

**Arthur Aw**

## **SINGAPORE: The One-North Project**

### **THE CITY**

As a tiny city state of 648 sqkm in Southeast Asia, Singapore has no natural resources. However, Singapore's strategic location at one of the crossroads of the world has helped its growth into a major centre for trade, communications and tourism. Since its independence in 1965, Singapore has transformed herself from a tiny port depending on entrepot trade and providing services to British military bases here into a thriving world-class centre of commerce and industry today. From earning a GDP of S\$2.15 billion in 1960 to a GDP of S\$153 billion in 2001, it went from being a third world country to a first world country in just one single generation. According to external sources, Singapore is the 2nd most competitive nation globally, after the United States and also the world's 2nd most network ready country after the US. In 2004, Singapore was ranked third best place for doing business, among 145 countries worldwide, according to the World Bank. It is also the fourth largest foreign exchange trading centre in the world. Singapore is also one of the busiest ports in the world with over 600 shipping lines sending super tankers, container ships and passenger liners to share the busy waters. With an airport ranked internationally the best in the world and served by more than 69 airlines, is very much the gateway to South-East Asia. In a survey reported in The Economist in March 2002, Singapore's quality of life surpassed that of London or New York.

Over 3,000 MNCs from America, Europe and Asia have set up their operations here. To name a few as examples, Carrier Transicold from USA, the world's largest refrigeration container manufacturer; Seagate from USA, the world's largest producer of hard disk driver; the world's 2 leading oil companies, ExxonMobil from USA and Shell from the Netherlands, making Singapore the world's 3rd largest oil refining centre; Media Tek from Taiwan, the world's 6th largest fabless IC design company; Vopak from the Netherlands, one of the world's largest chemical logistics service providers; LVMH from France, one of the largest and most diversified luxury conglomerates in the world, and many others, are putting Singapore as one of the robust cities on the world map.

In telecommunications connectivity, besides a nationwide broadband network infrastructure, Singapore has 21 Tbps of installed international capacity, sufficient for most business needs.

Notwithstanding these worldwide recognitions, Singapore recognized that our only blessing is our human resource, and with the globalization of trades and commerce, the ocean we are competing in will soon become bloody and red.. In late 1990s, while the hard-core manufacturing sector continued to support the Singapore's economy, we begin to establish the framework in grooming the nation beyond a competitive manufacturing base and into a knowledge-based economy in which the knowledge-intensive research & development (R&D) work is emphasised. It is under this context that the idea of one-north began to take place.

### **THE CONTEXT**

Embarking on our journey into 21<sup>st</sup> century, the government unveiled in January 1999 the Industry 21 blueprint, seeking a vision of a vibrant and robust global hub in electronics, chemicals, life sciences, engineering, communications and media, logistics, healthcare, education and HQ

and business services. These are knowledge driven industries where the knowledge and highly specialized skill sets are the critical success factors.

Concurrently, a national Science and Technology Plan identifies and builds world-class science and technology capabilities in niche areas and to strengthen and seed growth sectors which are globally competitive. The plan also aims to aggressively groom and attract more talented scientists and researchers to fuel the growth of these highly knowledgeable intensive industries. The Science and Technology 2005 Plan will also see more collaborative partnerships forged amongst world-class research organizations, institutions and talented individuals.

In April 1999, the Enterprise 21 blueprint was also unveiled. It announced a US\$1 billion Enterprise Investment Fund to attract smart venture capital to Singapore. It also activated a series of tax and regulation incentives to encourage high tech investors and encourage talented individuals both locally and overseas to start businesses in Singapore.

An innovative knowledge driven economy, if to be successful, will need not just the BIG FISH, but also the SMALL fish.

In Jan 2000, a Small and Medium Enterprise 21 blueprint was launched to help both local and foreign small and medium firms in Singapore to advance into the competitive knowledge base market. The blueprint established the targets to provide affordable space, solid platform for information exchange and networking, and helps in upgrading capabilities.

