlate positively with the amount of private housing units within 500m of the stations. The MTR provides an important transport mode for the people to travel back home.

Table 4.6 Land Use Data

Station	Working Population within 500m	Public Rental Units within 500m	Subsidized Sale Housing Units within 500m	Private Housing Units within 500m	Total Housing Units within 500m	Public Rental Units within 200m	Subsidized Sale Housing Units within 200m	Private Housing Units within 200m	Total Housing Units within 200m
adm	5268	0	0	3422	3422	0	0	440	440
cab	23753	0	0	13835	13835	0	0	7222	7222
cen	8549	0	0	5553	5553	0	0	833	833
chh	27038	15604	2163	1768	19535	11878	0	1487	13365
chw	43329	11900	6269	7470	25639	5334	571	4696	10601
csw	35418	13942	1616	9214	24772	7723	15	1756	9494
dih	43331	8830	13285	6757	28872	0	3695	3947	7642
foh	43039	0	0	25033	25033	0	0	11702	11702
hah	53410	11148	13623	6425	31196	5796	9369	6324	21489
hfc	13219	0	0	6835	6835	0	0	6340	6340
hok	*	*	*	*	*	*	*	*	*
jor	23373	0	0	15775	15775	0	0	6802	6802
kob	57852	27318	2446	13956	43720	9238	0	13212	22450
kot	8944	0	0	4010	4010	0	0	1704	1704
kow	652	0	0	349	349	0	0	349	349
kwf	50489	23684	1670	5464	30818	5076	0	3753	8829
kwh	42246	20773	2181	3264	26218	15697	2181	3264	21142
kwt	39956	13244	1750	11527	26521	0	0	5314	5314
lak	14707	6733	536	825	8094	6733	536	825	8094
lat	24194	8150	0	7005	15155	0	0	5126	5126
lck	3903	206	0	2002	2208	0	0	364	364
lof	25558	12716	2470	325	15511	6014	1992	15	8021
mef	24290	0	0	13448	13448	0	0	12198	12198
mok	33846	0	0	21516	21516	0	0	8013	8013
nop	44901	1505	0	23219	24724	1505	0	14481	15986

Table 4.6(Con't) Land Use Data

Station	Working Population within 500m	Public Rental Units within 500m	Subsidized Sale Housing Units within 500m	Private Housing Units within 500m	Total Housing Units within 500m	Public Rental Units within 200m	Subsidized Sale Housing Units within 200m	Private Housing Units within 200m	Total Housing Units within 200m
ntk	26029	8416	0	8715	17131	4925	0	2504	7429
oly	16888	0	1220	8873	10093	0	0	4225	4225
poa	46822	11614	7498	8939	28051	6344	5263	6429	18036
pre	30765	0	0	19168	19168	0	0	8685	8685
qub	21257	1812	1088	9442	12342	1358	0	3957	5315
shw	16550	0	0	11101	11101	0	0	2995	2995
skm	27651	10277	0	9250	19527	6485	0	2670	9155
skw	34129	8345	3408	10442	22195	3280	1876	6577	11733
ssp	45192	5508	894	23030	29432	1385	670	10740	12795
swh	49598	5786	7125	18533	31444	2047	4086	7320	13453
tak	62628	2047	5815	29365	37227	0	1731	14686	16417
tih	20159	2678	0	10459	13137	0	0	5587	5587
tik	3567	0	1915	8	1923	0	0	0	0
tko	29111	5274	11624	10	16908	0	1915	8	1923
tst	8473	0	0	5724	5724	0	0	3188	3188
tsw	30061	3126	0	15449	18575	0	0	9205	9205
tsy	29939	5453	6005	5131	16589	828	2200	3459	6487
tuc	11245	1625	2635	1555	5815	1625	2635	1555	5815
twh	37991	14188	691	8490	23369	3463	691	1501	5655
wac	29127	0	0	17784	17784	0	0	9735	9735
wts	39330	20770	2682	4518	27970	11782	0	0	11782
yat	7241	1820	1703	738	4261	639	0	710	1349
ymt	27634	723	0	16338	17061	0	0	5217	5217

Table 4.7 Correlation Coefficients

Variable	Correlation Coefficient	Variable
Morning Peak Origin Ridership	0.346*	Working Population
Morning Peak Origin Ridership	0.333*	Total Number of Housing Units within 500m
Morning Peak Origin Ridership	0.652**	Evening Peak Destination Ridership
Morning Peak Destination Ridership	-0.343*	Number of Subsidized Sale Housing Units within 500m
Morning Peak Destination Ridership	0.946**	Evening Peak Origin Ridership
Morning Peak Destination Ridership	-0.289*	Housing Concentration within 200m
Evening Peak Origin Ridership	-0.348*	Number of Subsidized Sale Housing Units within 500m
Evening Peak Origin Ridership	0.563**	Evening Peak Destination Ridership
Evening Peak Origin Ridership	-0.309*	Housing Concentration within 200m
Evening Peak Destination Ridership	0.321*	Number of Private Housing Units within 500m

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

- 4.30 *Regression Analysis:* The regression analysis demonstrates how housing density and integration between railway and housing development contribute positively to MTR ridership. Nineteen out of 48 stations were selected in running our tests. These stations comprise a wide range of stations, but include nearly all the stations that record high patronage as the origins during the morning peak hours and those which provide better integrated rail-property development projects. To avoid distortion of the results, terminal and exchange stations with high usage, such as Tsuen Wan, Prince Edward, Mong Kok and Kowloon Tong stations were excluded.
- 4.31 The 19 stations include: Choi Hung, Chai Wan, Diamond Hill, Hang Hau, Heng Fa Chuen, Kowloon, Lai King, Lam Tin, Lok Fu, Mei Foo, Po Lam, Sham Shui Po, Tai Koo, Tiu Keng Leng, Tseung Kwan O, Tsing Yi, Tung Chung, Wong Tai Sin and Yau Tong stations. Table 4.8 provides a collective data profile of these 19 stations.

Table 4.8 Selected 19 MTR Stations: Land Use and Ridership Data

Item	Figure	% MTR Total	% Territory Total
Stations (Number)	19	48	-
Working Population within 500m (Persons)	544,803	40.6%	16.7%
Public Rental Units within 500m (Number)	129,192	45.3%	20.7%
Subsidized Sale Housing Units within 500m (Number)	79,117	77.3%	24.7%
Private Housing Units within 500m (Number)	124,501	27.5%	12.4%
Total Housing Units within 500m	332,810	39.6%	17.1%
Ratio: Public Rental vs Sale Housing within 500m	63%	-	-
Public Rental Units within 200m (Number)	58,358	49.0%	9.3%
Subsidized Sale Housing Units within 200m (Number)	30,577	77.6%	9.6%
Private Housing Units within 200m (Number)	78,894	34.1%	7.8%
Total Housing Units within 200m (Number)	167,829	43.1%	8.6%
Ratio: Public Rental vs Sale Housing within 200m	53%	-	-
Housing Concentration within 200m	50%	-	-
Weekday Daily Origin (Passengers)	703,601	30.0%	
Weekday Daily Destination (Passengers)	675,611	28.8%	
Weekday Morning Peak Origin (Passengers)	128,044	45.6%	
Weekday Morning Peak Destination (Passengers)	45,390	16.2%	
Weekday Evening Peak Origin (Passengers)	56,241	20.6%	
Weekday Evening Peak Destination (Passengers)	89,970	33.0%	

4.32 Table 4.9 presents the findings. The key important interpretations are as follows:

- (a) All the models confirm the positive relationship between housing density and MTR ridership in these stations. In other words, a larger number of housing units tends to increase MTR patronage⁵.
- (b) The benefit of integration of housing development and railway station is clearly demonstrated in all cases. The impact on MTR ridership of housing units within 200m of an MTR station tends to be much stronger than those within the 500m range. For instance, Model 1 demonstrates that, assuming most passengers come from within the 500 m walking catchment, every unit of public rental housing unit and of private housing units within 500 m of a station will respectively account for about 1.97 and 1.62 passengers using the station as the origin on a typical day. Model 2 shows that the ridership figures will increase to 2.55 and 2.64 passengers respectively for every unit of public rental and private housing units within the 200 m zone around an MTR station, assuming most ridership comes from this zone.
- (c) Generally speaking, the effect of public rental housing units on MTR ridership tends to be stronger than that of the private housing units within the 500m distance range. However, the housing impact on ridership appears to reverse within the 200 m zone⁶. In other words, it tends to improve ridership when private housing development is clustered around an MTR station.

⁵ This does not contradict our earlier findings about the lack of statistically significant relationship between housing and daily MTR ridership because the previous analysis examines all the MTR stations but this analysis is deliberately focused on the housing districts only.

⁶ The reasons to explain this may include: higher income, higher value of time, profession, taste and household characteristics such as size and composition of the private households.

Table 4.9 Selected 19 MTR Stations: Regression Analysis Results

Model	1	2	3	4	5	6
<i>Dependent Variable</i>	DAYORIG	DAYORIG	DAYDEST	DAYDEST	MORNORIG	MORNORIG
Constant	13051.72	18248.93	13280.80	17837.06	2392.88	3533.27
Independent Variable(s):						
PR500	1.97		1.70		0.42	
PVH500	1.62		1.64		0.23	
PR200		2.55		2.16*		0.51
PVH200		2.64		2.67		0.40
R Square	0.838	0.545	0.863	0.564	0.791	0.483
F	41.327	9.575	50.282	10.367	30.259	7.748

Model	7	8	9	10	11	12
<i>Dependent Variable</i>	MORNDEST	MORNDEST	EVENORI	EVENORI	EVENDEST	EVENDEST
Constant	1244.71	1255.12	1493.97	2144.30	1448.535	2325.81
Independent Variable(s):						
PR500	3.74E-02**		7.60E-02*		0.269	
PVH500	0.14		0.15		0.222	
PR200		7.50E-02**				0.307*
PVH200		0.22		0.2		0.353
R Square	0.606	0.452	0.724	0.398	0.836	0.479
F	12.303	6.602*	20.941	11.262	40.636	7.355

Notes:

Significant at 0.01 level

* Significant at 0.05 level

** Not significant

Legend:

DAYORIG: Weekday total origin ridership

DAYDEST: Weekday total destination ridership

MORNORIG: Morning peak origin station ridership

MORNDEST: Morning peak destination station ridership

EVENORI: Evening peak origin station ridership

EVENDEST: Evening peak destination station ridership

PR500: Number of public rental units within 500 m of MTR station

PVH500: Number of private housing units (excluding subsidized sale housing) within 500 m of MTR station

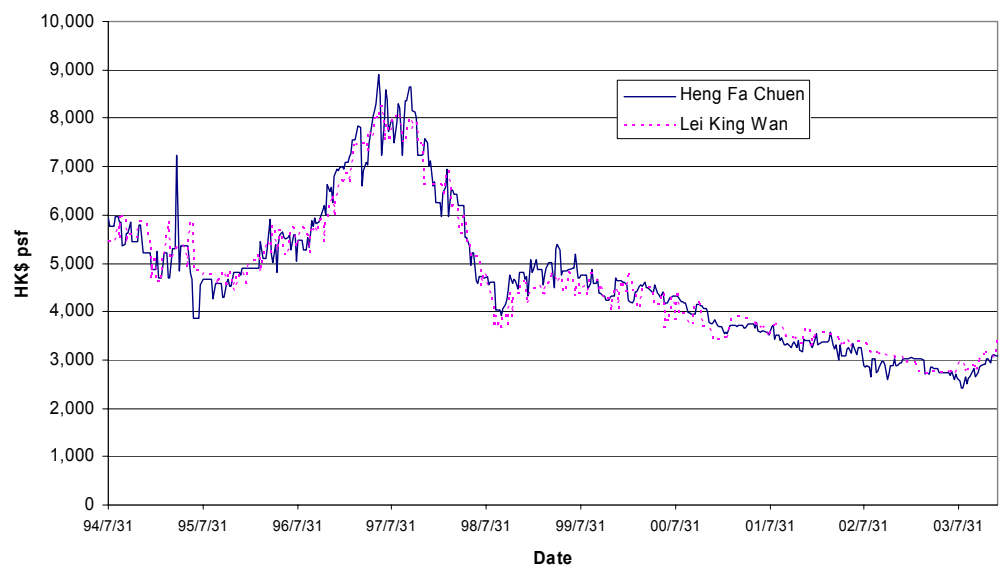
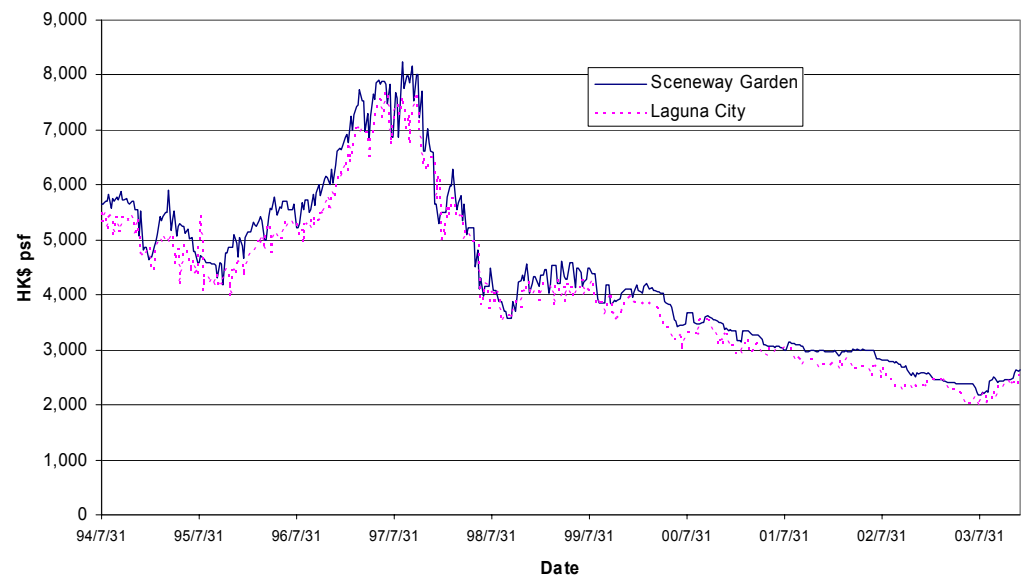
PR200: Number of public rental units within 200 m of MTR station

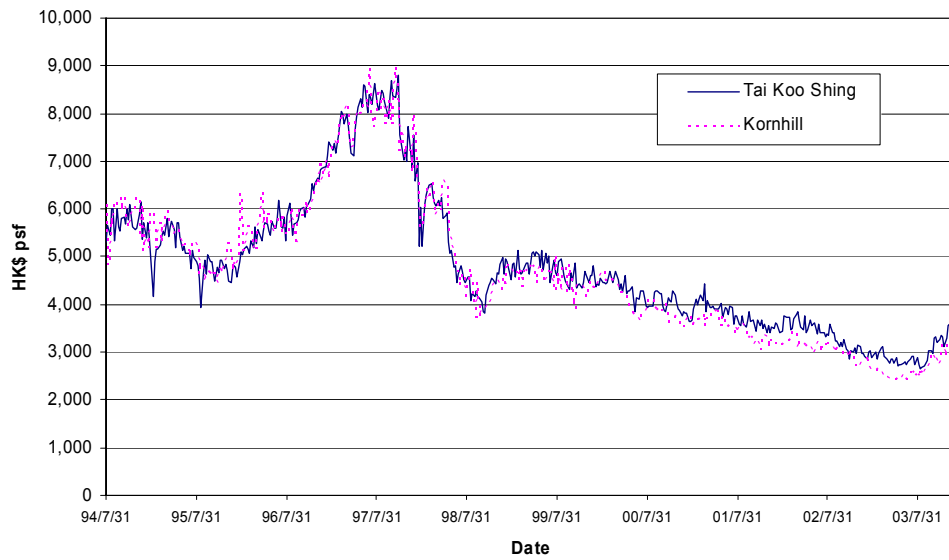
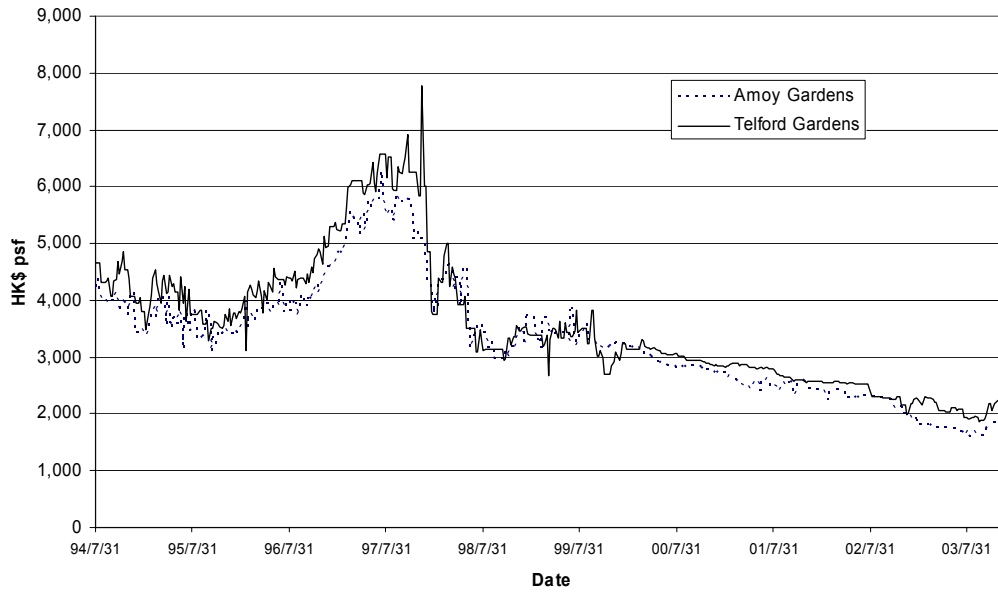
PVH200: Number of private housing units (excluding subsidized sale housing) within 200 m of MTR station

Property Value & Integration with MTR

- 4.33 Housing projects that are better integrated with an MTR station, in terms of closer distance, better layout, attractive design and efficient connection, are expected to be favoured by the buyers and hence are likely to command higher values than other properties. But, what exactly is the value premium generated by such integration?
- 4.34 Clearly, the property values are affected by numerous factors such as flat size, flat mix, size of estate, orientation, building age, property management and so on. This analysis examines the average property values between two comparable housing projects over a long timeframe. One project within the pair has a better integration with the MTR station than the other, while other factors are generally equal. Paired-samples t-test is then used to determine whether there is a statistically significant difference between the average property values (or the means) of these two projects over time.
- 4.35 Property value data are collected from Centa-City Index (CCI) published by a property agency firm on the internet. The analysis compares four pairs of housing projects in which the first one in the pairs is generally regarded to be better integrated with the MTR services. These four pairs of housing estates include:
- (a) Sceneway Garden and Laguna City
 - (b) Heng Fa Chuen and Lei King Wan
 - (c) Telford Gardens and Amoy Gardens
 - (d) Tai Koo Shing and Kornhill
- 4.36 Figures 4.3 to 4.6 show the property value movements of these four pairs of housing estates during the study period from 1994 to 2004. Their price fluctuations were generally in line with each other and with the general property market conditions.

