

HSINCHU 3.0, City of the Future

An INTA Panel

for the National ChiaoTung University

with the support of the Hsinchu County

HSINCHU 3.0, City of the Future

Reflections stemming from the panel's work in Hsinchu, focusing on development principles for the whole site and in particular for the new Campus.

The whole area is branded "*Hsinchu 3.0, City of the future*" to describe a new type of development, integrating the latest notions and techniques of urban sustainability.

Also a demonstration that a different approach to urban sustainability is possible in Taiwan

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THE MISSION

- 1) The request from the host institution
- 2) The objectives given to the panel
 - i) Mandate
 - ii) Composition of the panel



iii) Working method

(1) The 5 1/2 steps



- (2) Documents consulted
- (3) The interviewees

iv) Words of caution



THE LOCAL CONTEXT

1) Land development as opportunity for the expansion of the University

A large site open for development 420 ha of which 10% will be dedicated to public services, in particular, for higher education and applied research as a new campus for the NTCU

The master plan for the whole area has been approved by Central government



2) Expectations

from the host, the local population, the other actors...

i) Contributing to regional and national policy objectives:

Hsinchu 3.0 (the whole of the 420 ha area) is a sizeable opportunity to contribute to the improvement of climate change and to the reduction of carbon emissions both being singled out by the Taiwanese Authorities as national and regional priorities. These objectives need the engagement of local authorities and of all territories

As tomorrow is being shaped by today's development, building a sustainable future implies new planning concepts such as eco-mobility of people and goods, less reliance on private car, less transport, carbon neutral development, 100% renewable energy, support for sustainable industrial growth and innovation in all aspects of city life.



integrated town concept, Hammarby Sjostad, Stockholm

The ultimate goal of the vision of the town is to create society, i.e. to bring together people of all conditions and all origins. But one must not forget the prevailing trend towards individualism and the search for autonomy. European developers address this contradiction in the aspiration for the town, on one side in the search for animation, community life, the importance of public realm, and on the other side in seeking to preserve privacy, being at home, in an intimate circle. Chinese developers and planners might have a different approach, focusing more on the private side rather than on the public one. Nonetheless there is a need to reconcile living together and living at home.



Urbanity can be defined as a collective way of experiencing the city and its functions, but also as the will to examine the heterogeneity of its forms and to think out public space to encourage people to meet in places they share in common

Creating urbanity is the task of the developer, being public or private, with the support of planners, architects, and landscapers. On the ground it is the careful design of buildings that will distinguish public space from private one, their dialogue with vegetation, the pathways that border or cross them, which make up the kind of atmosphere one wishes to achieve. Urbanity is landscape, atmosphere, place: it is usually perceived on the scale of views from windows, but also on the scale of different types of mobility from the pedestrian to the car or public transport systems.

ii) A territory in search of competitive positioning

- (a) a recognisable position at National level
- (b) a specific position as Regional metropolis
- (c) a "Gateway" City extending its reach



3) Constraints

Local power structure: University vs. City; City vs. County; local landlords and tenants vs. University; Government's agencies vs. local partners, Higher level strategies that could interfere with local plans.



THE CHALLENGES

NTCU faced with a double challenge:

To carry the development of the campus site (40 ha) in a phased way so that the first phase (incubators in particular) can fund the following phases (in particular the new Campus);

To be a significant partner in the development of the rest of the site, so that future plans do not jeopardize the expected high quality of the Campus site.

1) Complex key issues at stake

Making cities more instrumented, interconnected and intelligent isn't only about overcoming the challenges cities face. It is about recognizing that many of the challenges we face in making a smarter planet are centred on creating sustainable cities.

Cities symbolize and centralize so many aspects of what will make for a smarter planet: smarter education, smarter healthcare, smarter water and energy use, smarter public safety, smarter transportation, and smarter government ... to name but a few.

2) Fragile natural environment

3) New development values

From manufacturing to R7D, innovation for sustainability, new urbanity: from a haphazard urban sprawl to a new sense of urban life based on health and sustainability.

4) Engaging all actors in comprehensive planning process.

Coordinating different local actors to support a collective vision of the future;

Create a sustainable building programme as objectives for private developers;

Co production with the community of innovative neighbourhoods – more of community participation than community consultation.