Chairman EDB Mr Teo Ming Kian, in the EDB publication Heartwork states

“Our purpose was to draw attention to the area of innovation that was founded on new knowledge and unique applications of technologies. New enterprises... could be pursued by entrepreneurs with grit, daring and imagination.. rely(ing) on knowledge and technology..”

Against this backdrop, the development of one-north is envisioned as a long-term strategic investment to promote the future direction of Singapore’s economic development towards an innovation based economy, so that Singapore will be able to maintain its cutting edge position in Asia. one-north is seen as more than just an extension of R&D space. Hence, the vision of one-north is developing an “exciting place of vision & inspiration” to attract, nurture and sustain a dynamic, vibrant and distinctive technopreneur community of innovators, students and professionals, technopreneurs, researchers, venture capitalists, corporate lawyers, investment bankers, business consultants, e-commerce specialists, and even media stars and artists. These diverse talents could live, or work, or congregate, or just be there to interact with each other to exchange ideas, collaborate and strike deals, or just to have fun.

One-north is an experiment itself, it aims to be a catalytic community in the area of innovation, in the area of knowledge creation. One could view it as the epitome of Singapore thrust towards value innovation at a national level.

The one-north site covers an area of approximately 182 hectares and located about 10 mins drive to the downtown Central Business District. It is a very prime location, having within its immediate vicinity the National University of Singapore, National University Hospital, Singapore Science Park I, II, and III, and Singapore Polytechnic. The locality enables strong linkages to these research and tertiary institutions and facilitate cross fertilisation of ideas and collaborations between industry and research.

The area is also well served by road and rail networks and has a large mature residential population base in nearby private and public housing estates.

3 promising industry clusters were identified for phase 1 development of one-north

- i) the Biomedical science (BMS) cluster,
- ii) the IT and Communication (Infocomm Technology or ICT) cluster,
- iii) and the Media cluster.

Biotechnology, IT and the media industry is but just the seed of a new generation of creative community in one-north. We envisaged that the system will constantly reinvents itself by creating new companies in successive waves of technology.

## THE PLANS

Singapore urban landscape is largely made up of isolated, interiorised air-conditioned spaces. The Science Parks built in the 80s and Business Parks in the early 90s carry this design approach further. Buildings housing the work community sit as individual pavilion on a large manicured garden. Purity in land use sanitised the atmosphere further in these enclaves that set out originally to capture innovation values. The more exclusive and pristine environment of the Science Parks and Business Parks arguably suits the large corporations branding needs. But in attracting the new generation of super creative talents, these existing models may not suffice. In one-north, we decided to take a paradigm shift from the local planning convention.

Today, I will present 4 key planning strategies we adopted in the formulation of the one-north masterplan :

Mixed use, Connectivity, Rejuvenation, and Identity

With a high degree of fine mixing and layering of work, live, play, and learn, one-north land use offers the variety and intensity vital to a vibrant community. Although the primary focus in the allocation of land use is to develop a sustainable business industry network, the plan mixes the various uses finely to achieve a sustainable combination and distribution over the site. The land use plan enables a symbiotic relationship between business ecologies and urban life. This fine-grained land use strategy acknowledges the new trends in working and living in this Internet age by incorporating a variety of residential and retail/ leisure uses into the business zones to provide committed and consistent patronage critical to the sustainability of urban life.

The two major components in the mix uses are the WORK or industry spaces and the LIVE or residential spaces. The WORK spaces are distributed near key transport nodes such as the MRT station or the tram station to enhance business accessibility within and beyond one-north. The LIVE quantum is mostly located adjacent to green relief spaces such as the linear park or the low density heritage estates. This offers the residents in one-north the best of both worlds – that is, the rich amenities of a city centre, and the tranquility of a park, both within stone throw away from the resident's living room. The intensity of the density is balanced by easy access to visual and physical green relief.