Fig. 4.3- 4.6 Property Price Movement





- 4.37 Table 4.10 illustrates the study findings and confirms expectations. The first property development in each pair generally commands a higher property value than the second one. With the exception of 'Pair 2', the differences are statistically significant at the .01 level ⁷.
- 4.38 It is concluded that housing properties with better integration with the MTR stations tends to give higher values. Our findings indicate that the additional premium on average can range between HK\$98 and HK\$280 per sq. ft.

Table 4.10 Property Value Differences

	Pair 1		Pair 2		Pair 3		Pair 4	
	Sceneway Garden	Laguna City	Heng Fa Chuen	Lei King Wan	Telford Gardens	Amoy Gardens	Tai Koo Shing	Kornhill
Unit Housing Price (HK\$psf)	4451.75	4171.55	4734.46	4703.45	3529.89	3291.72	4858.43	4760.93
N	529	529	529	529	500	500	529	529
Std. Deviation	1498.98	1427.60	1435.86	1353.35	1160.55	1037.92	1411.37	1534.82
Paired Differences:								
Mean								
(HK\$psf)		280.20		31.01		238.18		97.50
Std.								
Deviation		237.62		356.60		324.73		357.56
Std. Error								
Mean		10.33		15.50		14.52		15.55
t		27.12		2.00		16.40		6.27
df		528		528		499		528
Sig. (2- tailed)		.000		0.046		.000		.000
Period under study	Jan 1994 - Mar 2004		Jan 1994 - Mar 2004		Jul 1994 - Mar 2004		Jan 1994 - Mar 2004	

Data source: Centra-city Index

⁷ It may be argued that Heng Fa Chuen and Lei King Wan are not directly comparable because they are located in two different districts and served by different MTR stations. Lei King Wan is located at about 400 m away (walking distance on footpaths) from Sai Wan Ho Station. Heng Fa Chuen Station, which is two stations further away from Sai Wan Ho Station, is much better integrated with Heng Fa Chuen housing estate developed by MTRC. However, the average housing prices of Heng Fa Chuen are found to be comparable, if not slightly higher than, those of Lei King Wan. This perhaps helps to show that, from the perspective of the home buyers, a better layout and design integration between railway station and housing development is able to compensate fully for the disadvantages of longer travelling time and higher transport costs on the MTR.

Impact on Urban Redevelopment

- 4.39 An MTR station greatly improves the accessibility of a development site and thus increases its value. This encourages land owners to redevelop their sites located near an MTR station and capture the full development potential generated by the MTR network.
- 4.40 More urban development activities may be expected to take place near to the MTR stations. These activities also include land use changes, from a relatively lower-value use to a higher-value use. An example is a shift from residential use to commercial-office development.
- 4.41 These expectations are verified based upon an analysis of the planning application data contained in the Planning Register provided by the Planning Department for the period between 1988 and 1997. These data refer to the planning applications for commercial-office development on Residential (Group A) – R(A) zones in urban Kowloon and Hong Kong Island. Under the Town Planning Ordinance, proposed land use development that fall under Column 2 uses of a statutory town plan requires prior application to the Town Planning Board for approval. Commercial-office development is a Column 2 use for land zoned as R(A) on the statutory town plans.
- 4.42 Figure 4.7 illustrates the relationship between the redevelopment site area and its distance with the nearest distance with an MTR station. Most of the redevelopment sites are clustered within 400 m from an MTR station. This pattern is the same when considering Hong Kong Island and Kowloon separately (Figures 4.8 and 4.9).
- 4.43 Table 4.11 confirms the arguments proposed. There were considerably more application sites for commercial-office development within the 400 m of an MTR station than beyond. The number of sites in the former was generally twice that in the latter.
- 4.44 These application sites were generally very small in terms of site area, particularly for those located in urban Kowloon and within the 400 m zone. The average site area was only about 340 sq.m.
- 4.45 The findings suggest that the private land owners and developers actively seek to capture the locational benefits generated by the MTR stations on their urban sites. By applying for land use change from residential to commercial development, they exploit the development potential of their sites. However, the scale of redevelopment remains small and piecemeal. It appears that, without comprehensive planning, their in-situ redevelopment is unlikely to fully maximize the social and economic benefits from better integration with the MTR networks.

Fig. 4.7 Property Redevelopment (HK Island & Kowloon)

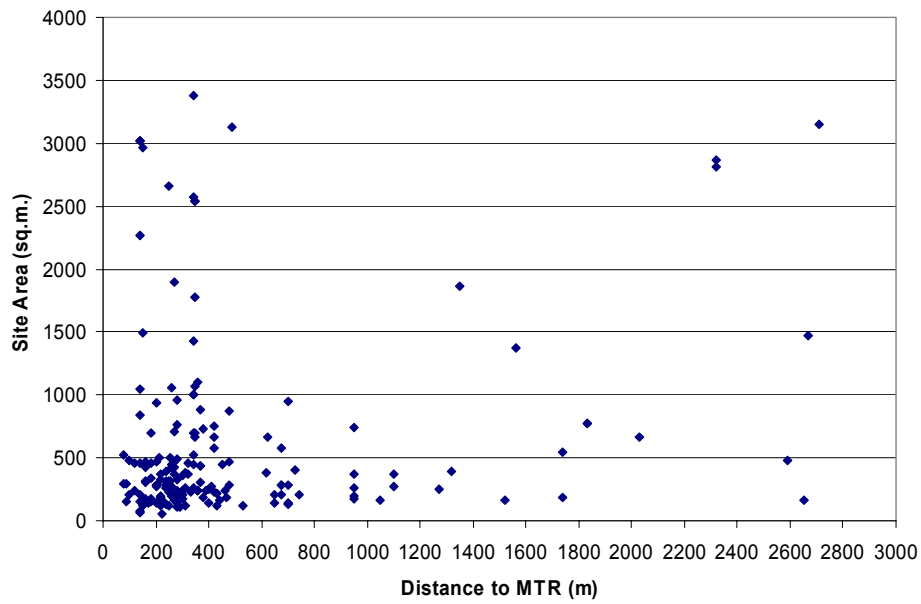


Fig. 4.8 Property Redevelopment (Kowloon)

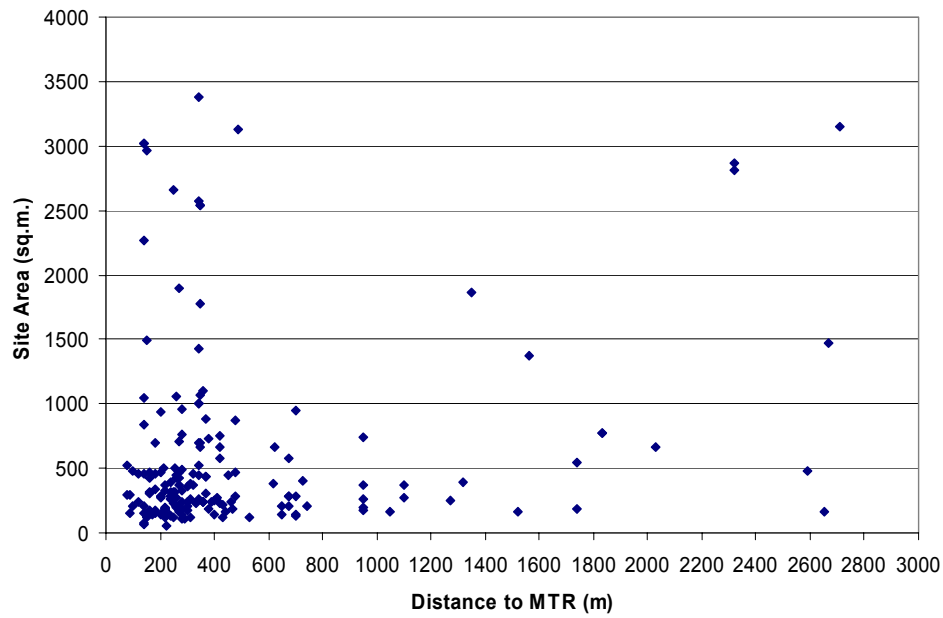


Fig. 4.9 Property Redevelopment (Hong Kong Island)

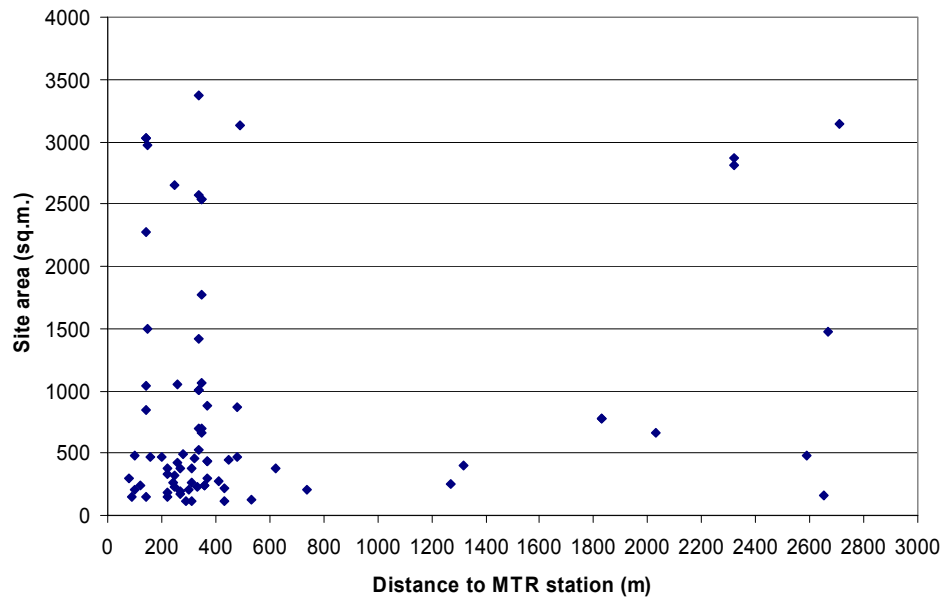


Table 4.11 Commercial-Office Redevelopment Sites**All Sites:**

Distance from MTR station	<400m	>=400m	all sites
Mean (site area in sq.m.)	578.45	615.61	589.95
Median	314.42	281.00	302.38
Minimum	56	114.62	56
Maximum	3374	3148	3374
Range	3318	3033.38	3318
Std. Deviation	702.58	751.77	716.26
N	125	56	181

Urban Kowloon Sites:

Distance from MTR station	<400m	>=400m	All sites
Mean (site area in sq.m.)	340.11	412.63	364.29
Median	270.00	275.00	275.00
Minimum	56	134	56
Maximum	1895	1863	1895
Range	1839	1729	1839
Std. Deviation	286.59	372.42	317.83
N	70	35	105

Hong Kong Island Sites:

Distance from MTR station	<400m	>=400m	All sites
Mean (site area in sq.m.)	881.79	953.92	901.72
Median	454.24	466.00	460.12
Minimum	111.4	114.62	111.4
Maximum	3374	3148	3374
Range	3262.6	3033.38	3262.6
Std. Deviation	928.00	1061.20	959.90
N	55	21	76

Planning & Design Features: Selected MTR Stations

- 4.46 This section identifies the essential planning and design features of an integrated rail-property development that contributes to promoting MTR patronage and urban environment. Earlier sections demonstrate that a high concentration of working population, housing and employment around the MTR stations is useful in increasing MTR ridership. However, this is only a necessary but not sufficient condition. Some MTR stations (e.g. Tsing Yi and Lam Tin stations) can attract higher patronage than others (e.g. North Point, Ngau Tau Kok, Tin Hau, Tai Wo Hau and Tseung Kwan O stations), which have comparable, if not greater, densities of working population and housing units in the catchment areas (Table 4.12)⁸.

Table 4.12 MTR Patronage and Land Use Characteristics: Selected Stations

Station	Working Population within 500m	Total Housing Units within 500m	Total Housing Units within 200m	Weekday Daily Origin Ridership
Lam Tin	24194	15155	5126	47042
North Point	44901	24724	15986	30511
Ngau Tau Kok	26029	17131	7429	29265
Tin Hau	20159	13137	5587	14926
Tseung Kwan O	29111	16908	1923	25577
Tsing Yi	29939	16589	6487	41988
Tai Wo Hau	37991	23369	5655	14949

Data sources: Extracts from Table 4.6 and MTR ridership data

- 4.47 This study suggests that some positive planning and design features of the integrated rail-property development projects explain why some stations are more successful in attracting MTR passengers. Site visits to some selected MTR stations help identify these essential features and throw light on the social and economic benefits associated with integrated development.
- 4.48 *Walking Environment:* Most of MTR passengers go to the stations by walking (Table 4.13). Thus, the walking distance and the quality of the walking environment become important considerations to the passengers. If the stations

⁸ The high patronage for Tsing Yi and Lam Tin stations are also caused by the significant volume of feeder passengers using the public transport interchanges. According to the MTR Transport Planning Report 2002, about 30% and 27% of the MTR passengers in Lam Tin and Tsing Yi stations, respectively, relied on public buses and light buses as the feeder transport modes. Current information illustrates that 7 bus lanes and 4 light bus lanes terminate at the transport interchange of Lam Tin MTR station, whereas 8 bus routes and 4 light bus lanes terminate at that of Tsing Yi station.

are physically too far away, inconvenient or unattractive to pedestrians, they are likely to deter potential passengers from using the MTR.

- 4.49 On the contrary, when the walking environment to the MTR stations is short, direct, convenient and attractive to the pedestrians, this is likely to promote MTR ridership. High building density and compact development clusters around the MTR stations are useful in shortening the physical walking distance between activity centres and the transport nodes. Sensitive planning and design can create an attractive walking environment to the stations.

Table 4.13 Feeding Mode by Walking to MTR Stations

Station	Per Cent
Chai Wan	78.5
Heng Fa Chuen	81.0
Quarry Bay	98.8
Admiralty	79.9
Lam Tin	62.4
Kowloon Bay	89.3
Lok Fu	87.1
Kwai Fong	73.0
Lai Chi Kok	92.9
Jordan	93.4
Tsing Yi	77.1
Tung Chung	63.6

Data source: MTRC's Transport Planning Report 2002

- 4.50 Chai Wan Station: Chai Wan Station is a case in point. It is located within a compact urban environment surrounded by mixed land uses including residential, industrial and business uses (Photo 4.1).

Photo 4.1 Compact Mixed Land Use Development around Chai Wan Station



- 4.51 New Jade Gardens, an above-station housing (plus podium retail) project developed by the MTRC on Chai Wan station, provides the maximum convenience to the residents in using the MTR services. Furthermore, Chai Wan station is well connected by extensive footbridges to the surrounding private and public housing estates (Photo 4.2). These footbridges bridge over extremely busy roads around the station and hence provide good accessibility and safety to the pedestrians. In addition, they link up well-managed shopping centres at the podium level around the station (Photo 4.3).

Photo 4.2 Footbridge Connections with Chai Wan station



Photo 4.3 Shopping Centres connected to Chai Wan station



- 4.52 Tsing Yi Station: Tsing Yi station is another showcase of MTR's integrated rail-property development project. Tierra Verde, an high-rise housing development project is developed on top of Tsing Yi station (Photo 4.4).

Photo 4.4 Tierra Verde above Tsing Yi station



- 4.53 Tsing Yi station also comprises a successful regional shopping mall managed by the MTR Corporation, the Maritime Square (Photo 4.5). This makes it a focal point of the district.

Photo 4.5 Maritime Square



- 4.54 The residents of Tierra Verde enjoy a direct access into the shopping mall which also provides a weather-free connection to the MTR station (Photo 4.6).

Photo 4.6 Weather-free Connections between Maritime Square and Tsing Yi Station



- 4.55 Po Lam Station: Po Lam station is one of the newly opened MTR station at Tseung Kwan O new town with high patronage (Photo 4.7). Although it has no above-station housing development, it is densely surrounded by new high-rise housing estates. Footbridge connections provide easy, convenient and safe access between the station and the podium shopping malls of these housing estates (Photo 4.8).

Photo 4.7 Po Lam Station



Photo 4.8 Footbridge Connections to Shopping Malls around Po Lam Station



- 4.56 Tseung Kwan O Station: MTR stations that lack the above planning design and layout features tend to attract fewer passengers. Tseung Kwan O station, another newly opened station, is a case in point. The station is a stand-alone facility. Although the station is also surrounded by new housing estates, most of them are located at a distance from the station (Photo 4.9).

Photo 4.9 Tseung Kwan O Station



- 4.57 Most of the land adjacent to the station is largely undeveloped. It therefore lacks the critical mass of population to support high patronage. The entry to the station is at ground level. The walking distance is not only long, but also unpleasant. Many passengers have to walk along pavements without any physical cover and/or cross major roads in order to reach the station (Photo 4.10).

Photo 4.10 Unpleasant Walking Environment to Tseung Kwan O Station



- 4.58 Yau Tong Station: Yau Tong station suffers similar problems like those of Tseung Kwan O station. Although Yau Tong is not a new development district like Tseung Kwan O, the housing mass and building density around the station remain relatively low. Its adjacent site is under construction and, when completed, it is expected to help MTR patronage in the future (Photo 4.11).

Photo 4.11 Development around Yau Tong Station



- 4.59 Although Yau Tong station is connected to the adjacent uphill public housing estates by escalators and footbridges, the walking environment is not particularly pleasant to the pedestrians. The local shopping mall, which connects mid-way between the station and the housing estates, is not attractive (Photo 4.12). The provision of a bus terminus at the doorstep of the public housing estates is likely to take away potential passengers from MTR (Photo 4.13).

Photo 4.12 Unattractive Local Shopping Mall



Photo 4.13 Competing Bus Services



4.60 Density and diversity are two inherent characteristics of urban life. They are also essential features that contribute to support the patronage of MTR services. The reverse relationship is also valid. MTR helps support dense development and diverse land uses. By concentrating urban development and activities around the MTR stations, this promotes compact environment, enhances pedestrian-free settings and reduces urban sprawl.

4.61 The above examples illustrate how responsive land use planning and design, especially the integration of safe, direct and convenient pedestrian connections with well-managed shopping facilities can maximize the benefits to both railway and property development.

External Benefits

4.62 Mass transit railways also create external benefits, which are values generated by the projects to the community but have not been internalized by the railway companies. These external benefits, also known as positive “externalities”, may consist of:

- (a) travel time saving and road safety benefits
- (b) positive impacts on property values within the railway catchment
- (c) financial gains to the government in terms of increasing property rates, taxes and land premiums

- (d) environment health benefits in terms of reduction in roadside pollution (as a result of less road traffic), decrease in government medical expenditure and productivity gains (due to healthier workforce)
- (e) possible rejuvenation of the older urban areas along railway catchment
- (f) possible increase in employment opportunities
- (g) possible increase in available land for amenities and possible protection of heritage features such as shorelines

4.63 Not all of these external benefits can be quantified. A recent study funded by the MTRC (Barron et al., 2004) sought to estimate the value of the external benefits generated by its proposed West Island Line/South Island Line project. This project extends for about 16 km from Sheung Wan via Kennedy Town to Aberdeen and from Ap Lei Chau past the lowland areas of Ocean Park to Admiralty (Fig. 4.10). It concludes that this project could generate an annual benefit of between HK\$2.6 and 3 billion per year, equivalent to a present value of around HK\$40 billion as at 2004.

