Toward Network City
Suburban High-speed Train Station as A New Node in the Network--How to Integrate a New Centrality into A Regional Development?

Mentored by
Dr. Diego Sepulveda
Dr. Frank van der Hoeven
Ir. Che-Sheng Chiang

Tseng, Shih-Hao  1531077
Urbanism MSc4
Complex City Studio
June 2010 TU Delft

Tseng ShihHao +31647235320
twohau@yahoo.com.tw

Urbanism MSc4
Complex City Studio
June 2010 TU Delft

Tseng ShihHao +31647235320
twohau@yahoo.com.tw
PART I RESEARCH
1. Introduction
2. Location and Context
3. History
4. Methodology
5. Research Actions
6. Problem Statement
   6.1 Regional Problem
   6.2 Local Problem
   6.3 Research Questions
7. Regional Approach
   7.1 Network City Modality
   7.2 Node Development
8. National Condition
9. Interdependence
   9.1 Regional Condition
   9.2 Poly-centers
   9.3 Functional Cluster
   9.4 Functional Networks
10. Vision
    10.1 Potential Corridor
11. Infrastructure
    11.1 Commuter Flow
    11.2 Manufac. Logistics
    11.3 Tourist Flow
    11.4 Agri. Logistics
12. Regional Masterplan
    12.1 Corridor Hierarchy
    12.2 Airport Articulation
    12.3 HST Articulation
      -- Key project
    12.4 Inner City Reposition
    12.5 Design Strategy
13. Strategy Framwork
    13.1 Taichung City
    13.2 Chunghua County
14. Target Groups
    14.1 Tourist
    14.2 Young Professionals
15. Corridor Strategy
    15.1 Functional Articulation
    15.2 Mobility Requalification
    15.3 Landscape Articulation- Agri.
    15.4 Landscape Articulation- Urban
    15.5 Local Spatial Hierarchy
    15.6 Functional Hierarchy
    15.7 Intercity Network
    15.8 R&D Network
    15.9 Tourism Network
16. Station Complex
17. Case Study

PART II DESIGN
18. Node Area Strategy
    18.1 Potential Local Resource
    18.2 Node Area Strategy
    18.3 Accessibility & Spatial Hierarchy
    18.4 Landscape as the backbone
    18.5 Two Centalities
    18.6 Local Flow Articulation
    18.7 Landuse Master Plan
19. Spatial Challenge I
    19.1 Multi-scalar Function
    19.2 Regional Function
    19.3 Regional Public Space
    19.4 Regional Infrastructure
20. Spatial Challenge II
    20.1 City Function
    20.2 City Public Space
    20.3 City Infrastructure
21. Spatial Challenge III
    21.1 Local Function
    21.2 Local Public Space
    21.3 Local Infrastructure
22. R&D Network
    22.1 Tourism Network
    22.2 Shopping Network
    22.3 Infrastructure Network
    22.4 Public Space Network
23. Current Housing Typology
    23.1 Proposed Housing Typology
    23.2 Density Design
24. Public Space I Design
    24.1 Regional Public Space
    24.2 HST Node Integration
    24.3/4 Skywalk Design
    24.5/6 River Square
    24.7 Museum Park
25. Public Space II Design
    25.1 Viaduct Transformation
    25.2/3/4 Lower Shopping Street
26. Public Space III Design
    26.1 City Public Space
    26.2/3/4 Park Entrance
27. Phasing
    27.1 Regional Future Development
    27.2 Network City
28. Evaluation
    28.1 Strategic Advantage
29. Calculation
30. Reference
Motivation
This graduation project is entitled "Towards Network City: The suburban High-speed Train Station as a new node in the Network". The scale of the region in this project is including four cities in central Taiwan and the high-speed train system runs at the speed of 300km/hr. The HST system (length 350km) in Taiwan was completed in 2007 and its station (five stations) was placed in a suburban location. It only takes 90 min to travel from north to south. Consequently, the perception of local, regional and national scale has had to be redefined and the new impacts from the suburban HST node are directly arising the urban spatial issues. Therefore, this specific condition became the motivation to research and to search a proper development model for this condition. Expectantly, the methodology could be applied to the other suburban HST stations.
The Central region is located in the center of west Taiwan. Five cities are included, Taichung city and Changhua city are the main urban areas and the rest region are mainly agricultural and mountainous areas. The population is 5.17 million which accounts for almost a quarter of Taiwan. The total area is 8686km² and it is 100km wide and 80km long. The history followed will illustrate how the urban development is influenced by the river and railway systems.
**Location and Context**

- **Taiwan HST**
  - Distance: 350 km
  - Time: 1hr30min

- **Thalys HST**
  - Distance: 340 km
  - Time: 2hr35min

**European HST map**

**Public Transport Capacity**

- **Passenger (million people)**

<table>
<thead>
<tr>
<th>Year</th>
<th>HSR</th>
<th>Highway Bus</th>
<th>Train</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>3,000</td>
<td>2,500</td>
<td>2,000</td>
</tr>
<tr>
<td>2008</td>
<td>3,500</td>
<td>3,000</td>
<td>2,500</td>
</tr>
</tbody>
</table>

**Map Details**

- HST station
- CBD/Rail station
- Urban area
- HST
- Railway

**Graphs**

- **Passenger-km**
- **Airport Cargo transport (ton)**
- **Airport Passenger (10,000 people)**
- **Container Traffic (1,000 TON)**

**Location**

- **Taipei**
- **Taichung**
- **Kaohsiung**
- **Bruxelles**
- **Lille**
- **Paris**
- **Antwerpen**
Central Region

The early villages are concentrated in south west Taiwan and developed nearby the coastal area along the rivers in --- East-West Direction 1880 1930

After railway, new cities emerged at the station area. Coastal villages started to decline. Urban development keep growing along the railway in --- North-South Direction 1945 2007

**History**

- **Dutch Colonization**
- **Chin Dynasty:**
  - 1732 permit immigration
  - Natural development by the river system
  - 1887 First Railway
  - Japanese occupation
  - Development along the railway system
  - 1930
  - 1960 R.O.C: Industrialization
  - Rapid expansion development
  - 2007 High-speed Train