5) Governance of project, institutional cooperation

The challenge is to foster the **emergence of a strategic project** that could influence the development of an urban area markedly more extensive than the site itself.

IMPORTANCE OF THE MODE OF GOVERNANCE OF THE PROJECT

For example, in addition to affordability, Malmö's stakeholders are engaged in a new planning process: the Creative Dialogue (ByggaBo Dialogen) which facilitated discussion amongst City representatives, together with property developers and architects concerning sustainability themes and expectations. Various firms, which are traditional competitors, learned to cooperate in order to build a more attractive and sustainable neighbourhood district. While there were challenges to start, most participants agreed it was a worthwhile process to engage in.

IMPORTANCE OF A SPECIAL DELIVERY MECHANISM

* Explore instruments able to carry the project on the long term with a sustained vision such as:

a development association between different partners – University, County Council, Science Park administration, HSRT,...vested with authority to overlook the development of the project,

a public private development corporation,

a limited liability company,

a real estate development corporation receiving land rights from the County in exchange of carrying the development of the whole site. Request the creation a regulatory framework for metropolitan development, management and administration.

Project management

Mobilising public and private resources

Delivery vehicles

- Recomposing the administrative levels
- Special development instruments

Delivery vehicles

Be a significant partner in the development of the rest of the site so that future plans do not compromise the high quality of the Campus

Coordinating different local actors to support a collective vision of the future Create a sustainable building programme as objectives

for private developers Co production with the community of innovative neighbourhoods – more community participation than



DESIGNING THE FUTURE

1) The Panel's approach

Change of scale, integrated and comprehensive approach, ...

i) Principles to shape the vision

Few general principles could inspire the development of Hsinchu 3.0:

compact development,

integration of functions and places,

hybrid, fluid and flexible residential facilities transforming themselves with the changing needs of the users,

inclusive city i.e. an inter-cultural and inter-generational city.

These principles apply regardless of scale, positioning, and nature of the project; they enable to draw an analytical grid, grouping key issues and their interactions.

Conserving

Take into account the physical, natural and cultural features of the site in the planning process Heritage, culture led development

Composing

Position new constructions to match the scale of the public infrastructure, heritage and recreational areas Provide a strict gauging of building processes and property management in order to reduce energy consumption compact development, integration of functions and places,

importance of public realm and of centralities

hybrid, fluid and flexible residential facilities transforming themselves with the changing needs of the users

Creating

Define all processes that contribute to meeting and anticipating the needs of citizens

Connecting

Propose a range of solutions that could reduce the congestion of urban spaces, promote inter modality and diffuse mobility while favouring lively and shared public spaces

inclusive city i.e. an inter-cultural and inter-generational city.

Competing

To thrive, a city needs to grow. City leaders have to consider factors related to demographics, globalization, environmental concerns, societal relationships, social stability and technology. But businesses, like people, have choices on where they locate. A vibrant, healthy city attracts new business and sustains those already present. New people bring new experiences, new expertise and new revenues.

In a globally integrated economy, investment and work flow not only to the places in the world that offer cost advantages, skills and expertise. It is flowing to countries, regions and cities that offer smart infrastructure—everything from efficient transportation systems, modern airports and secure trade lanes... to reliable energy grids, transparent and trusted markets, and enhanced quality of life.

Comparative territorial advantage lies also in efficient infrastructure

As population centres grow, they are placing greater demands on the city infrastructures that deliver vital services such as transportation, healthcare, education and public safety. Adding to the strain are ever-changing public demands for better education, greener programs, accessible government, affordable housing and more options for senior citizens.

Building new roads and new lanes often just isn't possible any longer, but building intelligence into the roads and the cars—with roadside sensors, radio frequency tags, and global positioning systems—certainly is.

Replacing the actual city infrastructures is often unrealistic in terms of cost and time. However, with recent advances in technology, we can infuse our existing infrastructures with new intelligence. By this, we mean digitizing and connecting our systems, so they can sense, analyze and integrate data, and respond intelligently to the needs of their jurisdictions. In short, we can revitalize them so they can become smarter and more efficient. In the process, cities can grow and sustain quality of life for their inhabitants.

Consuming

Maintain a diversity of choice for different groups of end-users and consumers.