Fig. 4.10 Proposed West Island Line/South Island Line Alignments



4.64 The existing MTR network of over 87 km certainly generates much higher external benefits because:

- (a) The existing MTR network is running through more expensive districts in the main urban areas and hence the values in terms of possible gains in property-related revenues are likely to be higher.
- (b) It connects the more congested and crowded districts and thus the saving in terms of travel time and environment benefits are likely to be higher.
- (c) The existing MTR network is a heavy capacity network and has a much larger carrying capacity than the proposed project, which is only a medium capacity train network.

Conclusions

4.65 This section discusses and quantifies, where possible, the empirical relationships between property development and MTR in Hong Kong. The objective is to demonstrate the impacts and benefits of the MTR and its integrated rail-property development model.

4.66 MTR is a key transport service provider and its network has extensive spatial coverage in the territory. Its current alignments and stations have achieved the following:

- (a) Over 2.78 million people (over 41% of the total population) and over 1.34 million workers (over 41% of the territory total) live within 500 m of an MTR station.
- (b) Over 43% and 20% of the housing units in Hong Kong lie within 500 m and 200 m, respectively, of an MTR station.

4.67 MTR takes up a market share of over 24% of the total public transport ridership. The station analysis confirms that it provides a major transport function for the working population during the morning peak hours by connecting the housing areas with the employment districts. During the evening peak period, MTR provides essential transport services for the purposes of return-home trips and other off-business hours social activities in the existing urban districts.

4.68 The study findings confirm the positive relationship between property development and MTR ridership as follows:

- (a) High concentrations and densities of both population and employment are associated with high MTR station ridership. Our model indicates that every single unit of public housing unit and of private housing unit within 500 m of an MTR station account for about 1.97 and 1.62

passengers, respectively, using the station as an origin on a typical day. These patronage figures will increase for housing units within 200 m of an MTR station.

- (b) The clustering of private housing units around MTR stations tends to exert a greater impact on the ridership than public housing.
- (c) Mixed land uses, compact environment, exciting street-level activities in the existing old urban districts promotes MTR patronage.
- (d) Integrated rail-property development projects in the new development districts, comprising good layout, attractive design, well-managed shopping facilities and efficient pedestrian connections with the surrounding district context, enhances MTR ridership. Successful development normally includes extensive pedestrian connections that are convenient, direct, safe and pleasant.

4.69 The study also confirms that integrated rail-property development projects tend to give higher property values. The analysis of the sample housing estates indicate that the additional premium ranges between HK\$98 and HK\$280 per sq. ft. gross floor area.

4.70 MTR affects urban development activities. Its stations greatly improve the accessibility of the adjacent development sites and encourage land owners to redevelop their land for higher-value uses. This study confirms the enthusiasm of land owners in applying for land use change from residential to commercial-office uses on private sites near an MTR station in the urban districts. However, most of the application sites were extremely small (e.g. only 340 sq.m. on average in Kowloon) and the redevelopment projects were piecemeal. While such redevelopment can enable the land owners to capture the additional land value, the social and economic benefits of an integrated rail-property development model cannot be fully realized.

4.71 The MTR generates external benefits which are values not fully captured by the corporation. These positive externalities include, for example, travel time saving, road safety benefits, environmental health benefits, possible increases in property rates to the government and other community gains. Not all these external benefits to the society as a whole can be easily quantifiable. However, it is obvious that the existing MTR network of over 87 km generates enormous external benefits to the society because it passes through the densely populated districts, commercial and employment centres in the territory and it carries large passenger loads.

4.72 In sum, it is concluded that an integrated rail-property development model can generate the following social and economic benefits in a city:

- (a) Increase MTR ridership, reduce road traffic and pollution and thus lessen the need for more road construction (and reclamation)

- (b) Enable comprehensive planning and development of the station site and increase its overall property values
- (c) Concentrate land development and urban activities around the stations and reduce urban sprawl
- (d) Promote walking with the provision of safe, direct, efficient, convenient, weather-free and pleasant pedestrian connections with the stations
- (e) Enhance diversity of land uses and urban life
- (f) Enable travel time saving and road safety benefits
- (g) Create positive impacts on property values within the railway catchment
- (h) Generate financial gains to the government in terms of increasing property rates, taxes and land premiums
- (i) Enhance environment health benefits in terms of reduction in roadside pollution (as a result of less road traffic), decrease in government medical expenditure and productivity gains (due to healthier workforce)
- (j) Encourage possible rejuvenation of the older urban areas along railway catchment
- (k) Provide possible increase in employment opportunities
- (l) Enable possible increase in available land for amenities and possible protection of heritage features such as shorelines

5. MTRC's Financial Performance

Introduction

- 5.1 This section addresses the following two questions:
- (a) How does the MTRC perform financially?
 - (b) How is it compared with the local and Japanese firms which undertake transport and property businesses?
- 5.2 The MTRC is a unique company that combines property development and urban railway operations in Hong Kong. The study analyzes its economic value generated by such business integration, and compares its financial performance with a local bus company and with its Japanese counterparts which are exemplary in integrating railways with real estate (see further discussions in section 6).

Railway vs Property Development

- 5.3 A simple valuation model suggests that the railway investment itself is not viable in a business sense. According to MTRC¹, the cost and revenue of its rail, for the year ended 31st December 1999, were:

The cost of civil works, plant and equipment and assets under construction= \$79,021 million (MTRC, 2000, p.I-25)

The operating profit less depreciation= \$232 million (MTRC, 2000, p.I-22)

- 5.4 Based on assumption of real constant profits, the yield to perpetuity (r) is derived from the following equation:

$$\$79,021 = \frac{\$232}{r}$$

$$r = 0.3\%$$

- 5.5 This yield to perpetuity being practically zero means that the rail project would be viable only when financiers and investors alike require virtually zero rate of return for their capital. Of course, collectively creditors and investors have demanded a commercial return for their investment. Obviously, it is the property development that has been the source of return for them.

¹ MTRC (2000) *Prospectus of MTR Privatisation Share Offer*.

- 5.6 An expectation of high perpetual annual growth based upon ridership is not realistic. It is unlikely that there would be sufficient growth in the local population and its demand on transport services to sustain this profit growth. Indeed, Table 5.1 indicates that there have been decreasing trends, in both absolute and relative terms, in the annual passenger journeys by the MTR. For its revenues and profits to subsidize the rail, property development has been, and will continue to be, an inseparable part of the MTRC.

MTR vs KMB

- 5.7 The KMB has a high return on capital of over 22% for the period between 1995 and 2002. Several contextual reasons help to explain this outcome. Unlike the MTRC, the KMB does not pay for the construction of roads. The KMB has expanded as the population has grown and as more new towns have been developed away from the main urban areas. Its bus routes have increased in number. Bus trips, miles traveled and passengers have all been increasing through the years. According to the *Third Comprehensive Transport Study*², average 1997 traffic speeds are comparable to those 10 years ago despite rapid development. It is about 26-30 km/h in heavily urbanised areas and 32 km/h elsewhere in the peak hour. This is attributable to “considerable improvements to public transport services, including a more comprehensive railway network”. It is believed that much of the improvements in the reduction of surface road congestion within the main urban areas are brought about by the MTR services.
- 5.8 The KMB is clearly a beneficiary of the changes in spatial distribution of the population. According to *Travel Characteristics Survey 2002*³, there has been a “major growth in the number of trips made within and to/from the New Territories and a corresponding reduction in the number of trips made within the urban area between 1992 and 2002”. There has been substantial population growth in the New Territories, providing opportunities for the KMB to expand its routes and thereby increasing the travel propensity of patrons living in the New Territories. There is an increase in their person trip by close to 10% from 1992 to 2002 despite a marginal reduction in the territory-wide average during the same period.
- 5.9 Table 5.1 shows that the respective market share of the KMB and the MTRC have remained about the same in the 5 years between 1999 and 2003. The KMB has taken the lion’s share of all annual passenger journeys by public transport operators. It has been about 27%-28% versus 19%-20% of the MTRC. KMB is a major transport player. Whilst the service provided by the MTRC is geographically restricted to its fixed routes within the urban areas, the KMB has been able to expand into the New Territories. As Table 5.1 indicates, the market share of the KMB has remained more or less constant. It can also infer that within this market share of the KMB, there are more routes

² Source: Transport Department (2003) *Third Comprehensive Transport Study*.

³ Source: Transport Department (2002) *Travel Characteristics Survey 2002*.

to the New Territories than before. This implies that revenues of the KMB have increased and so have its profitability and profits.

Table 5.1
Annual Passenger Journeys by KMB and MTRC

Year	Annual Passenger Journeys by Public Transport Operator (unit: thousands)							Market Share (%)						
	Kowloon Motor Bus (KMB)			Mass Transit Railway (MTRC)			Total	Kowloon Motor Bus (KMB)			Mass Transit Railway (MTRC)			Total
	KMB	Long Wan Bus	KMB Total	Local Line	Airport Express Line (AEL)	MTRC Total		KMB	Long Wan Bus	KMB Total	Local Line	AEL	MTRC Total	
1999	1060011	16901	1076912	777309	10396	787705	3894359	27.2%	0.4%	27.7%	20.0%	0.3%	20.2%	100.0%
2000	1089176	17251	1106427	767416	10349	777765	3972720	27.4%	0.4%	27.9%	19.3%	0.3%	19.6%	100.0%
2001	1111171	18999	1130170	758421	9022	767443	4020588	27.6%	0.5%	28.1%	18.9%	0.2%	19.1%	100.0%
2002	1134354	20311	1154665	777210	8457	785667	4090353	27.7%	0.5%	28.2%	19.0%	0.2%	19.2%	100.0%
2003	1060508	19260	1079768	770419	6849	777268	3935471	26.9%	0.5%	27.4%	19.6%	0.2%	19.8%	100.0%

Source: *Monthly Traffic and Transport Digest January 2004*, Transport Department, HKSAR Government.

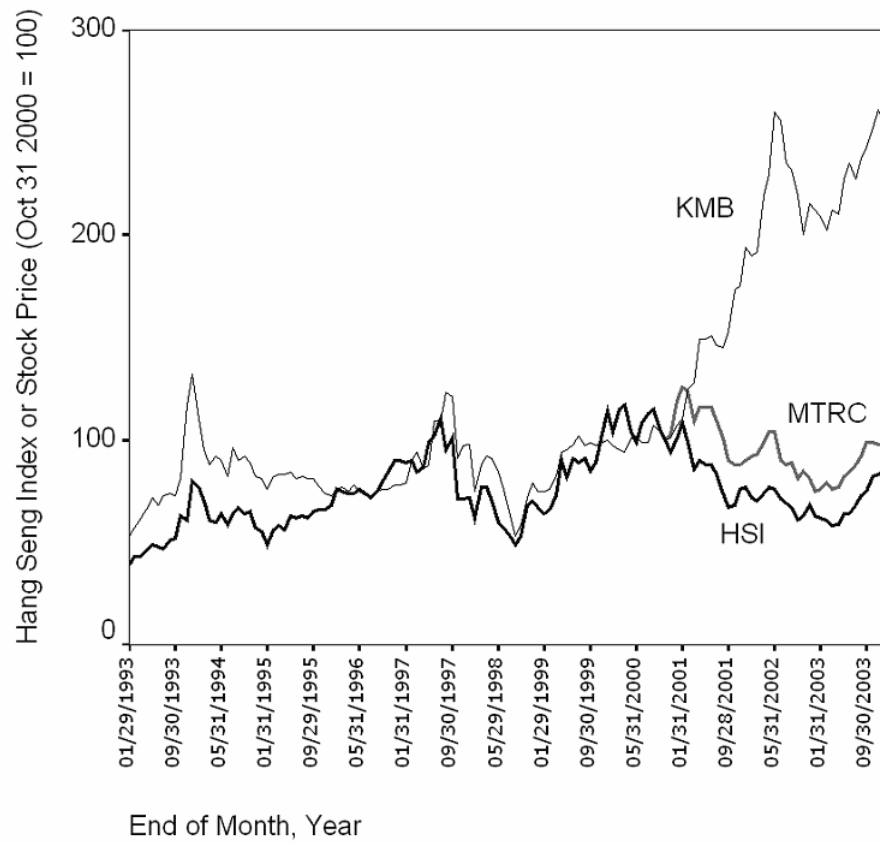
5.10 One reason for KMB's high profitability may be due to its regulated bus fares. In accordance with the Public Bus Services Ordinance, the last fare schedule was endorsed by the Executive Council in 1997 when the costs of living were all time high. Since then, Hong Kong has suffered a deflationary downward spiral. According to Frederick Fung in Legislative Council (Hansard, 2002⁴), between 1999 and 2002, deflation in Hong Kong was as high as 9.7%, whilst there was an increase of 1.1% increase in the transport fare index during the three years leading to 2002. Further, Fung also maintained that, based on opinion surveys, monthly transport expenses accounted for an average of about 10% of total income of the respondents. This proportion was considered to be higher than the 5% to 7% elsewhere in the world. Indeed expenditures on transport has become such a major concern that in October 2001, the then eight-party coalition reached a consensus on transport fares and "urged the Chief Executive to ask public transport operators to ride out the storm with the people together" (Hansard, 2002⁵).

5.11 The performance of the KMB stocks reflects its profitability during a deflationary economy. The stock prices of the KMB and MTRC are compared against the Hang Seng Index (HSI). Stock prices and the HSI are both converted to indices with the common base on 31 October 2000 being equal to 100. The MTRC started listing in October of 2000. The following Figure 5.1 shows the two series of price indices (MTRC and KMB) and the re-calibrated Hang Seng Index.

⁴ Hansard, 23 October 2002, p.656.

⁵ Hansard, 23 October 2002, p.645.

Figure 5.1
KMB versus MTRC and HSI



- 5.12 There are altogether 133 daily closing indices for HSI and KMB respectively for the period between January of 1993 and January of 2004. Four months after the initial public listing of the MTRC in October 2000, the KMB stocks have outperformed both the MTRC and the market (HSI). The trends have become more and more divergent ever since.
- 5.13 Thus, the KMB has been able to increase revenues by expanding into the New Territories and capitalizing on the rapid enhancement of the public transportation system, of which the MTRC has made major contributions. Further, the high return on capital has been made possible by regulated bus fares. On the other hand, the MTR has not been able to maintain such high level of return on capital, due to its inherent nature of business.

MTR vs KCRC

- 5.14 The financial ratios of the unlisted KCRC are not available. It is not possible to carry out in-depth financial analyses and comparisons. However, what the capital market has so far signalled is not in favour of the KCRC, or the planned merger between it and the MTRC. The market has generally commented that the merger could only raise the cost of capital of the MTRC. The profitability of the KCRC has been “dragged down” by its two unprofitable rail lines: the West Rail and the Light Rail. Whilst the MTRC has been able to maintain more or less the same level of profit for the last 4 years (\$4.45 billion or an earning of \$0.85 per share), the profit of the KCRC dropped 38% from one year earlier to \$1.38 billion for the year ended December⁶. There are thus indications that the KCRC has not been doing as good as the MTRC, especially when there have been more passenger travels originating from the New Territories where the KCRC is serving.

Comparisons with Japanese Railway Companies

- 5.15 Table 5.2 lists a sample of major railway operators in Japan and their financial data as of 31 March 2003. There are altogether 9 companies with a total market capitalization of 2843.47 billion Yen producing sales of 1389.62 billion Yen. Of the total sales, 57% came from railway, and the remaining 27% and 15% from real estate and “others” (mainly hotels). All but two of the firms had beta less than 1. Their average return on equity is 4.8% and their average debt-to-equity ratio 5.7.
- 5.16 The study compares the Japanese financial ratios with the MTRC’s, based on their *2003 Annual Report*. Similar to each other, the MTRC and the Japanese railway operators have business portfolios comprising largely railway operation and property development & investment. As of 31 March 2003, an average Japanese railway operator had 57% and 27% of their sales coming from railway operation and property business respectively. The corresponding figures for the MTRC were 65% and 35% from railway and property

⁶ Asian Wall Street Journal (2004) *MTRC May Buy Pieces of KCRC*. April 30 – May 2, 2004, p.M3.

respectively. The figures, derived from the *MTRC Annual Reports*, are averages for the 5 years between 1998 and 2002. It seems that the MTRC has had slightly more proportions of its revenues coming from property development, ownership and management.

- 5.17 For the year ended 31 December 2003, the MTRC made a net profit of HK\$4,450 million. Given a total “shareholders’ funds” of HK\$57,292 million at 31 December 2003, the “return on equity” is calculated to be about 7.8%. This is higher than the Japanese average of 4.79%.

Table 5.2
Financial data of selected Japanese railway companies as of 31 March 2003

	Beta	Market capitalization (million Yen)	Operating margin (%)	Return on Equity (%)	Debt to equity	Sales (billion Yen)			
						Real estate	Railway	Others	Total
Sagami Railway Co Ltd	0.52	132945.7	12.49	3.24	3.8725	69.27	33.72	5.04	108.03
Keihin Elec Express Railway	0.62	324587.8	13.72	4.13	5.8815	26.32	95.19	28.15	149.66
Keisei Electric Railway Co	0.92	99897.6	12.44	1.49	6.1934	14.49	73.06	-	87.55
Tobu Railway Co Ltd	0.82	320285.0	17.56	5.22	5.2400	77.65	163.73	-	241.38
Seibu Railway Co Ltd	0.96	639124.9	11.93	7.08	16.5303	29.64	99.41	70.25	199.30
Keio Electric Railway Co Ltd	0.73	360585.0	23.56	7.27	1.7454	29.22	84.17	-	113.39
Tokyu Corp	1.16	580754.2	16.70	2.62	3.5892	99.87	133.58	64.39	297.84
Odakyu Electric Railway Co	0.66	375102.5	22.42	3.51	3.4459	-	112.10	48.14	160.24
Odakyu Real Estate Co Ltd	1.04	10186.4	4.48	8.51	4.5941	32.23	-	-	32.23
Average	0.83	315941.0	15.03	4.79	5.6769	47.34	99.37	43.19	154.40
Total		2843469.1				378.69 (27%)	794.96 (57%)	215.97 (16%)	1389.62 (100%)

- 5.18 Besides “return on equity (or capital)”, another measure of business efficiency is operating margin. This indicates the quality of the company’s operation to its counterparts or competitors. A company that achieves a higher operating margin tends to have lower fixed costs and/or higher gross margins. This generally allows higher flexibility to the company to set prices and hence greater security to face difficult economic periods.

- 5.19 Compared to Japanese railway operators, the MTRC has had much higher operating margin. From its *Ten-year statistics* downloaded from its web-site on 26 January 2004, the “operating margin from railway and related operations before depreciation” fluctuated within a narrow band between 47.3% and 55.9% for the period 1993 - 2002, with an average of 52.6%. This does not include property development and investment. From the same

statistics, if we divide profit with total turnover, the range and the average of the operating margin would be diluted to 16.1-56.3% and 35.8% respectively. This average operating margin, though diluted, is still about triple of most of the Japanese railway operators.