---

**PROBLEM STATEMENT**
**Methodology**

### Research Actions

**Context**

**Problem statement**

**Research question**

### Analysis

**Theoretical framework**
- HST & Urban development
- Regional synergy
- Regional network
- Polycentric development

**Empirical framework**
- Japan: Nogoya
- Singapore
- UK: Edinburgh
- NL: Rotterdam

### Research tool

- Data research
- Policy reflection
- Mapping

### Literature review

- Theoretical framework
- Empirical framework

### Regional scale

### City scale

### Local scale

### Data research

### Mapping

### Theoretical framework

- HST & Urban development
- Regional synergy
- Regional network
- Polycentric development

### Empirical framework

- Japan: Nogoya
- Singapore
- UK: Edinburgh
- NL: Rotterdam

### Evaluation

- Evaluate if HST supports regional synergy
- Evaluate if HST enhances local identity
- Local level Pilot project
- Evaluation

### Output

- Governmental Vision
- Evaluate if HST supports regional synergy
- Local level Pilot project
- Evaluation

---

**Research Actions**

- Context
- Problem statement
- Research question

**Analysis**

- Regional scale
- City scale
- Local scale

**Research tool**

- Data research
- Policy reflection
- Mapping

**Literature review**

- Theoretical framework
- Empirical framework

**Theoretical framework**

- HST & Urban development
- Regional synergy
- Regional network
- Polycentric development

**Empirical framework**

- Japan: Nogoya
- Singapore
- UK: Edinburgh
- NL: Rotterdam

---

**Evaluation**

- Evaluate if HST supports regional synergy
- Evaluate if HST enhances local identity
- Local level Pilot project
- Evaluation

**Output**

- Governmental Vision
- Evaluate if HST supports regional synergy
- Local level Pilot project
- Evaluation

---

**Theoretical framework**

- HST & Urban development
- Regional synergy
- Regional network
- Polycentric development

**Empirical framework**

- Japan: Nogoya
- Singapore
- UK: Edinburgh
- NL: Rotterdam
Methodology
**Regional Scale**

**Traditional urban model**
- Railway and rail stations use to become part of the CBD of a city.
- Several adjacent station areas constitute a complex metropolis.
- Each metropolis develops independently and competes to each other.

**New urban model**
- The new mobility is restructuring whole urban networks.
- New correlation of regional urban networks is restructuring in business and tourism flows.
- New network city model.

The railway mobility is remaining insufficient for creating more correlation between metropolises to change the polarized urban development condition. Today, HST system has connected these metropolises physically and tightly. Therefore, the metropolitan market hinterland could be overlapped by this new mobility and restructuring whole urban networks. Local urban networks could be strongly connected become a regional urban network and the great potential for new possible centralities and networks could be explored as well. Then the new correlation of regional urban networks would form a new network city model to generate greater economic synergy for the region.
**Regional Problem**

**National Territorial Policy**
Obviously, Taichung region will be included into the Taipei commute area. Spatially, Taipie-Taichung might gradually become one large metropolitan area to release the over-developed pressure in Taipei region. Base on the Economic Development Department, the “Research of the HST impacts on the territorial space and develop strategy”, there are three core plan: North Region will give the priority development to “high-technology and finance”, Central Region will give priority to “living, tourism, precision machinery”, South Region will develop mainly on “logistics, refined agriculture”. (Base on National Territorial Plan)

**Taichung HST Special Zone**
The Taichung HST Special Zone will be positioned as” Super entertainment shopping city, develops large scale of commercial, entertainment and shopping facilities, as well as the administrative center and the science park. The plan will tend to place outdoor theater, housing, theme Leisure Park, landmark office building, administrative center, Research and development, Power Center etc. The administrative center could concentrate the central region branch of central government into this zone to facilitate the development of new town and increase the development position and effect.

**Conclusion**
- In the policy of “Research of the HST impacts on the territorial space and develop strategy”,
- Central Region will give priority to “living, tourism, precision machinery”.

**Taichung HST Special Zone**
- Super entertainment shopping city
- Large scale of commercial, entertainment and shopping facilities, the administrative center
- The science park, outdoor theater, housing, theme Leisure Park, landmark office building, Research and development, Power Center etc.
6.1 Regional Problem

Policy Reflection
In the official regional plan, government only highlights the existing situation. There is lack of the concrete strategy or plan in the regional policy. In the Taichung HST station, most of the proposed programs are all commercial-oriented and already exist in Taichung City. There is lack of concerns on the rest part of central region. More attention should be paid on the demand of agricultural and coastal area and the correlation functions within them.

Conclusion
- No concrete regional strategy or plan.
- Concentrate in one node toward north region
- Less attention for southern region
- Less local identity
- Less relation with landscape

Taichung metropolis

Territory Planning: Central Region Plan

Taichung HST station

Taichung HST station special zone

Taichung HST station special plan
Local Problem

Administrative border
The most critical point is that the local governmental plan totally ignores the consideration of the HST node development due to the administrative division. As a result, the local urban projects have no relations to the HST node. For instance, the original domestic airport has been transformed into a financial trade complex zone, including a stadium and an international conference and exhibition center to contain large events for precision machinery industry. This location is certainly not a better choice compared with the HST node which has strong potential for global and international scale activities. Therefore, the disconnection between the suburban HST node and the local urban projects are obviously. Local governments still develop independently without the institutional co-operation and the regional strategy, and networks could be explored as well. Then the new correlation of regional urban networks would form a new network city model to generate greater economic synergy for the region.
6.2 Local Problem

Backwash Effect and Spread Effect
In central Taiwan, new towns have been planned by local governments in the HST station areas located in the periphery of the cities. New tension has been raised between traditional CBD, periphery CBD and the suburban HST station area. "Growth poles may cause backwash effect as well as spread effect in the periphery" (Myrdal, 1957). Regarding spatial economic development, therefore, the effect of the HST is one of polarization, increasing the focus on large cities at the cost of the intermediate regions" (Trip, 2007). Major infrastructure service can reinforce the polarized spatial distribution of economic activities, because a variety of activities may prefer to settle in the immediate vicinity" (Pol, 2002).

HST node location and central urban area

(base on Myrdal, 1957; Pol, 2002; Trip, 2007)
Local Problem

Taichung Airport
- The current Taichung airport is just transformed from military airport at 2005. The accessibility is still poor and disconnect to the cities. The current transport is completely relying on cars and bus. The lack of public facilities and connection to the HST node are the most critical weakness for the present situation.