Respective industry players are clustered together into Xchanges to foster collaboration among the like minded companies and individuals. This concept of clustering has achieved very positive outcome in our biomedical cluster – the Biopolis.

PLAY, the recreational and retail programs such as sport centre, media theatres, museum, clubs, café, and restaurant, and LEARN, the educational institutions such as schools and libraries, are carefully distributed to act as bridging elements between the different Xchanges. They catalyse cross districts interaction, and seeds social vitality.

The principle of mixing various uses is also cascaded down to the districts in one-north. However, the proportion of distribution at district level is refined according to the natural characteristic of the site and the nature of the industry it is supporting. In Life Xchange where the biomedical cluster is located, for example, the quantum of LIVE, and PLAY are relatively lesser when compare to the Central Xchange where the ICT/ Media clusters are located. The scientists of the biomedical communities, by comparison, are largely a community that prefers relatively quieter environment. The Life Xchange thus embraces the hill and has relatively lower density.

The plan also offers variety of parcel sizes to attract not just the large corporations, but also small companies. Moving forward, Singapore's focus on Multi-National Corporations would require an equal attention on proliferating small and medium enterprises. The plan eliminates the monopoly of mega development parcels that cater to only the big players. Smaller parcels could be easily deduced for a diversity of small companies. The variety of parcel configuration and sizes also establishes the impetus for a diverse and lively urban environment. It provides a platform for multiple players to encourage more sustainable business ecology.

## CONNECTIVITY

In one-north, we envisage that within 3 clicks, pieces of information could be gathered; within 3 calls, a business contact could be made; within 3 hops, any facility of live, work, play or learn could be reached. Such connectivity is achieved through the following networks:

- IT network
- Transport network
- Pedestrian network
- Social network
- Business network

Envisioned as a totally wired, wireless and high-speed-fibre broadband environment, one-north IT master plan aims to offer the community connectivity to unlimited resources available in the world-wide-web. Not only in private spaces but also in public areas such as the park or the pub, the individuals would be able to access information and establish high-speed connection around the clock.

Together with private ICT service providers, JTC as the master developer set up a partnership to provide a service-on-demand, pay-as-you-use IT infrastructure for the community in one-north. Under this new arrangement, tenants can pick and choose the ICT services that they would like to be installed on their premises via a web-based service portal that will be available round-the-clock. In addition, one-north community will have ready access to future advances in technologies such as broadband wireless and mobile systems, high service availability and reliability, as well as specialised technical resources.

## TRANSPORT NETWORK

Traditionally, most roads in Singapore are planned with a high standard of traffic flow rate to eliminate peak hour congestion. The efficiency of Singapore road system is measured by the low degree of traffic saturation at peak hours, and is highly regarded by the Authority as being business friendly as compares to the economically stifling congested roads in Bangkok. The vitality of fast vehicles is enabled by often under utilised roads during most part of the day between the peak hours. This in turn reduces the vivacity of the pedestrian streets and diminishes the design of roads as important community areas. However, in one-north, we pursue a balance of pedestrians, car, public transport, and alternative means of personal travel. We could see a very vibrant street life without the elimination of car traffic. We planned with the principle that cars, public transport, and pedestrians belong together. Their co-existence enriches the streets and sustains the networks of interactions. Well-designed shop-front parking, bus stops, pedestrian crossings, and traffic junctions are impetus for unplanned surprises. Thoughtful and well-targeted separation of pedestrian life from transport infrastructure such as overhead bridges and car-free streets are introduced only at locations where connectivity and amenity would be compromised by the presence of vehicular traffic.

The transport network of one-north provides convenient accessibility to all districts, offering alternative choices of approaches and variety of traveling experiences. Linkage to the neighbouring precincts and ease in orientation or re-orientation are also the key values provided by the roads and transport network of one-north.