Conclusions

- 5.20 The core business of the MTRC comprises rail construction and operation, and property development, investment and management. Such unique combination enables railway and property businesses to complement each other so as to generate the economic benefits of financial synergy and risk diversification. The above financial studies have demonstrated how the MTRC approach has vividly achieved such objectives.
- 5.21 The study has shown that railway investment is not financially viable on its own. Property development of the MTR is essential to subsidize its entire operations. Another example is the HK\$46 billion West Rail project developed by the KCRC. This recently completed railway, planned to connect the North West New Territories with the main urban areas, is getting insufficient number of passengers. Daily passenger volume amounted to around 100,000, as opposed to the originally predicted level at 200,000. As a result, the railway is now running at an operating loss of about HK\$5 million per day. While strong competition from public buses explains partly the low patronage, the delay of housing projects (amounted to some 30,000 units) at the stations along the West Rail also reduces the potential amount of passengers within the railway catchment. This demonstrates the problems generated by the failure of integration between railway and property development, which ultimately necessitates government financial assistance to bail the railway out.
- 5.22 Between 1999 and 2002, Hong Kong underwent its economic recession. Poor economy had an adverse impact on many aspects of the urban activities. Property development business was particularly hard hit. Despite this, the MTRC managed to earn a reasonably high level of return. This is not an insignificant achievement.
- 5.23 The MTRC has continued to invest in its railway services and network during the tough economic times. Rail construction has been infamous for its cost overrun. In their analysis of 258 projects in 20 nations on 5 continents worth approximately US\$90 billion at constant 1995 prices, Flyvbjerg et al. (2003)⁷ concluded that substantial cost escalation “is the rule rather than the exception” and “appears a global phenomenon”. They found that average cost escalation for rail, fixed links and roads are 45%, 34% and 20% respectively. The analyses showed that rail projects “appear to be particularly prone to cost escalation”. Further, “cost performance has not improved over time” for all

⁷ Flyvbjerg, B., Skamris Holm, M.K. and Buhl, S.L. (2003) How common and how large are cost overruns in transport infrastructure projects? *Transport Reviews*, **23:1**, 71-88.

three types infrastructure projects generally. In rail operation, the MTRC had to deal with the pressure for fare reduction at the same time when “annual passenger journeys” dropped as a result of the economic slowdown.

- 5.24 Despite the unfavourable economic conditions, the MTRC continued to meet the expectation of its investors. Unlike the KMB which does not pay for the roads and has been able to capitalize on the improvement in the highways infrastructure, the expansion of its service to follow population shift to the new towns, and the reduction in surface road congestion, the MTRC was geographically “stuck” with the construction and operation of its fixed rails. Obviously, if the MTRC were allowed to expand its railway networks to cover a much wider territory (e.g. through the merger with the KCRC), or to simultaneously provide franchised public bus services (e.g. like many of its overseas counterparts – see section 6), the synergy arising from the integration of transport and property could be much higher.
- 5.25 The analyses to benchmark the MTRC performance with that of its Japanese counterparts illustrate some favourable results. When compared with the private Japanese companies that also operate rails and develop properties, the MTRC is found to have much lower debt. It also records higher profitability in terms of operating margin. The MTRC has also had slightly higher proportions of property revenues.
- 5.26 The study therefore concludes that, burdened with the risky business of rail construction, and despite of economic recession and its implication on fare diminished customer base, fare reduction and a collapsed property market, the MTRC managed to meet expectations of its investors. It is no mean feat. Further, the situation of the MTR is expected to improve as the general economy and the property market continues its revival.

6. International Review

Introduction

- 6.1 This section covers a literature survey of international experiences of integrated railway and property development in order to examine the extent in which the benefits have been realized empirically in overseas cities. The purpose is to draw lessons from the relevant experiences in other parts of the world.
- 6.2 It is not possible to examine all the possible impacts caused by such development model. This review will focus on the most relevant aspects to this study. They are as follows:
 - (a) How did rail transit system affect property development in a positive way?
 - (b) How did the land use characteristics benefit transit ridership?
 - (c) How did integrated and joint railway and property development actually perform? What were the key factors that influence its performance?
- 6.3 This section includes a focused study of the experiences of the following 10 cities:
 - (a) North American cities: Toronto, Washington, D.C. and New York
 - (b) European cities: London and Stockholm
 - (c) Mainland Chinese cities: Guangzhou, Shanghai and Beijing
 - (d) Asian cities: Singapore and Tokyo
- 6.4 To comply with the requirements of the project brief in maintaining strict confidentiality, this international survey is based *entirely* upon desktop literature search and the knowledge of the research team. It is important to note that the depth, scope and accuracy of the findings are subject to the availability of information and the constraints of the study methodology.

Railway Impact on Property Development

- 6.5 The impacts of rail transit on the adjacent properties within its catchment areas have shown mixed results (Porter, 1997). For instance, in Santa Clara County of California, Cervero and Duncan (2002) have found substantial increase in land values arising from its proximity to commuter rail stations. This was in the order of about 23% for commercial land parcel near a light rail transit station and more than 120% for commercial land in a business zone within walking distance ($\frac{1}{4}$ miles) of a commuter rail station. Similarly, after

assessing the conditions in Washington, D.C., and Atlanta areas during the 1980s, Cervero (1994a) concludes that rail transit can generate positive impacts on office property around station areas in terms of higher office rents, lower vacancy rates, larger building densities and greater ridership.

- 6.6 However, in other instances, offices located at or near rail transit stations were found to command only a slight office rent premium over competing properties near freeways, while other comparative performances appear ambiguous (Cervero and Landis, 1993). In terms of residential use, Cervero (1996a) has found that multi-dwelling housing near some suburban rail stations in the San Francisco Bay Area tended to attract many young middle-income professionals and commanded higher market rents. In contrast, Gatzlaff and Smith (1993) have found that the neighbouring housing values were only weakly influenced by the Miami Metrorail rail system. Hence, the influence of transit rail system on property performance appears inconclusive¹.
- 6.7 Another often asked question is whether the construction of transit railway systems has caused land use changes. Cervero and Landis (1997) have studied the land use development impacts of Bay Area Rapid Transit (BART) after two decades of its operations. They have found highly uneven and localized impacts, which were mainly restricted to downtown San Francisco and a few suburban stations. BART did attract some commercial office development to some nodes of the railway corridor. Proximity to railway stations, availability of developable land, and land use mixes are the three key predictors of land use transformation associated with the railway. However, local opposition and poor market viability did obstruct land use changes in some other stations. Similarly, Huang (1996) examines the impacts of urban rail systems on property development in US and Canada and concludes that land development does not mechanically follow the implementation of the rail system.
- 6.8 Thus, it appears that the positive impacts of rail transit on property are case dependent and they need to be empirically established. Ryan (1999) argues that the proximity to a transport facility does not necessarily increase property value. It is only when the transport facility leads to travel cost savings (in terms of travel time), then this will bid up the property values. She cautions that it is inappropriate for many previous studies to measure accessibility by the distance of the property to the transport facility; but instead it should be in terms of the travel time savings for firms and households. Ryan (1999) points that the policy implication is that rail system should be planned to penetrate, rather than to attract the existing concentrations of activities, in order to

¹ There are conflicting conclusions on the effect of railway on *relative* land values in the case of Hong Kong. Lai (1991), in his study to refute the findings of an earlier study (Williams, 1989) on the MTR, concludes that improvement in accessibility brought about by the MTR did not reduce the relative primacy of the Central Business Districts as an office centre. However, in a more recent study by Chau and Ng (1998) on the effect of KCR on residential price gradient between Sha Tin and Tai Po, it was found that improvement in railway transportation resulting from the electrification of the KCR did have a negative effect on the price gradient along the railway line.

maximize its impacts on travel time improvement. This gives support to a closer integration between railway and property development, in order to fully realize its potential synergies.

Land Use Impact on Transit Ridership

- 6.9 The influence of land uses on transit ridership appears to be less controversial from empirical studies. A wide body of literature supports that master-planned, high-density and mixed-use development will lead to higher ridership (Bernick & Cervero, 1997: 73-102). Cervero (1994b) finds that Californian people working near rail stations were, on average about 2.5 times more likely to travel to work by rail than other typical commuters in the same area. He concludes that clustered office development and clustered housing development in a multi-centred urban form along an efficient railway line will increase the levels of rail travel.
- 6.10 According to Cervero and Kockelman (1997), the three critical land use components that affect transit ridership are the 3 D's: Density, diversity and design. They have found that compactness of the built environment, diversity of land uses and pedestrian-friendly designs can reduce vehicular trips and encourage non-motorized travels.
- 6.11 Mass transit railway requires the building 'mass' or development density to support ridership². Higher development densities and compact development are found to generate higher transit ridership (Pushkarev and Zupan, 1977; Smith, 1984). CBD size, employment densities and residential densities are some key factors leading to higher transit ridership, when the income factor is controlled (Bernick & Cervero, 1997). Cervero (1996b) concludes from his comparative studies of seven traditional neighbourhoods in the San Francisco Bay Area that higher residential densities tend to exert stronger positive influence in transit-oriented than in auto-oriented communities.
- 6.12 Another key land use factor is the diversity of land uses. By adding vitality and variety to an area, mixed land uses promotes efficient use of space, enhances convenience to shoppers and visitors, gives a safer environment, and encourages people to walk, ride on transit rather than drive. Many US cities have been actively promoting mixed-use development near mass transit stations through zoning, density bonuses and special land use permits.
- 6.13 Cervero (1989) indicates that mixed use development in sub-urban employment centres, with inclusion of on-site and near-site retail provision, is important to reduce car ridership and parking, encourage mid-day walking and promote convenience to these workers. He has found in his study that every 20% increase in retail and commercial floor space in these suburban office

² Bernick and Cervero (1997: 74), for instance, criticize that average plot ratios of many US suburban office and commercial development at 0.2 to 0.3 are too low to support high rates of transit ridership.

development projects was associated with about 4.5 % increase in proportion of trips by carpool or transit.

- 6.14 In another study, Cervero (1996c) has found that the presence of retail uses and consumer services provision encourages mass transit commuting. The provision of neighbourhood shops exerts a stronger influence than residential densities on non-auto commuting. They help to spread commuting traffic because the trips to consumer and retail services tend to be off-peaks. Mixed land uses are having a stronger positive effect on mass transit ridership, provided they are nearby. This supports the theory that mixed land uses influence modal choice, so that people find it convenient to shop en route from the transit shops in their trips, and in so doing increase transit ridership.
- 6.15 The third key factor is attractive design. Safety, pedestrian-friendliness and convenience are some principal design components in attracting people to visit the transit stations and use the rail service. A coordinated planning approach of comprehensive design for mixed-use development, increased densities, provision of efficient transport interchanges and parking facilities is needed in this respect.

Performance & Success Conditions

- 6.16 How did integrated railway property development model actually perform? It varies. High-densities cities like Tokyo, Hong Kong, Singapore seem successful. The situations in US appear less clear-cut in terms of property values and land use changes. In terms of financing, according to a survey by Landis et al. (1991) in the US ³, capital contributions to transit investment were very small, making up generally less than 1% in most places and between 3 and 5% of capital expenditure in New York. Annual lease payments from land development were also small relative to annual operating budgets of the transport companies. In other words, joint developments generated only small income to transport operators. Small scale of the property projects and inexperience of the transport companies in real estate deals are some possible explanations.
- 6.17 In view of these situations, many studies have put emphasis on the need for some essential conditions under which the beneficial impacts of integrated railway and property development can be fully exploited. Mass transit is believed to be a 'powerful shaper of cities and regions, though rarely on its own' (Cervero, 1998: 82). Similarly, Kelly (1994) agrees that transport facilities only 'shape' urban growth, rather than 'cause' growth. Different

³ According to Landis et al. (1991), as of October 1990, there were 162 transit joint development projects in more than two dozen US cities, and 70% of them were completed at the time. Most of these projects were located in 5 cities including New York, Washington DC, Philadelphia, Atlanta and Boston. TODs in the US take three primary forms: (a) revenue sharing arrangements, (b) cost-sharing arrangements and (c) both. Only 30% of joint development involved large scale, new land development; the majority involved only small scale projects like station renovations, connection of existing developments to stations.

transport technologies tend to support different urban forms. Rail systems reinforced by appropriate planning controls support 'nodal subcommunity development around railroad and transit stations' whereas highways encourage 'dispersal of population and activity over a wide area' (Kelly, 1994: 137).

- 6.18 The literature suggests that urban transit railways will have significant land use impacts and land value changes only under a healthy growing economy and supportive government programmes such as high-density zoning and infrastructure support (Gannon & Dear 1975; Knight & Trygg, 1978; Cervero, 1984; Porter, 1997). The timing of transit investment is critical. Strongest land use impacts are expected when transit investment occurs prior to the upswing of the urban economy (Cervero, 1998).
- 6.19 Huang (1996) points out that government planning intervention in the form of land use zoning is instrumental to facilitate land use changes associated with rail system. For instance, Cervero (1998: 104) suggests that strong regional planning, coupled with pro-active and strategic planning of the metropolitan government in support of the rail-property development are reasons behind the success of the Toronto's Yonge Street subway line. Part of the reason was to allow the transit operator to acquire strategic land parcels and transfer development rights from elsewhere to land around the transit stations.⁴
- 6.20 Landis et al. (1991) suggest that successful joint development project requires a properly institutionalized joint development planning process. The mere presence of land development potential conferred by the mass transit is not adequate. They have listed four critical success factors including: (a) active, healthy and booming real estate market; (b) entrepreneurial, development-oriented agency to take the lead; (c) co-ordination with multiple agencies including public and private stakeholders; and (d) must bear with objectives and benefits, e.g. increased ridership and better urban form, that go beyond simple revenue generation.
- 6.21 Porter (1997) has made similar arguments and put emphasis on regional governance. In other words, there is a need to align the interests of different levels of government, especially when the railway crosses the boundary of several administrative jurisdictions. Boarnet and Crane (1997) have concluded from their study of more than 200 existing and proposed rail stations in southern California that, owing to inter-city competitions, parochial political interests and fiscal disincentives, there was a stronger tendency for the

⁴ Toronto's Yonge Street subway line, being planned, managed and operated by the Toronto Transit Commission (TTC) and opened over the 1954 and 1966 period was regarded as a successful experience. The Metropolitan Corporation, abolished in 1998, was responsible for planning for regional growth and supporting TTC's railway services and land development. Canadian constitution allows the local governments to seize private land under public interest. In contrast, US constitution does not allow entrepreneurial acquisition of land by transit operators. However, Cervero (1998: 104) points out that the introduction of a Joint Development Policy by the Federal Transit Administration in early 1997 now enables US transit corporations to dispose land previously assembled with federal moneys to private developers if the development projects enhance ridership and fare revenues.

municipalities to zone the station land for commercial and industrial rather than transit-based housing uses. This resulted in the creation of too many employment centres relative to transit housing development. Boarnet and Crane (1998: 217) point out the 'Land use planning near transit stations is an inherently intergovernmental activity. Municipal authorities have jurisdiction over land use concerns, while, in most urban areas, regional transit authorities plan passenger rail lines.' Conflicts of interests among different land agencies need to be tackled. Boarnet and Compin (1999) conclude that TODs is an incremental, slow process to implement and officials have to realize the benefits take time to bring out the benefits and overcome the many barriers.

- 6.22 The success of integrated railway and property development also requires complementary support in other policy areas. Urban Land Institute (1979:6) suggests that successful implementation of joint development requires supportive growth management policies not only to encourage high density development around stations, but also to restrict intensive development in areas not served by the rail transit.

- 6.23 Furthermore, it is necessary to exert controls on alternative modes of transport. Based upon his study of 12 countries in North America and Europe, Pucher (1988) argue that public policies such as automobile taxation, transit subsidies, land use controls, housing programmes influence travel choices. Pucher argues that land use controls and better co-ordination of urban development and compactness explains the relative success of transit commuting in Western Europe than the US. Similarly, Bernick and Cervero (1997) put emphasis on the supportive public policies to promote rail transit ridership in Japan including car ownership controls and taxations, high gasoline taxes, tolled expressways, tax-free allowances for transit riders, and so on. Japanese government regulation of rail fares promotes affordable rail ridership. Its designation of exclusive territories for franchised bus and railway operations by one particular transit operator reduces competition and enhances transit viability.

- 6.24 This review of overseas experiences about integrated railway and property development is by no means exhaustive. However, it suffices to point out that the synergies of such development model are contingent upon many factors. The positive effects do not emerge naturally. As Bertolini and Spit (1998) rightly summarize, the success of TODs requires attention to the 'planning triangle' that comprises (a) the object (e.g. project location, site viability, project design etc.); (b) the process (e.g. actors, interests etc) and (c) the context (economy, planning system, society, culture etc.). The following paragraphs examine each of the 10 selected cities in turn.

Toronto

- 6.25 ULI (1979: 151-179) has considered Toronto as one of the showcases in North America to demonstrate the benefits of integrating property development with mass railway transit. High-density joint development projects are highly visible around mass transit stops and railway stations in the city. They have been built since the 1960s and have been the outcomes of deliberate planning, careful implementation and coordinated efforts of both public officials and private developers.
- 6.26 A major historical event of Toronto's mass transit system happened in 1921 when the City of Toronto established the Toronto Transportation Commission to amalgamate various urban transport services and the previously separate systems within the city limits. In 1954, the Metropolitan Toronto (Metro) was formed to consolidate the City of Toronto and the suburban communities. Public transit was placed under its jurisdiction. After this consolidation, the Commission was renamed the Toronto Transit Commission (TTC) and it expanded its servicing area from the central city to an area about three times as large. Nowadays, the City Council is responsible for appointing the board of the TTC, approving its financial proposals, land decisions and transport policy. The TTC is responsible for preparing the above proposals to the City Council and operating the transit system.
- 6.27 The TTC is functioning as an independent agency of the City Council. It is currently led by a seven-person commission comprising entirely of elected members of the Council. It operates an integrated single fare, free transfer public transit system comprising subway, streetcars and buses. It carried a peak volume of passengers of about 464 million in 1988 and then ridership began to decline by almost 20% by 1996, largely because of the suburban sprawl of population and weakening of the local economy (Soberman, 1997).
- 6.28 According to ULI (1979:155), the original idea of using land and property development to finance the railway came from a councilman in 1959, as a cost recovery programme. It came at a time when fare revenues alone could no longer support the expansion of the railway. The TTC funded the initial railway with its operating surpluses while the Metro was drawn in to share the costs of constructing the extensions. The TTC began exploring possibilities of long-term leasing of its properties and cost-sharing with developers for station connections.
- 6.29 Under the direction and approval of the City Council, the TTC acquires land for its subway lines and transport right-of-way. The TTC is responsible for planning the alignments, determining the land requirements, costing the alternatives, managing the land acquisition and its disposal, if appropriate. When the TTC and the government bodies agree that certain pieces of TTC's land are not required for subway facilities and transit improvement, such surplus land can be considered for disposal or joint development. When the surplus land is not accepted by the City Council and other local governments for their public projects, it can be offered to the private developers through

open tenders. Developers can submit proposals to and negotiate the lease agreements with the TTC. The TTC will make the recommendations and the ultimate approval rests with the City Council.