Taichung inner city
- Taichung CBD has declined gradually due to the replacement by shopping malls and emerging new CBD in the edge. The traditional small scale retailing in inner city no longer has attraction to compete to the nearby new retailing centers. Abandoned commercial buildings and closed stores are underused and available to redevelop.
- How to use the HST system to support the regional economic synergy in central Taiwan?
  - What are the possible potential centralities and networks in relation to the development of the new HST station?
    - What is the suburban HST node position in the central region?
  - What are the correlated urban functions within the cities in central region?
  - How to create the cooperation or complementary synergy for those existing centralities?

- How to integrate the suburb HST node into the local urban structure?
  - How to reverse the extra tension between the existing CBD, the suburban HST node and others possible new centralities?
  - How to improve the accessibility to the suburban HST node and Taichung airport to support the activities (urban functions) in the region?
  - What kind of urban functions (specialized or integral functions) could be introduced into the suburban HST node area as the new development to support the urban network?
Regional Approach

**INTERDEPENDENCE**
Urban function
- Identify functional networks
- Identify new (potential) nodes (centralities)
- Station
- Airport
- Seaport
- CBD

**ACTIVATOR**
- Node development
- Identify correlated functions
- Co-operation
- Specialization
- agglomeration
- complementarity
- Multi-function

**MOBILITY**
Infrastructure
- Usage of infrastructure
- People commter
- tourist
- Freight
- Agric. logistics
- Manufac. logistics
- Multimodal transport
- Airport
- HST
- Railway
- Metro
- Bus
- Car
- pedestrian
- Transportation interchanges
- Long/medium/short distance journey
- Local public transportation
- Car-parking facilities
- Rail-Airport links

**P3 OUTPUT**
1. Mapping of local questions
2. Siteplan for new functions
3. Mapping of potential suburban HST node
4. Proposed new functions
5. Regional masterplan

**P4 OUTPUT**
1. Mapping of new infrastructural networks
2. Siteplan for new functions
3. Mapping of potential suburban HST node
4. Proposed new functions
5. Regional masterplan

**Challenge**
- Regional--- indicate the proper complementary and cooperation functions for the HST node to activate the regional functional network
- Intercity--- Flows articulation toward the nearest functional nodes
- Local--- Take the advantages of multi-scalar mobility and local spatial condition to accommodate and integrate the proposed programs
Network City theory
Nowadays, a city is no longer only the concentration of buildings around one center, it consists of several concentrations of economic, social, and cultural functions, activities, and facilities, which has given reasons to use the notion “multi-nodal city” (Jacobs, 2000a quoted by ROOIJ, 2005). Castells (1996) who defines cities as networked phenomena. He postulates that “the really significant feature is the network, not the particular status or functions and roles cities perform. Cities are nodes of the ‘space of flow’” (Castells, 1996 quoted by ROOIJ, 2005). From this point of view, the suburban HST node could be also viewed as a certain size of city or node in the network.

Furthermore, “the concept of networks is strongly linked to the notion of “synergy which refers to a situation in which the effect of two or more co-operating or combined bodies or functions is larger than the sum of the effects each body or function alone can achieve” (Meijers, 2007) “Synergy in network city model is generated through:
- co-operation (refer to club networks; regional organising capacity or frameworks for co-operation and their functioning leading to horizontal synergy).
- complementarity (refer to web networks; differentiation in the economic roles of cities, in urban facilities, in business and residential milieus coupled with a regional demand leading to vertical synergy)” (Meijers 2007).
7.1 Network City Model

Regional Scale

City Scale

Local Scale

Overall Relationship

Research Scope

Taichung metropolis

Taipei metropolis

Kaohsiung metropolis

Airport

Harbor

Changhau county

Changhau city

Agriculture Village

New CBD

Old CBD

HST station

Taichung city

Changhau city

HST station

Taichung metropolis

Taipei metropolis

Kaohsiung metropolis

Main Centrality

Sub Centrality

Interrelation
Node and Place
Bertolini (1996) characterized two dimensions for the station area, “the connections to ever denser, faster and further reaching transportation systems, as well as the development there of office complexes and shopping centers are materializations of the ‘global dimension’ of station locations. On the other hand, stations identify a ‘place’, a both permanently and temporarily inhabited area of the city, a dense and diverse conglomeration of uses and forms accumulated through time, that may or may not share in the life of the node. Furthermore, from these features, two potentials for the station are indicated as (i) the strengthening of integration among heterogeneous transportation systems as response to the mobility gridlock; and (ii) the emerging of the multi-centred urban region as the mature form of industrialized metropolises. From this double perspective the redevelopment of railway stations may be defined as the enhancement and combination of a ‘transportation interchange’ and an ‘activity pole’. (Bertolini, 1996) To conclude, the suburban HST station could also be considered as a node which “on one hand, offering a (potential) connection to several of the material and immaterial flows that create value in the current ‘informational’ (Castells, 1989 in Bertolini, 1996) mode of development. On the other, the stations are (or may become) important nodes in both transport and non-transport (e.g. business, consumption) networks” (base on Bertolini, 1996).
National condition

Population

Financial Institutions

Exhibitions & Cultural Activities

Labor Force

Universities

Hostels
**Conclusion**

- Central region performance in many aspects is in the secondary position in Taiwan and still presents large gaps between Taipei Region.
- Central region stands a strong manufacturing environment playing an important role for the regional economy.
- Central region is adjacent to the natural scenic places.

1. Highlight potential functional corridor
2. Distribution and interrelation between functional networks

(Meijers, 2007), (Rooij, 2005), (Trip, 2007)

Identify strategic location for new centrality to reform functional networks

The club network creates horizontal synergy

The web network creates vertical synergy

(Meijers, 2007), (Bertolini, 1996), (Trip, 2007)
9.2 Poly-centers Function

Centralities in Central Region

Chunghau CBD
Loukang
Taimwei
Taichung City

Urban area in central region

Main heritage in Loukang

National Flower Park

Chunghau inner city

Central heritage

Taichung City
Wuci town
Loukang town
Functional Cluster

- Industry & University
- Hospital & Medical Center
- Museum & Leisure
- Retailing & Finance

NETWORK
9.4 Functional Networks

Functional Networks

Taiching inner city

Visit and Travel density

Visit & travel number

Population

Existing interrelation

Potential interrelation

2nd and 3rd industry rate

0 - 0.75

0.75 - 1

0 - 120000

120000 - 250000

0 - 1500

1500 - 100000

Eco-wetland

Sea food market

National Flower Park

Bettn of Taiwan

Taipei Pro,"
Rebuild new functional relations and links to improve the suburban disconnection.

Expand and integrate existing urban functions into the suburban HST node.