Communicating

Create an image that is at the same time global and attractive to specific targets.

A VISION FOR THE SITE

- i) A recognisable place
- ii) A piece of a new city
- iii) Improved identity and integration

iv) Setting a new standard for expansion

New model of living and working that brings together knowledge, technology and ecology.

As cities wield increasing economic, political and technological power, they are gaining greater control over the quality of services they provide to their people and businesses. Instrumented and interconnected core systems are providing new levels of intelligence that allow for synergistic interaction and operation.

Technological advances allow cities to be "instrumented," facilitating the collection of more data points than ever before, which enables cities to measure and influence more aspects of their operations. Cities are increasingly "interconnected," allowing the free flow of information from one discrete system to another, which increases the efficiency of the overall infrastructure.

Despite this new empowerment, cities are struggling with a wide range of challenges and threats to sustainability in their citizen and business systems, as well as in such vital infrastructures as transport, water, energy and communications.

To overcome these challenges and provide sustainable prosperity for citizens and businesses, cities must become "smarter" and use new technologies to transform their systems to optimize the use of finite resources. As well, cities must have the means to assess their progress against their overall strategic objectives and their peers.

2) Cooperation between territories

Reconcile urban-rural areas,

Recognise the metropolitan dimension of the project,

Shape a network of development poles with critical mass to confront regional/national and international competition

Create the conditions for better living environment

Develop and built process inspired by the "spirit of place"

Integrating and articulating the territories between themselves

Optimise the exchange corridors: green axis, urban parks, mobility loop, etc.



3) Drivers behind the vision

Drivers behind the vision

- Capitalise on NCTU investment and reputation
- Capitalise on the HSR connection
- The site delivering the ambition of national agenda
- Promote adaptability and longevity
- Maximise connections
- Animate the public space.
- Encourage diversity

i) Mobility

General Approach

•From transport to mobility ! Live an experience

How mobility system can spur clusterisation, sustainabi urbanity? Not transport but knowledge distribution

Moving is creativity!

Mobility •a wide range of tools from walking to the A380

•Mobility system : efficiency,

service, software, hardware (vehicles, nodes, urban integration)

Local Strategy Requirement

Articulation between 3 territorial scales:

NATIONAL METROPOLITAN

Careful phasing:

Short term

Mid term Long term

Create a specific (site and context related) mobility solution : a symbol for the whole area, a brand area, easy to implement and co-produced by local actors (operators, industrials, researchers and users) through an innovative conception process

HSRT: the core of sustainable mobility

Pedestrian scale and bike scale :Velib in Paris or Barealona
 *Electric car : autolib in Paris
 *Smart card (make the use simple) : integrated pricing
 *Bus on demain liniside the area :
 *O line as a symbol for area

 Agency in the statuon - evaluate your energy consumtion and how to optimize your energy consumition -Shifting behaviour through innovation and support Cf. n Zuch agency with load as rempting or two your doing 2 minute.

•Urban integration : mark the land through another vocabulary •Spur the clustensation of the area on stations and vehicles

Mobility: business and social opportunities MOBULTY: no sufficient in itself -9 op luther or Sint behaviour through: strains, stirtactiveness of mobility systems, both ENERGY Hop, Shifting behaviour clear objectives - 50% of wikking, cysting, PTS, ... eeining is emergy swing, holp, ething behaviour integrated servers for recovering/producing emergy

GOODS : not necessary for goods in that special case





ii) The global agenda Conservation, climate change, energy consumption,...

iii) Fluidity, mixity, quality of public space



FROM VISION TO PROJECT

"Hsinchu 3.0, the City of the Future" is not an homogeneous territory, composed of different sectors, each having its own character derived from geography and ancient pattern of occupation (paddy fields).

"Hsinchu 3.0, the City of the Future" is connected to strong polarities (Jubei and Hsinchu city centres)

I) Development sectors

Several sectors composing the site and future development of the site should take into account the different typologies and built on them rather than ignoring them.

Sectors composing Hsinchu 3.0, the City of the Future

The Hub around the High Speed Station	The Residential area	The Public realm
The Bio park	The Industrial park	The Linkages, infrastructures, connections
The Campus	The Natural environment, canals, rice fields,	The other Polarities
	hills,	

Future development of the site should take into account the different typologies and built on them rather than ignoring them.