- 6.30 In the case of Toronto, the term ‘joint development’ should probably be re-phrased as ‘common development by the public and private sectors’ in that:

‘The public sector in this case engages in land banking and subsequently leases surplus land and rights to the private sector. These private developers accomplish land assemblage on adjoining sites.’
(ULI, 1979 :155)

- 6.31 Nonetheless, the TTC establishes a close working relationship with the private developers on a project-by-project basis. Although the governments are not involved as a partner in joint development, they have to draw up a plan and implement supportive planning strategies consistent with the plan. These strategies may include, transfer of development rights, density bonuses and zoning approvals.
- 6.32 Park Place is a case in point. Located in the western part of Toronto, this high-density development comprises ten high-rise housing blocks, four townhouses and a recreation centre, within easy walking distance to both High Park and Keele Stations. To promote comprehensive development, the government planners designated the entire five-block area as a redevelopment site, providing bonus floor space to the developers if they could meet certain requirements, the most significant of which was a minimum lot size. The selection of a promising site, the developer’s ability to assemble land and the facilitating planning strategies all contributed to the success of this joint development project (ULI, 1979; Roeseler & Dosky, 1991).
- 6.33 Sheppard Centre is another example of Toronto’s success. Located on the north-south Yonge Street Line at the Sheppard Station, it is a mixed-use development containing office and apartment towers and a three-level shopping mall with direct connection to the station. This direct access to the station was made possible by a successful agreement between the developer and the TTC so that the developer could move the planned subway entrance from a corner of the site to the shopping mall in the middle of the block (ULI, 1979; Roeseler & Dosky, 1991).
- 6.34 The TTC (2003a) reported to have carried about 416 million riders in 2002, representing about 1.4 million passengers on a typical weekday and some 90% of local transit trips in the Greater Toronto Area. The ridership is increasing by one billion for every 30 months. The TTC is expecting to carry its 25 billionth passenger in 2005. In 2002, it had an active fleet of 692 subway cars, 29 light rapid transit cars, 248 streetcars and 1603 conventional and Wheel-Trans buses. Table 6.1 shows the key operating statistics of the TTC.

Table 6.1
Key Statistics of the TTC, 2002.

Passenger Trip (Millions)	415.5
Average Number of Employees	10,356
Km Operated (Millions)	
Bus	100.4
Subway Car	76.2
Streetcar	11.3
Scarborough RT	4.3
Total Km. Operated	192.2
Operating Revenue (C\$ million)	687.8
Operating Revenue per Km. (C\$)	3.58
Operating Expense (C\$ million)	848.9
Operating Expense per Km (C\$)	4.42
Operating Subsidy (C\$ million)	173.7
Operating Subsidy per Km. (C\$)	0.90
Revenue/Cost Ratio	81.0%

Source: TTC (2003a)

- 6.35 In terms of funding, the TTC is dependent on the governments for both operating and capital subsidies. In 2002, the TCC received C\$63.6 million in capital funding from the provincial government and C\$62.3 million for capital improvements from the federal government. The TCC is not subject to income and capital taxes and is also permitted to exempt certain property taxes. The financial statement of the TTC reveals that passenger fare revenues in 2002 amounted to C\$648.8 million (93% of total operating revenues) and property rental only generated a mere C\$21.7 million. The City of Toronto government contributed an operating subsidy of some C\$174 million to the TTC. The TTC expects to have a C\$1.5 billion shortfall in capital funding for maintenance of the existing system, not including expansion of railway lines and new fleets.
- 6.36 This review has identified a number of key factors leading to the implementation of integrated railway and property development in Toronto:
- (a) The public has long been receptive to the use of public transport.
 - (b) Rapid growth of Toronto, both in population and economy, provides a favourable environment to promote and facilitate implementation of joint development. A supportive political climate is also instrumental.
 - (c) Government town planning policy encourages development to concentrate in the nodes along the mass transit routes. A plot ratio of 12 is provided for much of the core areas in central Toronto. The governments may offer planning incentives such as density bonuses and area designation to the above-station property sites.

- (d) The success of earlier joint development projects provides the learning experience for all parties and strengthens the confidence of the developers.
 - (e) The property development industry is highly competitive. Premium sites are difficult to acquire than in the other cities. Property developers recognize the benefits of linking the development sites with the mass transit.
 - (f) The TTC operates like an autonomous business-like organization when dealing with the property developers. Considerations were given to restructure the TTC into another new 'department' of the City Council with a view to getting easier funding commitments. This was not recommended because the independent status of the TTC allowed it to 'function efficiently as a business in a changing marketplace' (Soberman, 1997: x).
- 6.37 However, the TTC remains heavily reliance on government funding in capital construction for service expansion and existing service maintenance (TTC, 2003b). Revenues from direct land and property development have never come close to playing a significant role in its financial position. But, by concentrating development around the transit stations, it does support more ridership and possibly contribute to the fare incomes.

Washington D.C.

- 6.38 Washington D.C. is regarded as another successful example of transit-oriented development in North America (ULI, 1979: 63-97; Parsons Brinckerhoff, 1996b: 37-69; Bernick & Cervero, 1997: 213-235; McNeal & Doggett, 2003). The Washington Metropolitan Area Transit Authority (WMATA) is responsible for providing 'safe, clean and reliable' public transport services for a population of 3.5 million within a 1,500 square-mile service area and some 22 millions of tourists visiting the capital of the US. The WMATA claimed to operate the second largest rail transit system and the fifth largest bus network in the country in 2002.
- 6.39 The WMATA was established in 1967 among the states of Maryland and Virginia and the District of Columbia to plan, develop, construct, finance and manage a regional transport system in the capital area. Its governing board comprises representatives from the member states. The Metrorail began construction in 1969 and its first phase commenced operation in 1976. It currently operates five Metrorail lines with 83 stations. The final leg of an 103-mile railway network was completed in 2001. Extensions of the railway are still on-going. When completed in 2005, the whole system is expected to have run over 106 miles (170.6 km) with 86 stations.
- 6.40 Table 6.2 shows some key operating statistics of the WMATA.

Table 6.2
Key Statistics of the WMATA, 2002.

Passenger Trip (Millions)	328.7
Rail	181.0
Bus	147.7
Rail	
Operating fleets (number of rail cars)	842
Subway (km, 47 stations)	80.58
Surface (km, 31 stations)	70.44
Aerial (km, 5 stations)	14.84
Bus	
Operating fleets	1,460
Revenue miles average weekday	163,990

Source: WMATA Facts

- 6.41 The WMATA reports that its system carried 47% of the federal government employees during peak hours and some 41% of those working in the centre core of city. 35 of its 83 railway stations serve federal administrative facilities. On the other hand, according to McNeal & Doggett (2003), the bus service of WMATA covered some 73% of the total bus service in the Washington region in 1997.
- 6.42 The WMATA relies on the metropolitan and federal governments on funding. The Metro represents a US\$9.4 billion investment that would cost US\$24 billion if built today. Since its inception, it has received 65% of the capital costs from the federal government. Fare and other revenues covered 51.5% of its daily operations, and the state and local governments provided funding for the remaining 48.5%.
- 6.43 Notwithstanding this financial situation, the WMATA is regarded as one of the most active and aggressive transport agencies in pursuing joint development with private developers, so as to recoup part of its capital investment. Such policy of promoting integrated railway and property development was adopted by the WMATA long before the railway became operational⁵. According to McNeal & Doggett (2003:204), the first initiated

⁵ ULI (1979: 64) presents a somewhat different historical picture here: 'In the planning and design of the Metro system, joint development has not been the foremost objective of Metro officials. Route selection and property acquisition policies have placed primary emphasis on right-of-way requirements and minimization of costs, rather than on selecting sites and acquiring land for the maximization of joint development. Many stations are located on non-developable public land while at others, elevated tracks and railroad rights-of-way thwart joint development. Personnel to manage the disposition of property for joint development were not hired until 1976, the year the first segment of the system opened. Before that time, property disposition and joint development planning were handled by other personnel in the Office of Real Estate. Fortunately, despite the absence of a forceful joint development consciousness, the WMATA system contains a number of sites with excellent joint development potential. The existence of these opportunities is largely attributable to strong market conditions and advantageous land ownership patterns rather than to advanced planning.'

project, Rosslyn (Virginia) Metro Center, was initiated in 1973, which was three years before the opening of the railway. The establishment of a planning and development office in 1981 was charged with the responsibility to implement an ambitious station-area development programme focusing on three major aspects (Parsons Brinckerhoff, 1996b: 48):

- (a) joint development of air rights over stations or small leftover land parcel on land owned by the WMATA
- (b) interfaces of stations with adjoining private properties under the other private ownership
- (c) collaboration with landowners and local jurisdictions in generating development within 3,000 feet of a station entrance (the transit zone development)

- 6.44 By 2000, the WMATA was able to realize more than US\$60 million in property income since the inception of its land development programme. 24 of its completed projects contributed about US\$6 million in annual income to the WMATA from four million sq. ft. of office space, half a million sq. ft. of retail space, 1000 hotel rooms and 300 housing units (McNeal & Doggett, 2003).
- 6.45 The WMATA has actively solicited private developers to develop its landholding for transit-oriented development. In general, it receives property development income in two main ways. First, on its own landholding, the WMATA normally executes a long term ground lease with the developers. This ground leases will provide both a base rent and a percentage rent to allow the WMATA to share the project success. Simple outright sales may happen in a few cases. Its was estimated that the WMATA held more than 1,000 acres of land with development potential and much of it was used for surface parking. Second, for non-WMATA sites directly connecting to the stations, it will negotiate with the developers for connection agreements to allow an annual rental fee with periodic adjustments (McNeal & Doggett, 2003).
- 6.46 The advantages of integrating railway and property development are obvious. According to an online leaflet '*Metro Matters: Fact Sheets*' prepared by the WMATA, the Metro system generates more than US\$25 billion of economic development potential near current railway stations. Office rents near the transit stations achieve a premium of about US\$2 per sq. ft. and commercial vacancy rates are about 23% lower. In addition, residential rents are about 25% higher near transit stations.
- 6.47 Recently (October 2003), the WMATA is appealing to the governments for funding of US\$1.5 billion to modernize and upgrade its system due to increasing ridership and aging infrastructure. The amount is intended for the purposes of replacing and rehabilitating transport assets, bringing additional

service capacity by putting eight-car trains into service and more buses into the system, and enhancing security and function in case of a regional emergency. Although the amount of property development revenues cannot completely pay off the capital investment in railway, they certainly do help to reduce the government subsidy, which amounts to about US\$300 million each year.

6.48 This review highlights a number of important characteristics in the case of Washington D.C.:

- (a) Since the 1960s, regional planning for the Washington region has long accepted the concept of transit-oriented development. Many local jurisdictions have adopted it as their primary tenet of their planning for community development. This provides a positive policy framework and administrative context for promoting station property development.
- (b) A strong real estate market has contributed to attracting private development initiatives around station areas and improving project viability.
- (c) The merits of transit railway to development are enhanced by high urban parking costs, car park shortage, good quality rail service and construction schedule.
- (d) Washington employment and spatial development have remained relatively concentrated in comparison with other metropolitan areas. The average floor area ratio (plot ratio) of most downtown blocks is about eight while the gross densities in the suburban centres are less than one.
- (e) The railway alignments have been designed to follow the major corridors of existing or planned high-density development in the local jurisdictions.
- (f) Early success in joint development projects of the WMATA set the tones and standards for subsequent station-area development. Clear goals, policies, administrative processes and developer selection criteria in terms of promoting joint development and interfaces with its railway system have been laid down publicly (WMATA, 2002)⁶.

⁶ WMATA (2002) states that the joint development program seeks to achieve the following goals:

- (g) The WMATA is highly supportive of joint development with private developers around stations. It has developed a close working relationship with developers and local jurisdictions in promoting and securing transit-focused development and is responsive to site-specific opportunities and issues.
- (h) The attitudes of the local jurisdictions are critical because they have taken the primary responsibility for planning and design for development around railway stations. This promotes community participation but its decisions against high-density station development may lead to a rejection of the WMATA scheme.
- (i) The law allows the WMATA a general power to acquire land and properties by purchase, lease or condemnation if necessary, for development of stations, entrances and other supporting facilities. This provision enables the WMATA to accumulate a landbank so that it can possibly engage in future land development activities.

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- “Promote Transit Oriented Development (TOD) by giving priority to Joint Development proposals which contain the following smart growth development principles; reduce automobile dependency; increase pedestrian/bicycle originated transit trips; foster safe station areas; enhance surrounding area connections to transit stations, including bus access; provide mixed uses development, including housing in compliance with local regulations; and the opportunity to obtain goods and services near transit stations and offer active public spaces;
 - Attract new riders to the transit system by fostering commercial and residential development projects on WMATA owned or controlled land and on private properties adjacent to Metro stations;
 - Create a source of revenue for the Authority to operate and maintain the transit system by expediently negotiating joint development agreements between WMATA and public or private development entities; and
 - Assist the WMATA local jurisdictions to recapture a portion of their past financial contributions and to continue making subsidy payments by expanding the local property tax base and adding value to available local revenue.”

New York

- 6.49 New York has its subway network since 1904. It now has probably the most extensive railway links serving this world financial centre. It is reported that the entire network currently comprises 22 lines with a total route length of 368 km (219 km underground) with 468 stations (277 underground). The New York City subway operates around the clock and its annual ridership reaches over 1.3 billion.
- 6.50 The New York transport network is the largest in North America serving a population of over 1.4 billion in a 5000 sq. mile of area extending from New York City through Long Island, southeastern New York State, and Connecticut. Four out of every five rush-hour commuters take public transit to New York City's central business district to avoid traffic congestion. A publicly chartered corporation, the Metropolitan Transportation Authority (MTA), operates most of the transit services in New York City. The MTA is governed by the board members nominated by the Governor, New York Mayor and other county executives, and with all board members confirmed by the New York State Senate.
- 6.51 The New York City Transit Authority (NYC), an agency of MTA, manages the metro subway, buses (80% of the city's surface mass transportation) and railway. It employs more than 45,600 staff. According to its homepage information, between January and November 2003, the NYC recorded an operating deficit of about US\$1,182 million, which represented some 38% of the operating expenses. During the same period, the farebox recovery ratio was only about 45%. As of 2002, the MTA received a total amount of subsidy of US\$2,097 million from the state and local governments (MTA, 2003: 23).
- 6.52 The MTA also engages in some property development activities. Its revenues from real estate operations amounted to US\$61 million in 2002 (MTA, 2003: 19). According to its homepage, its Real Estate Department is in place to manage over 4,000 occupancies on its properties in various parts of New York region. Many tenancies are retail stores. A current project under marketing is its Grand Central Terminal, which is 'a major New York City destination for transportation, shopping, dining, fresh food, public events, and entertainment with over 500,000 visitors every day. The terminal has more than 90 restaurants, retail stores, and food shops'. According to its annual report, nearly all available space is occupied or under contract (MTA, 2003: 19).
- 6.53 Its Real Estate Department is also responsible for acquiring private land to support the extension of commuter service, provision of parking space at stations, and the installation of subway systems. It is also responsible for selling the authority's excess landholding. Several sites have now been put up on its homepage.

- 6.54 Notwithstanding this institutional setup, the core businesses of the MTA and the NYC lie in public transport as illustrated by the following statements on their homepage:

‘It is impossible to place a dollar figure on the MTA's land, equipment, and facilities, located on or under some of the world's most expensive real estate. But the greatest value of the MTA lies in its beneficial impact on the New York region's economy and quality of life. New York ranks near the top among the nation's best cities for business, says *Fortune* magazine, because it has "what every city desires, a workable mass transit system”.

Since 1982 the MTA has been carrying out the largest public works rebuilding project in the country. Funded by federal, state, and local government and by the issuance of debt, the MTA's most recent capital program has generated an average 31,760 private-sector jobs, \$1.3 billion in wages, \$100 million in state and local tax revenues, and \$3.52 billion in economic activity annually.’

London

- 6.55 London is quoted as ‘the mother of all the world's metro systems’. Its first tunnel for railway was opened in the city in 1863. Extension of the lines continued in the following decades and quickly a large network of underground and surface railways was constructed. When Paris opened its first line in 1900, London had already operated a very extensive metro railway system.
- 6.56 The Greater London has a population of over 8 million. The London Underground (the Tube) forms the backbone of its mass transit network comprising a total route length of over 410 km. Most of the underground railway lines were completed during the first half of the 20th century in deep level tube tunnels going within the central core of London and extending above ground to the suburbs. Major system expansion of the metro railway network almost came to a halt in the 1970s, with the completion of the Victoria Line (opened 1968-1971). Recent additions during the late 1990s include the southeastern extensions of Jubilee Line (opened 1999), and the Docklands Light Rail (opened 1999) which is a light rail system to serve the new housing and commercial areas in the docklands area to the east of the central city.
- 6.57 The changing political atmosphere has played a strong influence on the management of public transit in the UK. Scheurer et al. (2000: 48) succinctly summarize the historical development of public transport in the country:
- ‘The UK’s post-war public transit history was characterized by a fundamental shift from mixed ownership regimes towards public monopolies in the 1960s, followed by an equally near-universal move towards deregulation and reprivatization in the 1980s. Compared to other European countries, there has also been a relative lack of investment in the urban rail since 1945, resulting in a massive modernization backlog within the existing, largely pre-WWI systems. Put simply, the UK went with buses for some 50 years.’
- 6.58 The Tube is currently operated by the London Underground Limited (LU), which was formed in 1985 with its history dated back to the opening of the first line in 1863. It serves over 3 million passenger journeys a day⁷, runs over 510 trains and manages an organization of over 13,000 staff. LU is government-owned and is a subsidiary of Transport for London (TfL), which is an integrated organization under the direction of the London Mayor responsible for planning, managing and delivering the transport services in London. In addition to the Tube, TfL also manages buses, trams, river services and Victoria coach station, and regulates taxis and private hire trade, and manages all traffic lights in London.

⁷ According to TfL, about 27.3 million journeys are made in the Greater London daily including 8.5 million on public transport. Buses cover 4.5 million while the tube has 3 million. 11 million journeys are by car or motorcycle.

- 6.59 Both the TfL and the LU require government grants and subsidies to sustain their operations and engage in capital investments. Based upon the Annual Report of LU (2003), traffic revenue covered over 91% of the total sale revenue but its rail operations were running at a loss of some GBP 826 million in 2003. Property revenues covered a very small portion of the total sales but were able to achieve GBP 28 million in 2003. LU does not appear to have engaged itself actively in property development activities.
- 6.60 Recently, there has been a revival of interests in a better integration of land use planning and transport development in the UK. The discussions largely evolve around the concept of Transport Development Area (TDA), which is defined by the Royal Institute of Chartered Surveyors (RICS) as 'a well designed, higher density, mixed-use areas situated around good public transport access points in urban areas'. This approach of planning and development is expected to bring in many advantages to the transport operators and the community as a whole.
- 6.61 According to Hine et al. (2000), property development and sale had been used by the London underground railway operators, before the advent of the 1948 Town and Country Planning Act, as the major funding tool for implementation of the public transport facilities. However, it was partly due to the effective nationalization of land development rights through the introduction of the Act, and partly due to the growth of automobile traffic after the Second World War, which began to break the relationship between railway and property development. Restrictions on development densities in London have led to a rapid rise in property prices, leapfrogged urban growth and massive volume of inter-city traffic along major highways.
- 6.62 The current situations of urban sprawl, high property prices, reliance on private transport and traffic congestions are not considerable sustainable. What TDA proposes is to re-establish the relationship between development density and public transport service. Based upon the concept of value capture, TDA is expected to bring together attractive land development opportunities and possible additional investment in public transport enhancement. One of TDA proposals is to ask the local authority to grant permission for higher density development on station sites. Such development form will also contribute to the achievement of more sustainable development in the world city.