Activate the interactions between centralities in different scale to form interdependence to create synergy.

**Node development**
- Short term: 1. Introduce the complementary urban functions into the suburban HST node 2. Integrate the HST into local infrastructure networks

**Corridor development**
- Medium term: 1. Restructure the functional networks 2. Co-operation between the suburban HST and existing CBD 3. Enhance the local economic synergy

**Network City**
- Long term: 1. HST-Airport connection development/ international business development 2. Regional economic synergy

**VISION**

**GOVERNMENTAL VISION**
- 1. Entertainment city
- 2. Living city
- 3. Precision Machinery

**EVALUATE**
- 1. If the HST node support the regional synergy
- 2. If the HST node enhance the local identity

**P2 OUTPUT**
- 1. Mapping of future scenario
- 2. Analysis of potential complementary functions for suburban HST node
- 3. Mapping of potential correlated networks
- 4. Proposed new functions for suburban HST node
- 5. Regional masterplan

**PROBLEM STATEMENT**
- LOCAL CONDITION MAPPING
  - Metro-system / Route / stop
  - New interchange / node
  - Pedestrian / riverbank / hill
  - Bus Station / Route / Density
  - Number of Destinations

**LOCAL APPROACH**

**FINAL OUTPUT**

**REGIONAL APPROACH**

**P3 OUTPUT**

Potential Corridor

2030
Taichung CBD --- HST station --- Changhua CBD --- Luogang

Slow and support
As a result of political status, the tourism flow from China remains limited. The immigration from Taipei and Kaohsiung increases gradually. The development is relatively slow and the current polarized cities shifts smoothly to network cities. This process lead central region grows as the support or satellite region for Taipei and Kaohsiung.

2050
Taichung Airport --- Industrial parks --- HST station

Fast and compete:
More and more population flow both from Taipei and Kaohsiung regions will converge in central region by the HST. Additionally large amount of tourists from China will stream into the central region. Population in central region will rocket and develop rapidly, more and more international business is created here raising its position becomes a new competitor to Taipei and Kaohsiung metropolises.
**Infrastructure**

**MOBILITY**

**Infrastructure**

- Usage of infrastructure → Evaluate the pattern/density/diversity of infrastructure to support the interrelation between nodes (Meijers, 2007), (Rooij, 2005), (Trip, 2007), (Pol, 2002)

**FLOW**

- People commuter tourist + Agric. logistics Manufac. logistics → Evaluate locations of functions Reorganization of functions and infrastructures

- Multimodal transport
  - Airport Metro
  - HST Bus
  - Railway Car pedestrian

- Node development
  - Transportation interchanges
  - Long/medium/short distance journey
  - Local public transportation
  - Car-parking facilities
  - Rail-Airport links

- 1. Strengthen the multimodal accessibility of activity places
- 2. Increase the liveability of nodes (Dijst, 2003), (Rooij, 2005), (Trip, 2007), (Pol, 2002)

- 1. Release congestion and pollution
- 2. Integration of multi-transportation network (Meijers, 2007), (Bertolini, 1996), (Trip, 2007), (Pol, 2002)
Due to the large number of manufacturing labors in this region, the manufacturing commuters have to travel to the west, which may create high car traffic and congestion in the local east-western direction. As for service sector workers and students, the railway provides multimodal transport in the north-south direction.
There are two medical universities and three medical research centers in the central region. The medical environment is at the second place in Taiwan. Combined with the best machinery manufacturing, there is a great potential for develop medical equipment manufact. and related R&D program. This kind of “biotechnology industry” could become the platform to combine and cooperate with these two functions. Additionally, the high-tech. manufact. is the strength of Taiwan in the south east Asia manufact. market.
11.2 Medical Equip. R&D

Machinery Manufact.
Automation machinery
Medical equipment
Precision processing

Industry Management

Calibration laboratory

Biotechnology Industry
Research & Development
Medical equipment
Medical consumable
Medical instrument

Hospital/Medical Research Center
Clinical Practice and test
New medical discovery and demand

The Department of Health

Market

Blood sugar inspection
Diagnostic Device
11.3 Tourist Flow

Present

Challenge

One start point

Two start point

Taichung City

HST
Tourist Flow

Proposal

Scenic Nature

National Scenic Nature

- New Terminal
- New HST node
- Extension Bus line
- Extension Metro
- Extension Open space
- Extension Bus station
- New Cultural-related program
- New Hostel-related program
Challenge
- Intensify the product volume
- Increase the quality of the product
- Increase the value for the product
- Create selling market

Proposed Agri. R&D and Marketing Management

Agri. Chemistry Dep. in univ.
Academic Laboratory

Agri. Research and Extension
Greenhouse Experiment
Application of Academic Result

Greenhouses and Farm Field
Cultivation / Plant

Marketing Management
Production Packaging / Selling

Potential Greenhouse area
Proposed Logistics center
Proposed Potential Agri. Research and Extension center
International corridor
Airport – HST
The proposed new airport terminal and new HST node combined as an international node to attract international business activities and logistics in the long term development. The present HST node could be viewed as the regional (national) node to complement the existing functional networks. Therefore, these two HST node could shape an international corridor along the HST line.

Regional corridor
Airport – Taichung CBD
The connection from the airport to the major service and financial center in Taichung CBD forms a service business-oriented corridor.
HST – Taichung CBD
The connection from the present HST node (proposed medical equipment manufacturing, experimental greenhouse and hotel) to the major museums and universities with medical research and agriculture chemistry research center forms a platform from academia and practice fields and a corridor for tourism as well.
Harbor – Airport
The main export and import logistics nodes build a important logistics corridor for the local manufacturing product. Since the position of Taichung airport and harbor is in the secondary place, thus the logistics corridor is mainly contributed for the central region.

Local corridor
HST – Chunghau City – Loukang Town (Heritage)
The concentration of heritages in Loukang becomes one of the main local identities to bring the tourism economy. The connection between Chunghau and Loukang is also a important route for commuters.
Airport – Foungyuan Town
The sub residential area in Foungyuan could become another potential high quality living area for service sector labors after the airport area development.
International node
New Airport – HST node
The proposed new terminal and new HST combination node is mainly articulating the financial, logistics and few tourism networks in this region. These networks are also referred to the international scale, thus the airport-HST node is positioned as the global node in this region being the strategic place for office, logistics center, hotel programs and the important transport interchange node as well. It will bring a new impetus for the international business and economy.