Below are few proposals based on the concept of sustainability, flexibility and diversity. Elements in one sector can be valid as well for another sector

SECTORS

HUB AROUND THE HSRT

the last kilometre – logistic organising inter modal transfers, horizontal and vertical hubs

FUNCTIONS & PRINCIPLES

office, retail, convention, exhibition centre, hotels, tertiary offices

The *horizontal* dimension of the hub handles:

the rail and incidentally to the road infrastructure,

the transition towards the city centres through modal transfers and redistribution of people and goods within the neighbourhoods.



DEVELOPMENT CRITERIA

The point of entry to "Hsinchu 3.0, the City of the future" is the multi-modal HSTR station transferring people and goods to the neighbourhoods via non polluting modes, individual or collective transport adapted to the specific needs of mobility.

The *vertical* dimension is the organisation of different services inside the station:

parking lots for light vehicles with upkeep station, rental of electric vehicles, a logistic platform for light trucks for delivery transfers and rerouting of goods

the *station hall* is the pivot of the hub orienting people to other modes of mobility and offering a wider range of services:

services dedicated to health and education,

services dedicated to sports & culture,

services and local stores,

rental areas- business centre, meeting & conference rooms, etc





specialised hospital, bio industry

health / bio-cluster

CAMPUS NTCU

incubator, living lab, creativity, design, advanced campus life cultural services, popular innovation carbon neutral, trading carbon rights to finance future development, fluidity of space, adaptability to change and future needs, openness, vertical and horizontal programming of functions – hybrid typology.



University of Copenhagen, Christensen & CO architects

concept and design Phospore2 Group Eiffage





RESIDENTIAL AREA

New mode of living, new new town; ideal town as the same time a pleasant daily life environment nature and built relations with rural agriculture zones,

low density, short circuit for distribution of goods,

modular living space to adapt itself to socio changes.



concept and design Phospore2 Group Eiffage, France

new modular planning of building in order to anticipate sociological trends, i.e., aging population, change in the composition of family, in particular intergenerational families.



compact, mix development to enrich the density of living, open spaces



concept and design Patrick Rheinert, architect

- A focus on architectural diversity as well as façade heights not to exceed a maximum of 25 meters to ensure the area is developed at 'a human scale.'
- Low energy consumption to reduce costs (total energy use should not exceed 120 kWh / square meter / at a decent temperature / year).
- A healthy indoor climate incorporating moisture control, whilst minimizing toxic substances (incorporating the so-called BASTA-system).
- Ensuring buildings are designed to incorporate accessibility for all: apartments should guarantee usability during different life-stages; supporting handicapped and elderly persons with decreased mobility.
- Safety buildings are designed and planned to create a safe environment.
- A certain proportion of the built-surface should incorporate green space (the so-called green factor system).
- A number of green points should be integrated to improve biodiversity.
- Providing waste separation facilities nearby every building's courtyard area

Eco town initiative: passive housing, carbon neutral housing, producing the energy they consume, no fossil fuels

A 100% renewable energy "bouquet" to meet the needs of a site with over 30 000 inhabitants and half many jobs while reducing greenhouse effect by 80%.

Ecomobility of people and goods inside the whole area through a decongested network of non-polluting, environmentally-friendly transport.

Design an construction processes based on bioclimatic architecture where, in particular the characteristics of the facades are defined as function of the use, exposure of each building.

Explore the principle of energy solidarity where a new building becomes a net energy producer benefiting the neighbouring buildings.

No use of fossil fuels through an integrated system of several sources of renewable energy:

free cooling by pumping water from the close rivers, biomass boilers,

thermal and photovoltaic solar panels combining various technologies,

urban wind generators integrated in the buildings and large wind generator off site.

NATURAL SPACES

The demand of city dwellers to live in town but at the same time in or near nature raises the question of how to create urban landscapes with a balance between the built and natural elements. In green enclaves inside the city or in natural sites to be urbanised, how can we mix nature and the built? How should we consider the relationship between urban space and natural territory, whether it be a question of building opposite a natural heritage or of creating a landscape in a dynamic relation to the built environment?

open and preserved,

construction integrated into the landscape, using the water edge or canals to improve the overall attraction of the neighbourhood

rivers, canals, hills, paddy fields



Vastra Hamnen, Malmo



Malmo, Sweden

PUBLIC SPACE

a horizontal hub

Acts as mediator between neighbourhoods, as Flexibility of the road and street system adaptable to the diversity of human activities.