Stockholm

- 6.63 Stockholm, the capital of Sweden, is considered a successful example of coordinated mass transit railway and urban development in Europe (Bernick & Cervero, 1997: 289-306; Cervero, 1998:107-131). The railway network is extensive to serve 700,000 of inhabitants in the city of Stockholm, and a total of 1.7 million in the whole metropolitan area on various islands.
- 6.64 Planned satellite communities surround the central city and are connected by a radial form of railway network. This is the result of a deliberate regional planning effort, after the Second World War, to channel overspill growth to these master-planned satellite towns in the suburbs. Furthermore, two other factors, including government (the city council) ownership of land in the suburb and its promotion of affordable housing for the people, are also important in contributing to the growth pattern of Stockholm.
- 6.65 The Storstockholms Lokaltrafik, owned by the Stockholm County Council, has since 1967, planned and coordinated metro railway, bus and tramway services (Cervero, 1998: 113). The regional railway network, called Tunnelbana, has become the principal device in connecting these satellite communities with the city core. However, as the government planning policy was to build the satellite communities in order to work as countermagnets of activities to the central Stockholm, Tunnelbana was constructed in advance of demand. It thus incurred huge operating deficits at the beginning and the government was expecting that future development pattern would eventually pay off the railway investment.
- 6.66 The first three metro lines were constructed during 1945 and 1957. Part of the Green Line began service in 1950. The whole railway network is about 110 km long (62 km are underground) with 100 stations, and is considered one of the most beautiful metro systems in Europe.
- 6.67 All the new satellite towns have some common characteristics which make them transit-oriented development. The railway stations are basically the hubs of the communities. They are planned with mixed uses, with highest densities closest to the central railway station and then progressively lower further away. Railway stations are easily accessible by foot with good pedestrian amenities including car-free environment and civic space.
- 6.68 Bernick & Cervero (1997: 302) point out that high concentration of workplaces and living places near railway stations in Stockholm provide a strong support for rail commuting. They report that half of all workers and more than one third of the residents in all the new towns travel by transit on a daily basis.
- 6.69 A remarkable achievement of the transit railway in Stockholm is its balanced bidirectional traffic flows (Cervero, 1998: 126-7). A directional split of 45:55% on some rail lines is not uncommon. This is made possible because of

sound regional planning, which channel population and employment into compact, mixed-uses and rail-served suburb areas, rather than consolidate all the jobs in the downtown. Cervero (1998: 124) describes Stockholm's new towns as 'polar opposites' in that the job-housing balance is not to be achieved 'within' the communities, but 'across' communities interlinked by efficient railway services.

- 6.70 However, apart from physical planning reasons, low Tunnelbana fares, coupled with high parking and taxi fares, expensive value-added taxes on automobiles and vehicle registration fees, also contribute to the popularity of rail commuting.
- 6.71 Nonetheless, passenger revenues only accounted for about one third of operating costs (Cervero, 1998: 127). The transit authority, Storstockholm Lokaltrafik (SL), has to competitively tender all services for the 400-plus bus routes and Tunnelbana lines in the region in order to contain costs. This reflects the public policy of promoting environmentally sustainable transport by keeping low fares.
- 6.72 Based upon the information from its Annual Report, SL (2003) does not appear to have engaged actively in property development. About half of its activities are financed through city council tax, and the other half through fare revenues. A combination of competitive procurements and fare increases has helped to improve its financial position to reduce tax financing level from 70% in 1990 to 50.3% in 2002. City council loans, which in turn are financed via tax or in the capital market, form the traditional way of financing SL's investments (SL, 2003:20-1).

Guangzhou

- 6.73 The Guangzhou Metro Corporation (GMC) was established in December 1992 for the purpose of constructing and operating a mass rapid transit system including underground railway and light rail, as well as engaging in real estate property development along the railway lines. The GMC was a state-owned enterprise established and supervised by the Guangzhou Municipal Government. Its status was equivalent to a bureau-level enterprise, implying that it was a profit-making quasi-government organization.
- 6.74 Similar to many state-owned enterprises, the GMC was a large company providing employment of over 4,660 (in 2002). Initially, it comprised a number of divisions including property, marketing, communication, project management, advertising, design and research. The property division was directly responsible for handling the property development matters. With the rapid expansion of the company during the past 10 years, a Resources Exploitation Division has been established to look after the company assets and it includes various departments including real estate, advertising, property management, commercial leasing, guest house and training centre (GMC, 2003).
- 6.75 The GMC began construction of the first underground railway in Guangzhou, the Metro Line 1, in December 1993. Its first phase was opened in June 1997 and the whole route was completed by the end of 1999. This Metro Line 1 served the east-west movement within the city. It was also planned to facilitate the eastern expansion of the city by linking it with the heavily populated districts at the urban core. Metro Line 2, which serves north-south movement was completed in 2002. Metro Line 3 is currently under construction and is scheduled to commence service by 2006. As of June 2003, the Guangzhou metro network in service covered a total length of 36.8 km (18.5km for Line 1, 18.3km for Line 2), with 31 stations. By March 2002, the total accumulated investment on these three lines was close to RMB 19 billion yuan (GMC, 2003).
- 6.76 Guangzhou has a long-term plan to expand its mass transit railway network to a total of seven lines. It is expected by 2010, the total length of the Guangzhou metro network would amount to about 190.8km.
- 6.77 The Metro Line 1 was the shortest route among all these lines. It had a planned daily capacity of over 1 million passenger trips and was expected to take up between 10-15% of the market share of daily travels by 2000. However, as of 2000, the Metro Line 1 only carried a daily average passenger volume of about 176,000 and it was operating at a loss. According to GMC (2001), the operating income in 2000 was about RMB 192 million yuan and the expenses were RMB 217 million yuan, making a loss of about RMB 25 million yuan. Although the daily passenger volume increased to 181,600 in 2002, the GMC still recorded an operating loss in railway of about RMB 37 million yuan and received an income subsidy of RMB 30 million to cover part of the deficit (GMC, 2003).

- 6.78 Financing the construction of the railway project was a critical issue. The cost of building the Guangzhou Metro Line 1 amounted to about RMB 13 billion yuan. As a comparison, this was about 50% more than the total annual income of the government, estimated at about RMB 9 billion yuan between 1993 and 1994. Borrowing the MTRC experience from Hong Kong, the Guangzhou Municipal Government determined to use private land development along the railway line as a means to get private funding for the railway project. The objective was to capture the land value appreciation along the railway route to pay off the huge costs in constructing and operating the underground railway.
- 6.79 According to the initial planning, the joint development of some 27 designated land parcels (total land area of about 34.8 hectares) along the alignment of Metro Line 1 for private property development would make up some 43% of the total railway construction costs. It was expected that the property development could bring in over RMB 20 billion yuan of capital investment into Guangzhou. ‘Project companies’ were set up as part of the joint venture between the corporation and property developers interested in developing particular sites.
- 6.80 However, this idea of using property income to subsidize railway construction turned out to be unsuccessful. By the mid-1996, only about RMB 2 billion yuan were received by the GMC (Tian and Zhuang, 1998). This was far below the original estimates in the project financial plan. No property development project was completed to meet the opening of the first phase of Line 1 in 1997. At that time, only one project was completed, four remained under construction and 14 projects just completed demolition and rehousing works (Tian and Zhuang, 1998) (Photo 6.1). For Metro Line 2, the scale of involvement of the GMC in property development was substantially reduced.

Photo 6.1 Housing Project above Guangzhou Metro Line 1 station



- 6.81 According to the report of *China Economic Review* (23 November 1998), the actual financing of this Metro Line 1 eventually fell upon the shoulder of the Guangzhou Municipal Government, which provided 63% of the overall costs. The remainder came from long term, low interest loans provided by the governments of Germany, US, UK and Japan. Of them, Kreditanstalt fur Wiederaufbau (KfW), the German government credit agency provided the major share of the external loans in exchange for the awards of various contracts to a consortium of German manufacturers spearheaded by Siemens. For instance, ABB Daimler-Benz Transportation manufactured the trains. Other firms provided a whole range of equipment including rolling stock, signalling and telecommunication devices, power supply and depot installations. Similarly, the US Export and Import Bank provided US\$36 million to finance the ticketing system of the railway line. There was no funding support from the central government.
- 6.82 There are a number of reasons which explain why joint development has not worked out successfully in the case of mass transit railway development in Guangzhou (Tang, 2003; Li and Yan, 2002):
- (a) Metro Line 1 development was not simply planned as a transport project alone. It constituted an integral part of the strategic plan of the Guangzhou Municipal Government in modernising the urban physical environment and facilitating eastern expansion of the city. The GMC is under direct supervision of the Guangzhou Municipal Government and does not act autonomously in its decisions.
 - (b) The alignment of Metro Line 1 was deliberately planned to go through the most populated areas in the inner city. As a result, over 1.1 million sq. m. of existing space were demolished to make way for the development, and over 20,000 families (about 100,000 residents) – equivalent to the scale of a medium city in the mainland - were relocated elsewhere (Liu, 2001). The GMC was responsible for assembling the lots, compensating and relocating the affected residents, demolishing the existing buildings and servicing the sites for redevelopment. The complexity of these tasks created a huge financial and administrative burden on the GMC.
 - (c) In order to cover its high costs of compensation, the GMC had to charge high land premiums for the land parcels. This further affected the financial viability of the property projects and deterred many property developers.
 - (d) Property market downturns during the mid-1990s, partly a result of the austerity economic policy initiated by the central government, adversely affected the interests of private developers.

- (e) Government's overall urban planning worked against the interests of the GMC. It created another new central business district to the east of the existing city centre, Tianhe, rather than consolidating the new office space along the nodes of the mass transit railway. Massive oversupply of office floorspace in the city jeopardized the viability of the GMC projects, which were planned largely for grade A office uses.
- (f) Government failed to control redevelopment of the other land parcels which were near to but fell outside the GMC's land acquisition boundaries. Redevelopment of these sites for office uses was expedited by the developers taking advantage of the proximity to a railway line and these properties eventually acted as a strong competition to the GMC's projects.
- (g) Land acquisition and clearance were carried out and completed within a short period. This tended to remove the population mass along the railway line which may help improve its ridership.
- (h) There has been poor integration of railway and adjoining property development projects in terms of layout design, pedestrian connections and timing, probably due to lack of co-ordination and institutional problems (see Photos 6.2).

Photos 6.2

Poor Integration between Guangzhou Metro Lines and Property Development



- (a) No direct connection between rail exit and Pazhou New Exhibition & Convention Centre
- (b) No direct connection between rail exit and adjoining development/mismatch in development timing
- (c) Unattractive and improper MTR entrance/exit locations

- 6.83 Apart from railway operation, the GMC has determined to focus on four core areas of non-transport business activities including real estate, advertising, commerce and communications. These activities covered an important source of income and contributed over RMB 61 million yuan of operating profit to the GMC in 2002.
- 6.84 Table 6.3 illustrates the growth of the non-railway revenues to the GMC between 2000 and 2002. It is worth to note that the term ‘commercial trade’ refers to the leasing of station space for shops, banks, chain stores and auto-vending uses. In 2002, the GMC had 535 sq.m. for banks, 2,209 sq.m. for retail and chain stores within stations and 12,390 sq.m. of underground shopping street.

Table 6.3
GMC’s Non Railway Income

Year	(RMB Mil)		
	2000	2001	2002
Operating income	69.95	89.39	100.50
of which:			
real estate operation	5.39	10.66	9.29
commercial trade	11.80	13.27	18.25
advertising	34.44	31.36	34.51
communications	1.42	8.01	13.54
property management	6.61	6.53	6.72
training center	2.67	2.37	3.16
hotel/guest house	3.42	3.29	5.55
others	4.20	13.90	9.48
Investment income	2.88	3.19	4.20
Operating profits	28.20	64.12	61.18

Data Sources: GMC Annual Reports, 2000-2003.

- 6.85 A review of the Annual Reports gives an impression that the GMC is making slow progress in its property developing activities. In 2002, about 40,000 sq.m. of its residential units were sold in five separate projects generating a total of about RMB 105 million yuan of sale revenues (GMC, 2003). This amounted to about RMB 2,625 yuan per sq.m. While the GMC indicated its active planning for several large scale development projects (one of which produced over 92,000 sq.m. of floor area), it also acknowledged that the strong market competition and oversupply of property space in Guangzhou would create difficulties for its property development business.

Shanghai

- 6.86 Shanghai has one of the world's youngest mass transit railways and is expanding rapidly. It is understood that it currently carries a daily passenger trips of about 1 million. It now has a 40-year phased programme that would include 11 metro lines covering over 325km by 2025.
- 6.87 Shanghai now operates three metro railway lines. Line 1, which had been planned and built over a period of six years, was opened in 1995 connecting the northern and southern districts of the city. It comprises a total length of about 16.4 km with 16 stations providing mainly north-south movement across the central city. Line 2 opened in 2000 serving east-west movement, and has a current service length of about 19.1 km. When fully extended to Hong Qiao Airport and Pudong International Airport, it would comprise a total service length of 55 km. Line 3, the Pearl Line, has been developed out of a former ring railway and is mainly elevated and has been opened since 2000. It now has 19 stations and 25 km but will eventually be extended to 62km in length.
- 6.88 These three lines were financed by different means, mainly through government funding and/or foreign loans as follows (Table 6.4):

Table 6.4
Financing of Shanghai Metro Railways

<i>Railway</i>	<i>Total costs</i>	<i>Funding Sources</i>
Line 1	US\$620 million	<ul style="list-style-type: none"> • Municipal government funding • Borrowing from German government: DM460 million • Mixed loans from France: F132 million • US government aids and commercial lending: US\$23 million
Line 2	RMB9.4 billion	<ul style="list-style-type: none"> • Municipal government's foreign loan: 1/3 • Contributions from 4 district governments: 1/3 • Urban construction & investment companies: 1/3
Pearl Line (Phase 1)	RMB9.0 billion	<ul style="list-style-type: none"> • Foreign sources: 19% • Local bank loans: 49% • Self-raised fund: 32%

Source: Zhou (2003).

- 6.89 Shanghai Metro Corporation (SMC) is responsible for running the railway lines. According to Zhou (2003), although the fare revenues amounted to between RMB 300 and 600 million yuan each year and are showing a rising trend, such incomes are simply too small to repay the investment costs. This has created enormous funding pressures on the municipal and local governments.

6.90 Desktop information about property development of the SMC is scanty. Based upon private sources, the research team has the following observations:

- (a) During the construction of Line 1, the SMC followed the Hong Kong experience in pursuing property development along the railway line. It set up three subsidiary companies responsible for operating, developing and managing the projects. These projects took the form of either sole investment or joint development with the relevant parties, such as the construction companies of the district governments.
- (b) Although some of these projects were successful, the development scale remains small. There were only a few projects along Line 1.
- (c) When the SMC decided to expand its scale of property development along the construction of Line 2, this proposal met with strong objections from the municipal and district governments. Eventually, it was decided that the property development rights of Line 2 stations would be granted to the corresponding district governments. Development of the above-station property would be integrated with their urban restructuring programmes.
- (d) Since then, the SMC has not directly involved in developing new development properties above its railway stations. The most recent Pearl Line is elevated and therefore offers no opportunities for property development on top of its stations.

Beijing

- 6.91 Beijing now has three metro railway lines: Line 1, Line 2 and Line 13. Line 1 commenced construction in 1965 and service in 1971. It provides east-west movement across the city centre. Line 2 is a ring route with transfers to Line 1. The entire Line 1 is now 38 km long and Line 2 is 16 km giving the total network length of 54 km. Line 13 is a city rail of 40.8 km which is either elevated (7.7 km) or at grade (30.3km). It is now under construction but parts of its section have already come into operation since 2002.
- 6.92 Road traffic congestion is an obvious experience to all visitors in Beijing. Road space only covers around 10% of the city. Underground mass transit railway is considered a feasible option to address the problem. As of 2001, urban railway only took up some 9.43% of the share of public transit; the total share of buses and urban railway in terms of total internal travels was 29%. (Wang, 2002). Beijing has a population exceeding 11 million but its spatial distribution is extremely uneven. Over 70% of the population is concentrated within 10% of the entire city area (Wang & Liu, 2002).
- 6.93 The Beijing government is prepared to expand the originally planned 13 mass transit railway lines (408 km) to over 20 lines (700 km). The objective is to achieve a railway network coverage so that the population within the central city can reach a station within 5 minutes (Wang, 2002).
- 6.94 Based upon the information available, the study team has the following observations about the mass transit railway in Beijing (Guo & Tian, 1997; Wang, 1999; Wang, 2002):
- (a) The Beijing railway operator has not actively made use of property development to finance the railway construction. The central government and the Beijing municipal government were the funding bodies of the railway.
 - (b) The construction costs for mass transit railway range between RMB 100 million and 700 million yuan per km, depending on the site conditions. This imposes a huge financial burden on the governments in considering to expand the railway networks.
 - (c) The fare levels are too low. The operator is running at a loss which requires government subsidies. As of 1994, the government subsidies amounted to about RMB 225 billion yuan (Guo & Tian, 1997: 19). Increasing ridership and aging railway infrastructure are causing the problems of overcapacity and safety risks of the system.
 - (d) Adjoining properties have all along enjoyed the benefits of improved accessibility with the completion of the existing railway lines without contributing to its construction. There are suggestions to re-capture their property value increments in order to cover the shortfalls of the

railway operation. Joint property development is considered a possible means to finance future railway development.

Tokyo

- 6.95 Tokyo is characterized by its extremely high density and extensive railway network, which makes up a total length of over 2,140 km in length. What makes Tokyo different from many other cities is that its railway development is primarily driven by the private sector, rather than the government (Bernick & Cervero, 1997: 307-329; Cervero, 1998: 181-210).
- 6.96 Railway transit is very common in Tokyo. It is reported that the Tokyo metropolitan area recorded on average around 460 annual transit trips per capita, which is higher than Paris, London and New York. Railways take up 25% of all nonwalk trips in greater Tokyo and 40% of those within the central area (Bernick & Cervero, 1997: 311). Within Tokyo's core area of about 621 sq.km. with a population of 8 million, rail travel alone accounted for 41% of the trips, significantly higher than those for auto (15%), bus (3%), motorcycle (17%) and walking (24%) (PADECO, 2000).
- 6.97 The railways in Tokyo are mainly built and operated by private consortiums which integrate rail transit with other businesses, especially real estate. These consortiums began their business in railway and then moved into other related businesses including real estate, bus transport, electricity supply, construction, department stores, entertainment and education. According to Cervero (1998:193-4), the Hankyu Railway Company was pioneering in developing the concept of integrated rail and new town development in the Takarazuka line in Osaka in 1910. Its success story of consolidating property development around railway stations quickly spread and was followed by other companies.
- 6.98 Rail operation normally generates very modest returns entirely in itself and is rarely profitable to these consortiums. Most profits came from real estate development. For instance, the largest rail-based consortium in Japan, the Tokyu Corporation recorded 59% of its profits from real estate (only 26% of the total revenue) and 47% from railway (35% of revenue) in 1990 (Bernick & Cervero, 1997:314). These consortiums thus operate a business model of 'internal cross-subsidization' in that they accept money losing railway and feeder services provided that real estate operations are profitable (Cervero, 1998: 193). Tama Den-en Toshi development project is a showcase of Tokyu Corporation. Houses, high-rise apartments and shopping centres have been developed since 1953 based upon the Garden City new town concept on a 5,000 hectares site to house a population of 500,000 people. Tokyu Corporation has claimed that the daily needs of the population can be met in the community and social facilities provided by the company close to the railway stations.