Taichung Airport Position
- In Taiwan, Taipei international airport is still the main air hub where the major tourist and business trips go firstly. Thus Taipei is considered as the start point of the Taiwan tourism.
- Additionally, from the central region the two international airports in north and south can be accessed already within 45 mins by the HST.
- Therefore, the Taichung airport is defined as the regional airport.
- The HST and railway become the national links in the west Taiwan corridor and the efficient access to the central position, Taichung. These facts make the existing stations more important.
Regional node
Existing HST node
In order to distinguish the role of the two HST nodes, the existing HST node is defined as the regional node articulating the medical, manufacturing, agriculture and tourism networks. It has strong interrelation to the local industries reinforcing the regional economy and representing the local identity. Therefore, programs such as medical equipment manufacturing, industrial management, greenhouse experiment, hotel and riverbank park are introduced into the HST node development.

Advantage
- The local landscape in the existing HST node is the most crucial essence of local identity and opportunity to create better quality of living in the central region.
- The existing rail system has integrated with the HST node providing multi-accessibility and TOD potential.
Chungkau inner city
The existing traditional food is the most famous local resource in the Chungkau inner city. A better pedestrian network can be planned to link those traditional food shops and to integrate them as a local food tourism attraction. This pedestrian network will also connect to the mountain scenic place. Therefore, combined with the heritage, flower market, and mountain natural tourism, the Chungkau inner city could strengthen its food culture to diverse and reinforce the tourism in the southern central region.

HST node
The specific node development strategy in this project is related to the regional functional networks. The selected complementary and cooperation functions for the HST node development are focus on the manufacturing, medical, tourism and agricultural functions. Therefore, the regional economic synergy is based on these selected R&D and tourism functions to synergize with those existing functional centralities. The extended tram and bus lines also provide multi-model transport to access those important natural scenic places to potentiate the national tourism flows brought from the HST system. By this network city modality, the HST node becomes the regional activator to generate economic synergy in the central region of Taiwan.

Taichung inner city
Many traditional shops in the historical inner city have been replaced by the nearby shopping center. The previous shops on the ground floor now are available to redevelop and they are mostly in the small land plots. The potential redevelopment could be explored from the existing four universities surrounded in the inner city area. The education-related program become the opportunity for the urban regeneration such as student housing or small studio office for the starters could be reintroduced into those small scale available space to accommodate students and young professionals. Thus Taichung inner city could be repositioned as the educational center to synergize with the proposed R&D center in the HST node.
In the regional scale, the mine node development task is to explore the potential correlated functions from the regional functional networks. Then the HST station is considered as a node in the regional networks and from this node to the existing nearest functional nod, this in between distance becomes the extended functional corridor to articulate the existing functional network in the cities. Tourism and R&D flows are the main potential from the HST node in the central region and there are four corridors have been defined. The HST line is the national tourism and business corridor connects to Taipei and Kaohsiung. From the HST node to the hospital, university and manufacturing zone are the R&D corridors. In between the HST and art museum, Buddha Park and the heritage are the tourism corridors. Therefore, how to develop these intercity corridors and the HST node to extent and articulate the flows is the next design task.
Strategy Framework

Function
(Developing A New Centrality)

Infrastructure
(Multi-scalar mobility integration)

Landscape
(Landscape perception and building local identity)

Economy

Environment

Social

(M) Corridor

(L) Network

(S) Node
Taichung City

**New City center area**
- Main public facility
- National cultural facility
- Highest quality residence
- City park
- Shopping mall
- Office
- Large block

**Taichung Industry park**
- International conference center
- Sport park
- Education/Research center
- Shopping mall
- Hotel
- High quality residence
- City park
- Manufacturing
- Machinery
- Chemical
- Plastic
- Electric machinery
- Textile
- Metal

**New Complex zone**
- Optical technology factory
- Electronic technology factory
- Education/Research center
- Park

**Taichung Science Park**
- Optical technology factory
- Electronic technology factory
- Education/Research center
- Park

**Taichung Harbor**
- Free trade zone
- Industry zone
- Cargo
- Power station

**Taichung City Center**
- Sport facility
- Education
- Shopping mall
- City Park
- Banking center
- Hospital/health care
- Heritage/culture
Fig. 26 Main local identity in Changhau county

**ChungHau city**
- Train factory/museum
- Financial center
- Heritage
- Education
- Traditional food

**LouKang town**
- Heritage
- Culture
- Religion
- Traditional food

**TainWei town**
- National flower and tree market
- Plant nursery
- Seasonal Event
- Greenhouse
- Bicycle tourism

**SheTou town**
- Textile
- Mountain climbing

**YuanLin town**
- Wetland
- Eco-environment
- Aquaculture
- Oyster farm
- Fishing
- Tourism

**SiHu town**
- Famous fruit
- Old sugar factory
- History
- Culture

**SiHu town**
- Wetland
- Eco-environment
- Aquaculture
- Oyster farm
- Fishing
- Tourism
In 2009, Sun Moon Lake which located in central Taiwan is the first tour choice for Chinese tourists. There were 600 thousand Chinese tourists (around 20 thousand tour groups, each group is about 25 people) visited Sun Moon Lake in 2009. To compare with this number in 2008, it is only 90 thousand tourists visit there. The Chinese tourists go to Sun Moon Lake rocketed in 2009 after Taiwan open the tourism to China and the growth rate in that year is 636%. The Taiwan overall tourist grew 469% in 2009 showing the huge potential market of Chinese tourist in the future.
Young Professionals

Potential User

---

In 2008, there are 50,000 graduates in the Central Region. People today generally enhance the level of education, low-paid is the main reason that highly educated young people are not willing to work. Therefore, highly educated unemployed people are becoming high, resulting in the human resources is a pity. Government should actively speed up the introduction of high-tech industries to the city to invest and to explore the job market.
Spatial Challenge

The challenge is try to break the barriers and integrate the HST node into the local networks.

Problem
Now the river and heavy infrastructure become the barriers blocking HST station area as an island. The infrastructure also obstruct the river to be perceived by people and river is becoming no place in this area.

Strategy
- Expand station development to cross the barriers and overlapped with local fabric.
- Transform part of these barriers into public space and introduce correlated functions. Thus the barriers are becoming the connectors to surroundings.