> Inter-neighbourhood landscaped links combining pedestrian paths, bike and roller paths, tracks for exercise and public transportation



Concept and design Phospore2 Group Eiffage

INDUSTRIAL ZONE	production zone	high density, recycling, non polluting production, flexible space, no fossil fuels
LINKAGES WITH OTHER TERRITORIES	Infrastructures fragment the urban space. How to integrate them into the making of the town? In order to overcome the handicaps of being cutting off by heavy infrastructures (railways, motorways etc.) what type of urban communications or interfaces can be developed? Can the networks become assets in inventing new urban poles?	Bridges, crossings, accesses to freeways and highways, road networks - efficient, convenient, high frequency Taoyuan airport, Taipei, Taichung
OTHER POLARITIES AND CENTRALITIES	Jubei new city centre Hsinchu traditional city centre and Science Park compound	Hsinchu Jubei a metropolitan pole servicing the north-western region of Taiwan

ii) Phasing the development



PROTECTING THE VISION

i) Performance indicators

type	indicator	goal
Good Natural Environment	Anties: Nr Ouelty	Energing at task Nultivial Antibert AF Duality Standard for at least 210 days, 50, and ND, contant not exceeding lines structured for fastional Amount An Quality standard for at least 155 days.
	Quality of water bodies within the Eco-	licent national standards
	Quality of Water from Tap	water from all tape should be potable
	Noise Pollution Levels	Ley compty with latest standards for environmental noise in urban areas
	Catton Emission Per Unit GDP	ept exceeding 160 ion-C per US\$3 million
	Nei Loos of Natural Weitands	eg nel loss of rotural worlands
Healthy Balance in the man-made	Propertion of Green Buildings	all buildings meeting green building standard
	Natve Vegelation moex	Al least 70% of the paint varieties the eative segretation
	Per Capita Public Green Space	At least 12 square morres per person
Good Lifestyle Habits	Per Capita Daily Water Consumption	net exceeding 120 it is per day per percen-
	Per Capite Delly Domestic Waste Generation	(gg exceeding 6.5 kg per person
	Proportion of Green Trips	At least 90% of green tips within the area non- molorised transport, i.e. cycling and walking, as well sublic transport.
	Overall Recycling Rate	At least 60% of total waste recycled
	Access to Free Recreational and Sports Attainibles	All residential areas have access to the recreational and sports emosilies within a walking distance of 500+

Performa	nce indicators	3
-		
	Watte Treatment	All hazardous and domentic waste rendered non taxic through invalment
	Barrier-Free Accessibility	100% barrier-Ine access
	Services Network Coverage	bg entre area has access to key infrastructure services, such as recycled water, gas, broadbar abstructly and heating
	Proportion of Affordable Public Housing	N least 20% of housing in the form of subsidioa- public housing
Developing a Dynamic and Efficient Economy	Usage of Renewable Energy	at least 20% of renewable energy, such as solar and geothermal energy
	Usage of Water from Non-Traditional Sources	At least 50% hommonitraditional sources such desailnation and recycled water
	Proportion of H&U Scientists and Engineers in the Eco-city Workforce	at least 50 HAD scientists and engineers per 10,000 workforce
	Employment Housing Equilibrium Index	A least 50% of the employable residents should be employed in the Eco-city by 2013
Qualitative KPIs		Maintain a safe and healthy ecology through green consumption and law carbon operations
		Adapt innovative policies that will promo regional collaboration and improve th environment of the surrounding regions
		Give prominence to the river estuarine culture preserve history and cultural heritage, and
		Complement the development of recycle industries and promote the orderly developmen of the surrounding remains

ii) Branding and identity



iii) Innovation dynamics





- iv) Convergence of stakeholders' strategies
- v) Political support and commitment
- vi) Dialogue and participation

CONCLUDING REMARKS

From ambiguous objectives to actual challenges



To foster the **emergence of a strategic project** that could influence the development of an urban area markedly more extensive than the site itself.