- 6.99 Such business vision and integration have enabled the full exploitation of increasing land value opportunities from the integration between railway and real estate. It allows the Japanese consortiums to finance the rail investments and promote rail ridership that sustains the railway operations in the long run. It is found that the companies with fewer real estate projects also achieved less ridership for their railways (Bernick & Cervero, 1997: 315).
- 6.100 Land readjustment is the principal mechanism of these railway consortiums to assemble land. This mechanism works like an in-situ land exchange process. The consortiums assemble from the land owners their raw land of irregular shapes and return fully serviced and often small-sized land parcels in a proper layout. The 'excess' land will be put up for sale to fund the services. This method relieves the upfront costs of the consortiums in land acquisition.
- 6.101 Government financial support was also crucial for urban rail development in Tokyo. This can take various forms including direct subsidies for construction, favourable loans and equity participation. According to the World Bank report prepared by PADECO (2000), government subsidies for private railway companies dated back to the early 20th century. The Law of Subsidizing Local Railways of 1919 empowered the government to provide subsidy to local private railways during the first 10 years of their operations. More generous subsidies were put forward subsequently. Furthermore, the Japanese Development Bank provided low-interest loans to support the private railway companies for rail development and improvement. All these measures helped relieve the debt burden on the companies and encouraged entry of more private firms into the railway industry.
- 6.102 For Tokyo subway construction, a financial subsidy programme was initiated in 1962 to cover part of the interest payments on subway investment. Such programme was amended in 1967 to enable direct subsidy on construction. With the expansion of the subway network and rising construction costs, the rate of subsidy was also raised from a modest 10.5% to 70% of the eligible construction costs (coverage to some 50% of the total construction costs). As such, PADECO (2000) concludes that 'It is almost certain that Tokyo's subway network would not have been expanded as much as it was without strong financial support by the public sector.'
- 6.103 The Tokyo government also put forward supportive public policies to promote rail transit ridership. These included car ownership controls and vehicle taxations, high gasoline taxes, tolled expressways, tax-free allowances for transit riders and corporations. Japanese government regulation of rail fares promotes affordable rail ridership. Its designation of exclusive territories for franchised bus and railway operations by one particular transit operator reduced competition and enhanced transit viability (Bernick and Cervero, 1997: 311-312).
- 6.104 The following discussions provide a case study of a private railway company, East Japan Railway Company (JR East), which is probably one of the world's

largest railway corporations⁸. JR East operates over 870 km of railway route (nearly 40% of the network) within the Tokyo Metropolitan Area. Its entire passenger railway network amounted to over 7,500 km, serving about 16 million passengers on a daily basis.

- 6.105 Like many of its Japanese counterparts, JR East has taken full advantage of the property development opportunities. It develops shopping centres, office buildings and hotels on its stations and nearby land. At the moment, it operates and manages a network of over 110 station shopping complexes that offer a total rentable area of 7.9 million sq. ft. In 2000, the annual sales of these complexes amounted to over US\$7.1 billion corresponding to US\$899 per sq. ft. per year.
- 6.106 These shopping complexes are developed as part of the stations that occupy prime locations within densely population areas and provide easiest access for railway passengers for shopping trips. Each complex has been designed to match with the local character and lifestyle of the neighbourhood, and the profile of the target customers.
- 6.107 In 2002, JR East also operated and derived rental income from some 14 office buildings. The most recent office building was developed with Tokyu Corporation, another major railway giant, and opened in that year at Meguro station which was used by 199,000 passengers daily and served by four railway lines. JR East owns some 24,000 sq.m. of the total 52,000 sq.m. of building space. In addition, JR East also operates a number of hotels of different grades with over 4,700 rooms as at May 2003. JR East is planning a large scale project at Tokyo Station for developing twin high rise towers comprising 340,000 sq. m. of offices and shopping centres. It comprises two phases to be completed eventually in 2011.
- 6.108 Tokyo has set a model for many US and European cities about how a private-sector, long-term entrepreneurial approach, coupled with public sector backing for the integration of railway and property development, can achieve in building up an efficiently moving metropolis.

⁸ Refer to <http://www.jreast.co.jp>.

Singapore

- 6.109 Singapore has one of the world's most efficient railway lines, the Mass Rapid Transit (MRT) system (Bernick & Cervero, 1997: 331-348; Cervero, 1998:155-180). It is a heavily planned market economy in which the government plays an assertive role in guiding urban development, community design and transport policy. The pro-transit attitude of the government provides a favourable policy background behind promoting transit-oriented development in the city.
- 6.110 Singapore Mass Rapid Transit (SMRT) Corporation Ltd. is the operator of the mass transit railway service. In addition to railway, it currently also provides complementary feeder and mainline bus services, downtown shuttle system, light rail, taxi service, convenience stores and newspaper. It has been incorporated since 2000. Although the SMRT is privately owned, the major shareholder is a government investment company.
- 6.111 MRT has begun service in 1987, with subsequent system expansion in networks. It was being constructed at the time when Singapore experienced among the world's fastest growth in urban development.
- 6.112 By mid-2003, average number of daily riders of the MRT was about 1.14 million and the total number of passengers amounted to 394.2 million. Rail operations contributed over S\$384 million in fare revenues to the SMRT (SMART, 2003). Table 6.5 shows some key operational statistics of SMRT.

Table 6.5
Key Operating Statistics, MRT System (year end 2003)

<i>Items</i>	<i>Figure</i>
Route Length (km)	89.4
Total number of passengers (millions)	394.25
Average number of weekday passenger (000)	1,139.3
Total number of employees	2,893
Railway cash operating costs per passenger carried(S\$)	0.64
Railway EBITDA per passenger carried (S\$)	0.39

Source: SMRT (2003:32)

- 6.113 Although the efficiency of the MRT has received world recognition, the bus services collectively carry three times more passengers than the MRT. So, Cervero (1998: 165) states that 'it is the Singapore's highly functional yet less glamorous buses that are the true workhorses of the island's transit network.'

- 6.114 Government's master planning has guided the physical development in Singapore and provided the basis for the integration of railway and property development. The Ring Plan, approved in 1971, put the high-density housing, industrial areas and urban land uses in a ring around the urban centres. This provided the background for the development of new towns and the provision of MRT to connect them together. Most new towns were developed with the planned connections by the MRT eventually.
- 6.115 The MRT has also worked as a strong catalyst for retail development. According to Cervero (1998:164), fifteen of the twenty-three largest mixed-use shopping malls lie within 400 m of an MRT station and they all achieve rent premiums in comparison with those locating further away.
- 6.116 Government's promotion of high-density development, coupled with the various restraint policies on vehicle ownership and usage, are the key reasons in explaining the popularity of public transit in Singapore. Cervero (1998: 166) reports that two-thirds of the Singaporean workers traveled via mass transit – 12% by the MRT and 54% by public bus. 72% of those living in high-rise public housing commuted by transit but only 37% in low-density housing traveled by rail or bus.
- 6.117 Judging from the available information, it appears that the SMRT remains committed to its rail and road operation and does not seem to have engaged aggressively in property development businesses, apart from within its own stations. According to its latest annual report, SMRT (2003: 43) states:
- ‘SMRT leases more than 23,000 square metres of commercial space within train stations. The tenant mix within the stations is carefully managed to meet the daily needs of commuters and to enhance their travel experience. During the year under review, occupancy for the retail units and kiosks in all the stations stood at a robust 97.8 per cent.’
- 6.118 Looking ahead, SMRT (2003: 52) states that:

‘the management is keenly aware that the potential of commercial space within MRT stations has not been fully exploited. SMRT will work with the Authorities to find create ways to improve the quantum and quality of commercial space at our MRT stations. In the process, a better mix of tenants will hopefully be attracted to our stations, encouraging heavier customer traffic and driving rents higher.’

Conclusions: International Review

- 6.119 A literature review indicates that the impact of rail transit on property development and performance have mixed results in different cities. Local circumstances and property market conditions will affect whether railway will influence the property values and land use changes. However, the positive influence of land uses on transit ridership is less ambiguous. High development density, land use diversity and responsive layout design are found to encourage the patronage of railway.
- 6.120 A wider body of literature has pointed towards the need for some essential conditions under which the synergy between railway and property can be fully exploited. Some of the more important factors include healthy growing economy, supportive government land use and transport programmes, appropriate timing of transit investment, the presence of an entrepreneurial and development-oriented transit operator and effective co-ordination among relevant government departments and bureaucracy.
- 6.121 This section reviews the experiences of 10 selected cities in terms of their implementation of mass transit railway. Despite their diverse institutional backgrounds, the following common themes can be identified:
- (a) Except Tokyo, nearly all railway operators in these cities are public bodies which are functionally, operationally and financially linked with the public authorities and/or the governments. Tokyo stands as an exception with its privately run railway companies.
 - (b) Almost all of them operate other modes of public transport in addition to metro railways. This has often made them the principal providers of mass transit services in the cities.
 - (c) Mass transit railway is unlikely to be self-financing on its own. Almost all of them have to rely on government subsidies. Japanese railway companies rely on profits from real estate to subsidize its railway operations, in addition to the government subsidies.
 - (d) Property development is not normally their core business in many cities, except in Tokyo. This echoes the survey findings of Landis et al. (1991) in the US that land development contributions to transit investment were very small, making up generally less than 1% in most places and between 3 and 5% of capital expenditure in New York.
 - (e) Strong economic growth and buoyant real estate markets are essential to support the construction of mass transit railway in the cities.

- (f) While the benefit of integrating property development and mass transit railway are widely recognized, whether such integration can be achieved and whether the land value increments can be captured by the railway operators are contingent upon a number of institutional factors. Some of these key factors include the government policy support, a strong real estate market and not the least, the business strategy and acumen of the railway operators.

7. Summary & Conclusions

Introduction

7.1 This study identifies the impacts and benefits generated by the MTR's integrated rail-property development model. The main objectives of this study are to:

- (a) explore how the MTR integrated rail-property development model has effectively contributed to the urban development of Hong Kong;
- (b) examine the critical success factors and conditions conducive to the implementation of this model in Hong Kong; and
- (c) determine to what extent and how this unique model can be successfully replicated elsewhere, especially in the Mainland Chinese cities.

7.2 This final section:

- (a) summarizes the key elements of MTRC integrated rail-property development model
- (b) summarizes the key achievements and benefits generated by such model in urban development of Hong Kong
- (c) presents a critique of an apparently different approach known as the 'Linear City'
- (d) compares the differences between the MTRC model with the situations in other 10 selected cities in the world
- (e) presents an institutional model that highlights the critical success factors and conditions to achieve the synergy between railway and property development

MTRC Integrated Rail-Property Development Model

7.3 Section 2 emphasizes that the MTRC integrated rail-property development model is more than a simple combination of railway and real estate. It is not the same as the MTRC property projects above many of its stations. The integrated rail-property development model represents a unique approach undertaken by the MTRC in maximizing the synergy of railway and property in Hong Kong.

7.4 The model contains the following components (see Fig. 2.3 above):

- (a) Policy: This includes favourable government policies in the areas of exclusive grant of property development rights of the station sites to the MTRC, supportive land use planning and public transport policies in promoting the use of the mass transit railway in the territory.
- (b) Process: This covers the effective project planning practices, management and control procedures, and development processes undertaken by the MTRC that seek to maximize the synergy between railway and property from the stages of project inception to completion.
- (c) Organization: A well-experienced and efficiently managed company that is committed to providing world class railway services and developing top-quality property development projects in order to enhance the quality of life in Hong Kong.
- (d) Project: Development of high-quality real estate projects that contain high development density, appropriate land use diversity and attractive layout design that integrates well with the railway facilities at the convenient locations and at the right timing.

7.5 The model requires the MTRC to act as a single entity and the intermediary between the government and market players for coordinating the implementation of these joint development projects at its stations, converting strategic objectives into site-specific requirements, transforming policies into deals and balancing possible conflicts between public and private interests. This is considered to be a better institutional mechanism than an alternative government planning and land sale approach, in which the projects are implemented separately by government disposal of individual land parcels for property development by the developers and for railway construction by a railway operator because:

- (a) Railway stations and its above-station property developments are intimately linked in many aspects such as site footage, civil works, and ancillary services. It is extremely costly and difficult, if not impossible, to disentangle and divide all these activities into separate contracts if they are not planned, supervised and managed by a single entity like the MTRC.
- (b) The MTRC has accumulated considerable local experience in planning and developing integrated railway-property development. This will decrease the monitoring, enforcement and search costs in undertaking the development activities.
- (c) The MTRC model provides a better institutional mechanism in addressing the possible problems of uncertainty caused by changing economic conditions. The MTRC has the organizational flexibility and capability to adjust to unforeseeable changes.
- (d) Given the exclusive rights of planning and developing the landed property of its stations, the MTRC has the incentive to protect, enhance and capture the

value of its assets. The corporation is in a better position, than the many government departments, to delineate all the rights of the contracting parties to benefit from the land.

- (e) The lengthy time period in completing the entire railway development will increase the overall risk of the project and the formation of an integrated firm like the MTRC is an appropriate mechanism to better weather the property cycles.
- (f) The MTRC has well-defined corporate missions, objectives and tasks, which are widely known to the public, the government departments and the developers. This puts the MTRC as the focal point to rally all interested parties in implementing the integrated development. The incentive structure for the MTRC is such that it has an interest to constrain opportunistic behaviour, cheating and non-compliances of the involved parties such as the developers and the contractors.

Summary of MTRC's Achievements & Benefits

- 7.6 MTR is a key transport service provider and its network has extensive spatial coverage in the main urban areas of the territory. The study estimates that its current alignments and stations have achieved the following coverage:
 - (a) Over 2.78 million people (over 41% of the total population) and over 1.34 million workers (over 41% of the territory total) live within 500 m of an MTR station.
 - (b) Over 43% and 20% of the housing units in Hong Kong lie within 500 m and 200 m, respectively, of an MTR station.
- 7.7 MTR takes up a market share of over 24% of the total public transport ridership. A station analysis confirms that it provides a major transport function for the working population during the morning peak hours by connecting the housing areas with the employment districts. During the evening peak period, MTR provides essential transport services for the purposes of return-home trips and other off-business hours social activities in the existing urban districts.
- 7.8 Previous research studies on other western cities indicate no definite effects between land use development and transit railway. However, in the case of Hong Kong, the study findings confirm the positive relationship between property development and MTR ridership as follows:
 - (a) High concentrations and densities of both population and employment are associated with high MTR station ridership. Our model indicates that every single unit of public housing unit and of private housing unit within 500 m of an MTR station account for about 1.97 and 1.62 passengers, respectively, using the station as an origin on a typical day. These figures will increase for the housing units within 200 m of an MTR station.

- (b) The clustering of private housing units around MTR stations tends to exert a greater impact on the ridership than public housing.
 - (c) Mixed land uses, compact environment, exciting street-level activities in the existing old urban districts promotes MTR patronage.
 - (d) Integrated rail-property development projects in the new development districts, comprising good layout, attractive design, well-managed shopping facilities and efficient pedestrian connections with the surrounding district context, enhances MTR ridership. Successful development normally includes extensive pedestrian connections that are convenient, direct, safe and pleasant.
- 7.9 This study also confirms that integrated rail-property development projects tend to generate higher property values. The analysis of some sample housing estates indicate that the additional premium ranges between HK\$98 and HK\$280 per sq. ft. gross floor area.
- 7.10 The MTR affects urban development activities. Its stations greatly improve the accessibility of the adjacent development sites and encourage land owners to redevelop their land for higher-value uses. This study confirms the enthusiasm of land owners in applying for land use change from residential to commercial-office uses on private sites near an MTR station in the urban districts. However, most of the application sites were extremely small (e.g. only 340 sq.m. on average in Kowloon) and the redevelopment projects were piecemeal. While such redevelopment can enable the land owners to capture the additional land value, the social and economic benefits of an integrated rail-property development model cannot be fully realized.
- 7.11 The MTR has contributed external benefits to the community. These are benefits generated by its projects but not internalized by the company, including travel time saving, employment gains, environmental health benefits, property value increases and so on. The existing MTR network obviously generates enormous external benefits as it passes through the densely populated districts, commercial and employment centres and carries large passenger loads.
- 7.12 MTRC's integration of railway and property enables these two types of business to complement each other so as to generate the economic benefits of financial synergy and risk diversification. The study has demonstrated how the MTRC approach has vividly achieved such financial objectives:
- (a) Despite economic recession and unfavourable competitive environment in recent years, the MTRC has managed to achieve the market returns expected by the investors in the capital market.
 - (b) Railway projects are not viable on its own, as evidenced by the financial analysis of market returns of MTR railway investment and the West Rail project of the KCRC. The latter project is getting inadequate volume of passengers due to the slowdown of the population built-up and the delay of housing development at its stations. Its financial difficulties would ultimately be levied on the government (and the taxpayers), if left unresolved.

- (c) With a relatively higher portion of property revenues, MTRC has achieved a more favourable financial performance than its Japanese counterparts in terms of lower debt and higher profitability.

7.13 It is concluded that an integrated rail-property development model can generate the following social and economic benefits in Hong Kong:

- (a) Increase MTR ridership, reduce road traffic and thus lessen the need for more road construction (and reclamation)
- (b) Enable comprehensive planning and development of the station site and increase its overall property values
- (c) Concentrate land development and urban activities around the stations and reduce urban sprawl
- (d) Promote walking with the provision of safe, direct, efficient, convenient, weather-free and pleasant pedestrian connections with the stations
- (e) Enhance diversity of land uses and urban life
- (f) Enable travel time saving and road safety benefits
- (g) Create positive impacts on property values within the railway catchment
- (h) Generate financial gains to the government in terms of increasing property rates, taxes and land premiums
- (i) Achieve financially sustainable railway development and operation without the need of public subsidy
- (j) Enhance environment health benefits in terms of reduction in roadside pollution (as a result of less road traffic), decrease in government medical expenditure and productivity gains (due to healthier workforce)
- (k) Encourage rejuvenation and redevelopment of the older urban areas along railway catchment
- (l) Provide possible increase in employment opportunities
- (m) Enable possible increase in available land for amenities and possible protection of heritage features such as shorelines

Linear City: A Critique

- 7.14 Many western cities have suffered from the problems of having too many private cars. Increasing ownership and use of private automobiles are often seen as a sign of economic progress and an expression of individual freedom. However, it has brought many urban problems such as traffic congestion, environmental pollution, urban sprawl and efficiency loss. Mass transit railway is considered a better public transport alternative than private cars. By sensibly integrating land development and transit railway, transit-oriented development (TOD) – as this study indicates - can deliver enormous social and economic benefits contributing to the sustainable growth of a city. It is therefore not surprising that the advocate of TOD and related ideas has attracted increasing popularity in many western cities.
- 7.15 ‘Linear City’ is a recent experimental concept that seeks to implement similar ideas in a wider urban scale. According to introduction of Rufo Guerreschi in his webpage¹, Linear City is ‘a prototype for a transit-based human settlement’. It represents:
- ‘a prototype for a polycentric corridor growth strategy developed strictly around a transit-based intermodal transportation network. Highly interconnected within urban spaces, station areas provide such high levels of accessibility that the need for auto use and ownership in area around its nodes would largely be eliminated.’
- 7.16 Guerreschi has made it clear that his Linear City concept is not meant to be developed in its actual form, but simply to provide a performance benchmark to guide its application subject to the existing local circumstances.
- 7.17 Many development parameters (such as population density and parking requirements) of Guerreschi’s Linear City concept are formulated in accordance with the western urban context and hence may not be directly transferable. However, it also contains some fascinating ideas which find much relevance to the context of Hong Kong as follows:
- (a) Strategic distribution of land uses and intensities around hierarchical transit/intermodal nodes to create compact development clusters
 - (b) Efficient and extensive transportation infrastructure to connect the communities and provide inexpensive access to desired activities strongly focused around compact nodes, which integrate public space, transportation hub and green areas
 - (c) Transportation system to comprise a highly coordinated intermodal network and feeder service that allows walking, bicycling, rental and privately owned automobile, rail, e-vehicles, and other modes, and to maximize the choices of the user from any location

¹ Refer to the webpage: <http://www.linearcity.org>.