Present
Infrastructure as place recognition

Vision
Landscape as place recognition
Corridor Strategy

15.1

Function
(Developing A New Centrality)

Infrastructure
(Multi-scalar mobility integration)

Landscape
(Landscape perception and building local identity)

Economy

Social

Environment

Strategy
R&D Tourism flows articulation
Spatial Hierarchy based on the multi-scalar accessibility
Node development expansion
Search favorable location for new programs
Multi-scalar functions two sub-centralities respond to different flows
Cross the barriers toward the existing functional nodes

Design Guideline
Strategy Spatial Hierarchy based on the multi-scalar accessibility

Node Expansion

Flows Articulation

Spatial Hierarchy

Node Expansion

Mobility Requalification

Pedestrian System

Dimish Barriers

Riverbank backbone

Multi-scalar Function

Green Artication

Riverbank park and cycling routes and squares
Leisure agriculture and agriculture R&D
Public space network
Multi-scalar function integration
Green and Blue articulation
Riverbank as the backbone of the public space network
Connect public transportation to the functions and landscape
Visiuct transformation and public space network formation
Integrate extra functions & public space / mobility hierarchy adjustment
Pedestrian system
Dimish barrier
Multi-mobility integration and requalification

 CONNECT TO THE ENVIRONMENT
Functional Articulation

1. Science Park
2. Industry Park
3. Buddha
4. Heritage
5. Art museum
6. Science museum
7. Hospital/Medical center
8. Hospital/Medical center
9. Agriculture University
The main attempt is providing alternative infrastructures given the clear hierarchy to access and articulate those existing functional centralities. In the intercity level, the approach is to change the profile and hierarchy of existing roads in order to give a better visual recognition to direct people to different destinations meanwhile reintroduce correlated functions into these roads and to continue the existing urban activities such as shopping and leisure.
15.4 Landscape Articulation

Agriculture landscape

Proposed

- Leisure Agri
- Agriculture Department, ChungShin University
- High density Living area / urban amenity
- Agrili Area
- Working area
- Riverbank park
- Leisure Agri
- Living area
- Working area

Present

- Agricultural landscape
- Agriculture research
- Holiday farmer
- Leisure agriculture
- Agriculture research
**Local Spatial Hierarchy**

Development zones related to the accessibility of an HST-stopping place (Schutz, 1998)

- **Primary Node and development zone**: 20 mins walking accessibility
- **Secondary Node and development zone**: 15 mins indirect accessibility
- **Tertiary Node and development zone**: 10 mins walking accessibility

Table 2.3 Development zones related to the accessibility of an HST-stopping place (Schutz, 1998)

<table>
<thead>
<tr>
<th>Accessibility to and from the HST-station</th>
<th>OG1: Primary development zone</th>
<th>OG2: Secondary development zone</th>
<th>OG3: Tertiary development zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>Direct</td>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>5-10 mins on foot or by a transport node such as a private car</td>
<td>&lt;15 mins, via complementary transport nodes (incl. travel and change time)</td>
<td>&lt;15 mins, via complementary transport nodes (incl. travel and change time)</td>
<td>&lt;15 mins, via complementary transport nodes (incl. travel and change time)</td>
</tr>
<tr>
<td>Location potential</td>
<td>Location for high-grade national functions</td>
<td>Secondary location for high-grade functions</td>
<td>Secondary location for high-grade functions</td>
</tr>
<tr>
<td>Building density</td>
<td>Very high</td>
<td>High</td>
<td>Depending on specific situation</td>
</tr>
<tr>
<td>Development</td>
<td>Very high</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

Key:
- Color code:
  - Red: Priority
  - Black: Station
  - Gray: Railway
  - Orange: Highway
  - Blue: Artery
  - Green: Secondary road
Functional Hierarchy

International Program
- Intensified Bus station
- Proposed Congress center
- Proposed Industrial management consultation & training
- Proposed Agri. Research center
- Proposed Enterprise incubator
- Office
- Intensified Hostel-related program

Metropolitan Program
- Intensified Potential Greenhouse area
- Proposed Medical Equipment-related Manufac.
- Intensified Open space
- Intensified Hostel-related program
- Proposed Shopping center
- Beer Museum transformed from beer factory
- Theater & library

Local Program
- Residential area
- Proposed Shop/Retailing
Public space Articulation

Urban landscape

- Mountain scenic park
- Mixed with Schools
- Riverbank park
- Mixed Functions
- Deconcentrated
  - City park
  - Green belt
  - Mixed with Cultural facilities
- Concentrated
  - Riverbank park
  - Mixed Functions
- Concentrated
  - Mountain scenic park
  - Mountain pedestrian
  - Mixed with Schools
R&D & Urban Tourism

North wing

15.9

Present railway on ground floor

Official plan of future overhead railway

New public space on the ground floor

International Program
- Extension Bus station
- Congress center
- Industrial management consultation & training
- Agr. Research center
- Enterprise incubator
- Office

Regional Program
- Eco-park
- Greenhouse area
- Medical Equipment-related Manufac.
- Extension Open space
- Extension Hostel-related program
- Shopping center
- Beer Museum transformed from beer factory
- Theater & Library

Local Program
- Residential area
- Proposed Shop/Retailing
- Leisure Agriculture

Hospital/Medical center
Industrial park
University
Museum/Exhibition
Park/Green corridor
Proposed Pedestrian
Proposed Green corridor
Shopping street/Avenue

HST
Railway
Metro
Highway
Viaduct
Artery
Secondary road

2km
South wing

1. Heritage
2. Sun Moon Lake
3. Eco-fishway nearby the river
4. National Flower market
Station Complex
Findings
- The multi-transport interchange model
- HST station area programs
- Flow distribution
- Multi scale integration

Frankfurt HST

Euralille
Node area Strategy

Function
(Developing A New Centrality)

Infrastructure
(Multi-scalar mobility integration)

Landscape
(Landscape perception and building local identity)

Economy

Social

Environment

Strategy
Local activator transformation

Existing village preservation/local identity

Locally flows articulation

Design Guidelines
Integrate extra functions related to the flows

Cultural identity and diversity

Densification by residential program mixed with office and retailing

Landscape perception and building local identity

Economy
Local activator transformation
Existing village preservation/local identity

Local flows articulation
Station indication
Main corridor permeability
Flows connection and distribution
Loop boulevards connect stations and waterfront public space
Small blocks along the corridor
Parking area, Bus stop, Pedestrian
Multi-scalar public space integration and accessibility

Permeable semi-public space
Landscape visual corridor

Social
Cultural identity and diversity
Integrate extra functions related to the flows

Design Guideline
Densification by residential program mixed with office and retailing

Loop boulevard
Permeable Street layout
Flows distribution

Public space network
Semi-public space
Landscape perception
Potential Local Resource

- Beer factory
- Brownfield
- Underused road
- Rised railway
- Available hill area
- Agriculture land
- Riverbank area
- Eco-fishway
- Brownfield
- Beer factory
- Preserved community
- Underused road
- Rised railway
- Ditch
18.2 Node Area Strategy

- Main public space axis
- Secondary public space axis
- Main development area
Accessibility & Spatial Hierachy

- 20 mins walking accessibility R=1500m
- Secondary development zone
- 10 mins walking accessibility R=750m
- Primary development zone

Function
- Infrastructure
- Landscape
- Economy
- Social
- Environment

NODE

| 1km | HST | Railway | Artery | Secondary road | Viaduct metro | Parking | Bus stop | Pedestrian |

L: L M S
Landscape as the backbone
Two Centralities

- Office
- Commercial area
- R&D area
- Cultural amenity
- Residential area
- Future expansion
- Public space
- Parking space
- Hotel area
- Eco-park
- Preserved community
Local Functions Articulation

18.6

Function
Infrastructure
Landscape
Economy
Social
Environment

Pedestrian
Commercial area
Office
R&D area
Cultural amenity
Future expansion
Residential area
Public space
Parking space
Hotel area
Government institution
Preserved community

1km
Landuse Master Plan

1km Office Commercial area R&D area Cultural amenity Residential area Future expansion Public space Parking space Hotel area Government institution Preserved community
**Spatial Challenge I**

**Regional Flows**

**Riverbank Transformation**
- Crossing the barriers/ river/ viaduct
- New green gateway image
- Landscape integration
- Public space network formation

**Beer Factory Transformation**
- Urban tourism flow articulation
- Public space network formation
- Entrance image
- Flows distribution

Present riverbank view
Present heavy infrastructure image
Riverbank perspective
19.1 Multi-scalar Functions

Station complex
International program
Regional program
Tourism program
City program
19.2 Regional Functions

Tokyo International Forum, Japan
Enterprise incubator
Industrial management
19.3 Regional Public Space

Riverbank, Taichung HST

Southbank Parklands, Brisbane

Riverbank, Dusseldorf

1km

Entrance square
Public square
Boulevard shopping street
Park
Pedestrian
Leisure green corridor
Regional Infrastructure

Taipei metro viaduct

De Haag Randstade Rail
Spatial Challenge II

City Flows

Viaduct Transformation
- Higher level main traffic
- Ground level underuse
- Linear public space

Ditch Transformation
- The main ditch is covered by the infrastructure
- Landscape integration
- Public space network formation

2. Taipei holiday flower market

Underused road in the ground floor

The road ended by the railway

2. Taipei holiday flower market

3. Taipei holiday flower market
City Function

- Office
- Commercial area
- R&D area
- Cultural amenity
- Future expansion
- Residential area
- Public space
- Parking space
- Hotel area
- Government institution
- Preserved community

[Map of city functions with various zones indicated]
Current ditch is treated as sewage drainage, Taichung HST

Upstream ditch, Taichung HST

Successful case in Taichung City

City Public Space

Green Corridor Formation

- Reopen the ditch
- Transform into waterfront pedestrian
- Connect agri. & riverbank landscape
City Infrastructure

Boulevard, Paris

Gold Coast beach boulevard, Brisbane
Local flows articulation
- Station/Shopping/Tunnel recognition
- People and car flows separation
- Activity continuity
- Green belt connector
The landscape (hill / river) perception is the main intention for the street layout design. The linear farm land and house buildings in both sides in the current north village form a strong visual corridor toward the hill. This spatial model is transformed for the linear public space approach. Another principle is the permeable streets. In the main shopping and leisure area, the smaller blocks could provide better permeability and accessibility for the functions thus to strengthen the local identity and flows.

Semi-public space provides the immediate accessibility from the household to the public space. To continue the landscape perception intension, the main semi-public space is also designed to access the main landscape area in north south direction. Additionally, the semi-public space in the pedestrian or public space urban front will be more permeable than the urban front faced the roads.
Local Function
21.3 Local Public Space

Hammarby sjostad, Stockholm

City green corridor, Taichung City
source: http://farm4.static.flickr.com/3036/2716417085_c4985a23.jpg

Pedestrian next to Sydney harbor

source: http://farm4.static.flickr.com/3036/2716417085_c4985a23.jpg
Local Infrastructure

Hammarby sjostad, Stockholm
source: google map

GWL terrein, Amsterdam
source: google map

21.4

Railway
Artery
Secondary road
Viaduct metro
1km

Parking
Bus stop
Pedestrian

source: google map
22.1 Tourism Network
22.2 Shopping Network

- Pedestrian
- Commercial area
- Office
- R&D area
- Cultural amenity
- Future expansion
- Residential area
- Public space
- Parking space
- Hotel area
- Government institution
- Preserved community
22.3 Internal Infrastructure
Public Space Network

- Entrance square
- Entrance
- Public square
- Boulevard shopping street
- Pedestrian
- Park
- Leisure green corridor

1km
Current Housing Typology

Housing re-qualification
- Gap of housing type
- Young professionals
- Enhance R&D potentiality
- Deepen the local identity within the region.
- Local public space network

**Apartment**
- Floors: 10~15
- Land use: housing
- Block: 250*150m
- Public space: community park

**Luxury Villa**
- Floors: 3~4
- Land use: housing
- Block: 200*170m
- Public space: community park

**Trad. Housing**
- Floors: 3~4
- Land use: housing
- Block: 100*100m
- Public space: none
23.1 Proposed Housing type

User
1. Young professional
   -- Suite housing
2. Creative class
   -- Small family
3. Business commuter
   -- Luxury housing

Strategy
- Mix function in the ground floor
- Shaping the functional networks

Southbank, Brisbane

Hammarby sjostad, Stockholm

Hammarby sjostad, Stockholm

South Bank, Brisbane

Sydney, Australia

Studio-Housing, Sydney

Mix-function building typology
Density Design

- Accessibility
- Landscape visual connection
- User / Function
- Public space quality/ Pedestrian density
- Landmark