- (d) A critical mass of superb-quality transport network and high-density property development around the nodes is considered the most important factor of success
- (e) Coordinated and concurrent implementation of the mainline transport system, feeder network and property developments to quickly achieve the critical mass in order to generate returns, attract private participation and drive further expansion.

7.18 The Kowloon Canton Railway Corporation (KCRC) in Hong Kong has commissioned a recent study on the concept of Linear City with a view to providing a basis for its future development and investment policies. The research team understands from the KCRC that ‘the need for the study emerged from the recognition that future development, apart from remaining profitable, should provide for a sustainable environment that would improve the quality of living and reflecting a city known to the outside world to have built its competitive edge out of excellence in the service industries’². It is intended that the study findings would enable the KCRC to establish a regional framework to enable implementation of optimal development schemes on its land banks along the existing and future railway network.

7.19 At the time of writing, the KCRC’s study is still ongoing and little is known about its final proposal³. However, a paper written by a senior KCRC staff member and published in a local professional journal may help to give some clues (Yeung, 2002). While the paper advocates transit-oriented developments (TODs) by concentrating property development around railway stations at intervals along the railway line, it puts forward some land use distribution concepts which might work against achieving the merits of TODs. The paper states:

‘Could we imagine sending off our kids in the morning to their schools which are one or two stations down the line from where we live before heading to our workplace just three stations away. At noon we just take the train and hop off the next station for a business lunch. On our way home from work, we stop by a station away from home and do all our shopping before taking the family for an evening out to cinema two stations down the line. The whole day’s activities could therefore take place without the need of leaving the rail line. What that would entail is planning strategically high quality residential developments, good schools and social communities, convenient shopping centres, well-served office environment and leisure facilities around station nodes along the rail-line. *Gone may be the sights of tall residential towers sitting on top of a fortress-like podium that houses the introverted shopping centres, club-facilities and car-park. Instead, we may see all these facilities being dispersed along the rail-lines. This would be city or town planning on a grand linear scale.*’ (Yeung 2002: 63) [Our emphasis]

7.20 Drawing reference to Guerreschi’s Linear City concept and the study findings, the research team has severe doubts on the potential advantages generated by the above proposal, which essentially represents the development of ‘single’ types of land use

² KCRC’s presentation to the Hong Kong Institute of Planners on 8 September 2003.

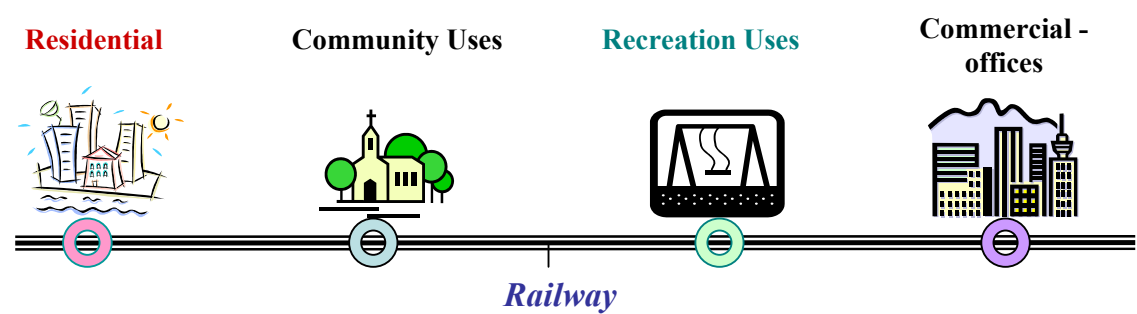
³ A website is created recently calling for study proposal. The entire study is expected to be completed in August 2005. See <http://linearcity.arch.cuhk.edu.hk>.

nodes and their spatial separation by railway stations (Figure 7.1). The reasons are as follows:

- (a) The study findings have demonstrated clearly that mixed land use development on and around transit stations is an important element contributing to railway ridership. Guerreschi's Linear City concept, which somehow is based upon Cervero, is in agreement to this point.
- (b) High-density development is another crucial success factor. Therefore, the proposed development of community facilities entirely on their own, such as schools, leisure and sports grounds, around the railway stations, is unlikely to be financially viable. This would not enable the railway operators to fully capture the land value associated with improved accessibility to the land around stations.
- (c) Development of a single type of land use around stations does not necessarily provide ridership. This study indicates that, more often than not, it only creates one-way flow of traffic that does not fully maximize the capacity of the railway network. At worst, it generates inconvenience to the riders, and hence adversely affects the railway patronage and the value of the land around stations.
- (d) Guerreschi's Linear City concept is aimed at minimizing reliance on the use of automobiles in daily travel. It does not suggest that a 'linear' railway can satisfy all the travel needs. There is a need for an extensive transport network that provides efficient feeder service to the railway. It is therefore unlikely that the land use concept as proposed above can increase ridership.
- (e) The research team is mindful of Lewis Mumford's (1963: 235) argument that the characteristic of a good transportation system is to 'minimize unnecessary transportation'. Yeung's (2002) description about a day in the Linear City simply works against this principle. People should not be 'forced' to travel on the railway more than absolutely necessary especially because the facilities are deliberately not being located within their easy reach.

7.21 The research team praises the KCRC for undertaking the Linear City Study for the purpose of contributing to the better future of Hong Kong. The above comments on its proposal at this formative stage may not ultimately be justified. The team has put forward its early concerns about the concept and hoped that they can be addressed in the study.

Figure 7.1
Linear City Concept



Source: Authors

Comparison with International Experiences

7.22 The MTRC model contains some unique features which are different from the situations in the other 10 cities discussed in section 6. These features include:

- (a) The MTRC does not operate other modes of public transport, except the mass transit railway. This makes the MTRC a relatively small and focused company in comparison with its international counterparts.
- (b) Unlike most of its counterparts, the MTRC engages actively in property development and investment activities. However, unlike the case in Tokyo, it is not privately owned.
- (c) The MTRC does not rely on government's subsidies to support its daily operations on a regular basis.
- (d) Property related incomes play an important contribution to the MTRC operations.
- (e) The MTRC is operating on prudent commercial principle. Its market-oriented business strategy and approach ensures that it will pursue financially viable projects and set appropriate fare levels. It has little to do with the urban renewal and similar revitalization programmes of the city.
- (f) Government grant of exclusive property development rights of the station sites to the MTRC and its partnering with selected property developers (and their payments for land premiums) eliminate the land holding costs of the corporation. These relieve a major financial burden on the MTRC in the process of land banking and acquisition.

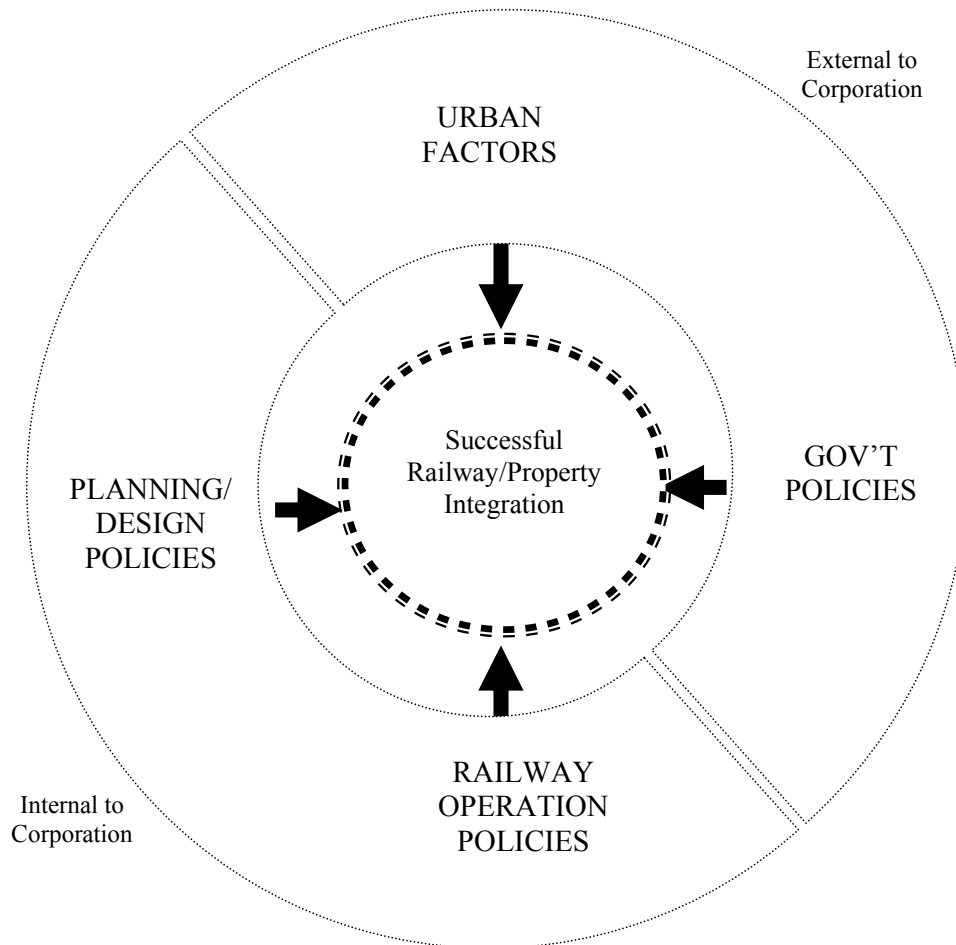
Institutional Model: Successful Integration of Railway and Property Development

7.23 The merits of integrating railway and property development are obvious. However, such form of integrated development does not come about naturally. It requires an appropriate institutional framework for successful implementation. The extent in which the MTRC integrated rail-property development model can be replicated in other cities also depend on whether these essential elements are in place.

7.24 This study proposes an institutional model that highlights the critical success factors to achieve such integration (Landis et al, 1991; Roeseler & Dosky, 1991; Porter, 1997; Scheurer et al., 2000; Babalik-Sutcliffe, 2002). Fig. 7.2 presents this institutional model graphically.

7.25 This model contains four major components in two dimensions which are external or internal to the railway corporation.

Figure 7.2
Institutional Model: Successful Integrated Railway and Property Development



Source: Authors

- 7.26 External dimension cover the aspects which are outside the direct control of the railway operator. It includes two major elements: (a) Urban factors and (b) Government policy support.
- 7.27 It is important to note that the construction of urban transit railways always requires a healthy growing economy, particularly a strong real estate market. Strongest land use impacts are expected when transit investment occurs prior to the upswing of the urban economy (Cervero, 1998). Furthermore, it will also make life easier if the public is generally receptive to compact, high-density form of development (as in the case of many European and Asian cities) and also to the use of public transit.

- 7.28 Supportive government policies in regional planning, land grant, high-density zoning and infrastructure development are important (Gannon & Dear 1975; Knight & Trygg, 1978; Cervero, 1984; Porter, 1997; Huang 1996). As indicated elsewhere, mass transit is believed to be a 'powerful shaper of cities and regions, though rarely on its own' (Cervero, 1998: 82). Similarly, Kelly (1994) suggests that transport facilities only 'shape' urban growth, rather than 'cause' growth. Cervero (1998: 104) suggests that strong regional planning, coupled with the government support of the integrated rail-property development through land acquisition and transfer of development rights are reasons behind the success of the subway lines (for example in Toronto).
- 7.29 The success of integrated rail-property development also requires complementary support in other policy areas. Urban Land Institute (1979:6) suggests that successful implementation of joint development requires supportive growth management policies not only to encourage high density development around stations, but also to restrict intensive development in areas not served by the rail transit. Failure to do this has a major reason leading to the problems failed by Guangzhou. Furthermore, it is necessary to exert controls on alternative modes of transport, as in the cases of Tokyo, Singapore and Stockholm. Thus, public transport policies such as automobile taxation, complementary bus and feeder services, and transit subsidies will affect the ridership of railway (Pucher, 1988; Bernick and Cervero, 1997).
- 7.30 Internal dimensions refer to the factors under the control of the railway corporation. There are two major aspects: (a) Operation policies in relation to the management quality of the railway services; and (b) Planning/design policies in connection with the integrated railway and property development.
- 7.31 Whether the public will use the mass transit railway depends to a large extent on whether it is capable of providing safe, convenient and reliable transport service commensurate with its fare. Operation policies concerns management issues of the railway such as train frequency, transfer between different modes, cleanliness and security management. These issues are mostly related to the transport considerations.
- 7.32 Planning and design policies are concerned with the development aspects of the real estate projects and its integration with the railway facilities. They relate to the issues about development density, property/station design and land use mixes of the above station property development projects. These factors are essential in enabling the property development to benefit from improved accessibility associated with the railway and to promote ridership of the railway.
- 7.33 Based upon this model, the institutional factors behind the accomplishments of the MTRC are essential. All these factors collectively contribute to the success of its integrated railway and property development model. The MTRC in Hong Kong, acting as a single body to plan and implement high-density property development above railway stations, has effectively and efficiently tied up the two latter aspects together. In so doing, it is capable of capturing the land value appreciation associated with improved accessibility. This constitutes an important institutional mechanism behind the significant achievements in integrating of land use and transport development in the territory.

- 7.34 The MTR integrated rail-property development model can bring enormous benefits to many rapidly growing Mainland Chinese cities, which are plagued by problems such as traffic congestion, environmental pollution and urban sprawl. At the time of writing, the MTRC has successfully made progress in applying this integrated rail-property development model in the development of Metro Line 4 in Shenzhen. This surely reflects a positive recognition of the success of the MTR model and its relevance in contributing to the future growth of the Mainland Chinese cities. One important message that comes out from this study is that, it is the model, *not the projects only*, which counts towards its success. The model contains policy, process, organization and projects. It is crucial that the Mainland Chinese leaders understand, endorse and be fully convinced about the essence of the model in order that they could possibly replicate the remarkable achievements of the Hong Kong MTRC in their cities⁴. The research team hopes that this study report has made a small step in this respect.

- END -

⁴ Some features in the mainland may work against the model, such as: (a) promotion of ownership and use of private cars, in order to increase domestic consumption and enhance middle-class lifestyles; (b) weak controls on the supply of development land; (c) oversupply of building space; (d) poor governance and fragmented government authority in urban planning, urban management and public transport policies; and (e) regulated and subsidized public transport fares.

Appendix: MTR Property Development Details

Urban Lines:

Residential	No. of Block	No. of Flat	Size of Flat (sq. ft)	Commercial Area (sq. ft)	Government Institution & Community Area (sq. ft)	No. of Car Park Spaces
Telford Gardens	41	4,992	473-667	561,569	9,784	723
Luk Yeung Sun Chuen	17	4,000	462-678	167,359	145,981	651
New Kwai Fong Garden	5	1,264	495-527	48,266	5,813	126
Fortress Metro Tower	4	757	495-1,098	73,098	-	114
Kornhill	32	6,648	581-1,237	1,121,286	103,765	1,168
Kornhill Gardens	10	2,180	484-807	-	-	-
Hongway Garden	2	412	506-592	27,384	-	-
Perfect Mount Garden	5	760	484-699	12,045	213,450	-
Southorn Garden	1	480	549-829	28,482	440,441	12
Heng Fa Chuen	48	6,504	560-1,227	287,851	210,572	849
Felicity Garden	4	732	775-904	-	144,087	-
Choi Hung Station Development	1	316	568-837	25,834	40,187	504

Commercial	Office G.F.A. (sq. ft)	Shop G.F.A. (sq. ft)	Lettable Area (sq. ft)	No. of Shops	No. of Car Park Spaces
Admiralty Centre	778,130	194,979	-	178	-
Admiralty Centre (Ten Shop Units at 1st Floor)	-	-	3,079	-	-
World-wide House	358,592	76,866	-	227	-
Fairmont House	224,817	-	-	-	-
Telford Plaza I	-	561,569	412,369	124	270
Telford Plaza II	-	334,007	211,104	103	188
Telford Plaza - Hang Seng Tower	286,699	-	-	-	25
Nathan Road (2 shops)	-	-	1,141	2	-
Luk Yeung Galleria	-	167,359	111,763	59	-
Paradise Mall	-	287,851	195,605	161	415

Airport Railway:

	Site Area (Hectares)	RESIDENTIAL		OFFICE		RETAIL		HOTEL / SERVICE APARTMENT		Total Gross Floor Area (sq m)
		Gross Floor Area (sq m)	No. of Units	Gross Floor Area (sq m)	No. of Towers	Gross Floor Area (sq m)	No. of Shopping Centres	Gross Floor Area (sq m)	No. of Rooms	
Hong Kong	5.71	-	-	254,190	2	59,460	1	102,250	1,000+	415,900
Kowloon (Union Square)	13.54	608,026	5,866	231,778	1	82,750	1	167,472	2230 - 2490	1,090,026
Olympic	16.02	493,152	7,146	111,000	4	63,500	2	-	-	667,652
Tsing Yi	5.4	245,700	3,500	-	-	46,170	1	-	-	291,870
Tung Chung	21.7	935,910	12,448	15,000	1	56,000	1	22,000	364	1,028,910

Tseung Kwan O Lines:

	Site Area (Ha)	Domestic GFA (m ²)	No. of Flats	Average Flat Size (m ²)	No. of Towers	Retail GFA (m ²)	Office GFA (m ²)	No. of Storeys
Tiu Keng Leng	3.24	236,965	3,772	62.8	9	16,800	-	49-55
Tseung Kwan O	5.55	110,925	1,742	63-66	4 (residential) 2 (office)	75,514	103,130	38-49
Hang Hau	1.8	138,652	2,130	65	6	3,500	-	48-49
Area 86	32.68	1,612,800	21,500	60-85	50	40,000	-	46-57

Data Source: Downloaded from MTRC Webpage (<http://www.mtr.com.hk>) on 5 April 2004.

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