Landscape
Infrastructure
Landscape

Office / Shop / Family & Studio housing
Office / Shop / Luxury & Family housing
Office / Shop / Luxury & Studio housing
1. Search favorable location for new programs
2. Multi-scalar functions/ two sub-centralities respond to different flows
3. Cross the barriers toward the existing functional nodes
4. Integrate extra functions into local elements and barriers correlated to the flows
5. Loop boulevards connect stations and riverbank public space
6. Connect public transportation to the functions and landscape
7. Riverbank park and cycling routes and squares
8. Multi-scalar public space integration and accessibility
Regional Public Space

24.1

Taichung National Art Museum

Yilan Wine Culture Museum

Beer factory
24.2 HST Node Integration
Skywalk Design
River Square Design
River Square Design
Museum Park Design
Public Space II Design

1. Multi-scalar functions/ two sub-centralities respond to different flows
2. Cross the barriers toward the existing functional nodes
3. Integrate extra functions into barriers correlated to the flows
4. Loop boulevards connect stations and riverbank public space
5. Connect public transportation to the functions and landscape
6. Viaduct transformation and public space network formation
7. Riverbank park and cycling routes and squares
8. Multi-scalar public space integration and accessibility
Viaduct Transformation

- Higher level main traffic
- Ground level underuse
- Linear public space

Underused road in the ground floor

1. Rotterdam below ground shopping street
2. Taipei holiday flower market
3. Taipei holiday flower market
Lower Shopping Street
25.3

Lower Shopping Street
Lower Shopping Street
1. Multi-scalar functions/two sub-centralities respond to different flows
2. Cross the barriers toward the existing functional nodes
3. Densification by residential program mixed with office and retailing
4. Loop boulevards connect stations and riverbank public space
5. Small blocks along the corridor/Parking area/Bus stop/Pedestrian
6. Connect public transportation to the functions and landscape
7. Riverbank park and cycling routes and squares
8. Multi-scalar public space integration and accessibility
26.1 City Public Space

1. Existing local shopping street
2. Beer street, Leuven, Belgium
3. Tokyo International Forum, Japan
4. Delft city center shopping street
26.3

Park Entrance Design
Park Entrance Design
Phasing

2020

2040

2030

2050
Regional Future Development

- Decentralized expansion
- Landscape as regional urban quality
- Regional Green ring
- HST nodes multi-direction articulation

Regional vision
The main consideration of further future is to keep the existing urban quality and identity in central region. The central region urban quality can be characterized as:
1. Climate
2. Nature landscape
3. Urban amenity
4. Urban landscape (green ring)
5. Medium density
6. High quality housing etc.
The population growth rate is slightly increasing and tends to be stable. The urban extension for the 50 years future will not like what it was in the past 50 years.

In Taipei city, the continued urban entity has been overdeveloped beyond its geographical capacity (fill up the plain area and extend to the mountain area) and extreme high density result in worse urban quality. Unlike Taipei, central region development is relatively low and surrounded by agriculture areas. This agriculture landscape with two hills in central region fragmentize cities into poly-centers. Additionally, these poly-centers have had their own specialization, as a result this urban model has potential to be transformed into network city model meanwhile has opportunity to enjoy more nature landscape and keep the high urban quality.
Therefore, the future urban extension will distribute toward each centrality in order to remain the poly-centric model rather than concentrated only in Taiching city and all centralities will be connected by intensified public transport system (metro). Base on this network city model perspective and the geographical constrains (next hill and river), the HST node will develop into “three direction linear form” and articulate to the existing urban corridors. This multi-direction-linear model is particularly profitable to distribute different flows and capture different local urban functions from and to multi directions at the same time. Thus, the suburban HST node could be integrated into local urban structure and cooperate with existing urban centralities to generate synergy.

HST node image
An entrance with few ways to go and the river will become the director. Landscape will become the main image for the HST node area. The R&D and cultural related facilities, riverbank housing will become another image as well. The west sub centrality will become tourism station with hotels and lots of shops surrounded by green open space.

Suburban HST Nodes as the Regional Activators

- HST node as functional and transport hub
- East-west new tram networks
- Corridors formation
- Network City formation
- Regional economic synergy
Evaluation

1. Program
Gov. --- Large scale shopping/ administrative center
Proposal --- R&D / Tourism respond to regional flows

2. Main developed area
Gov. --- one center concern about the main city
Proposal --- two centers/ multi-direction integration

3. Landscape
Gov. --- Regardlessness
Proposal --- Local identity/Public space network

Offical landuse plan
28.1 Strategic Advantage

**Challenge**

Indicate the proper complementary and cooperation functions for the HST node to activate the regional functional network.

Flows articulation toward the nearest functional nodes.

Take the advantages of multi-scalar mobility and local spatial condition to accommodate and integrate the proposed programs.

**Proposal**

**Advantage**

- The correlated functions explored from the regional network can cooperate and complement the existing cities to reverse the backwash tension and create the synergy.

- Take the advantage of HST mobility to facilitate multi-scalar flows.

- The local flows are integrated with regional flows in this node development.

- The landscape integration strengthens the local identity by providing the good public space.

- The proposed public space network creates a better quality of living environment to activate regional and local flows.
### Rotterdam Centraal

1. office --- 81000m2
2. housing ---
3. amenity --- 72000m2
4. Parking --- 40000m2

### Euralille

1. offices (45,000m2),
2. shops (31,000m2),
3. park (100,000m2),
4. 700 apartments,
5. 3 hotels: 4, 3, 2 stars, 6,000 parking places, 6778m2
6. Exposition (20,000m2), Congress (18,000m2) with amphitheaters of 1,500, 500 and 300 seats, total 38,000m2

### Taichung

1. office --- 51,960m2
2. housing --- 743,700m2
3. amenity --- 77,540m2
4. R&D --- 100,000m2
5. Hotel --- 41,300m2
6. Parking ---
Literature:


Websites (visited in Oct 2009):

National Geographic Information System
http://ngis.moi.gov.tw/Eng2/1_list.aspx?k_id=40

Ministry of the Interior, Department of Statistics
http://www.moi.gov.tw/stat/

Ministry of Economic Affair
http://www.moea.gov.tw/

Construction and Planning Agency Ministry of the Interior

Taichung city government official website:
http://english.tccg.gov.tw
https://gis2.tccg.gov.tw/address/main.cfm

Taichung city government statistic department official website:

National electronic these and Dissertation system
http://etds.ncl.edu.tw/theabs/english_site/search_simple_eng.jsp

Taiwan studies over the internet
http://twstudy.iis.sinica.edu.tw/
Before HST

After HST

www.thsrc.com.tw

只有一點時間，也可以去很遠的地方玩 Be There

Be There