Superimposed on the road network is the Mass Rapid Transit system, the new generation of People Mover System such as optical guided driverless bus system, the parking strategy, and the provision for alternate means of personal transportation. Together, they form an integrated framework to not only move people around one-north, but also to energise the network of open spaces.

## PEDESTRIANS NETWORK

one-north master plan carves out a complex network of public spaces from the development masses to enable a comprehensive framework for community interactions. A concoction of parks, green spaces, streets, pedestrian thoroughfares, and even the space between building parcels transcend the boundaries of public and private ownership to provide the arenas and choices for the individuals to engage in both planned and spontaneous activities. The primary public open space, the Buona Vista Park meanders through the urban fabrics in the middle of the site, providing a key channel for the rests of the pedestrian networks to feed into.

In one-north, we advocate gateless community and impose minimum degree of porosity through each development parcel. Each parcel, depending on the uses of the site, will need to provide for a certain percentage of public thoroughfares while balancing their operational security or privacy need. With the imposition of porosity as a key urban design guideline, the public domain in one-north cuts through the private plots to connects with other formal community spaces. The creativity of individual developer offers further variety to the pedestrian experiences that could often surprise and trigger inspirations. The streets, the park, the pocket green, now simultaneously support effective movement through one-north, and cultivate a diversity of social and economic life. The variety of public spaces and thoroughfares offers rich public experiences. It offers surprise, texture, and serendipity. In a busy workday, planned schedule could be disrupted for something – may be a new idea, may be a new business

contact, or may be even a romance. In a highly innovative community, inspiring moment could not be planned, but could be hoped for.

### **Social network**

Traditionally in Singapore, public space design and ownership are largely defined by the ease of maintenance and clear demarcation of responsibilities. However, in one-north, the shift from the emphasis on exclusive, individualistic built environment to the focus on integrating public spaces with private properties establishes an intrinsically symbiotic relationship between members of the community. This closely weaved relationship between public and private domains encourage interaction between various forms of economic activities. It also engages the various communities in one-north to co-own and co-define their social network. It requires a new model of collaboration between the regulators and the private communities in one-north.

This new social network will encourage innovation process to escape the constraint of formal conduct of businesses within the office buildings to the informal and fun public areas. Economic life is no longer neatly contained within the lab or the office, but has instead a more fluid relationship with the community. The streets and the park become active resources for the pursuit of economic vitality. The open plaza, the Internet street cafe, the sculpture corner, etc. provide the individuals simultaneous choices of work, live, play, and learn.

### **BUSINESS NETWORK**

A successful business network requires strong collaboration between entrepreneurs, private businesses, public institutions, and government regulators. In 2004, a joint government-private sector effort between government economic agencies, the National University of Singapore and Nanyang Technological University, one-north, and the key private industrial developers has led to the development of a business networking and mentoring initiative known as HOTSpots.

The "H.O.T" in HOTSpots stands for the "Hub Of Technopreneuers". HotSpots ties up seven technopreneur incubation centres across the island with a special programme to link technopreneuers and technology-related companies. It has a membership of 400 technology related companies and a total prime space of 400,000 square metres offering a mix of hard and soft infrastructure solutions. Community activities such as mentoring workshops, industry roundtable, brokerage events, fund raising platforms, networking sessions, and informal get-togethers are conducted periodically. As the business community in one-north builds up, other forms of business network will begin to establish.

### **CONSTANT REJUVENATION**

The fine grain mix use concept may bring social vitality to the community of one-north, but to remain relevant over time, one-north will have to constantly reinvent herself. Embedded in the plans of one-north are the impetuses for renewal over time.

One key idea is the concept of dynamic zoning. Although the whole of one-north is planned with mixed uses, the statutory zoning is white zoning for all parcels that have yet to be developed. White zoning is a planning use that allows the developer to change their use of the building over time, such as from a hotel to a commercial office, without the need of obtaining a ministerial

approval to change the use on the national gazetted masterplan. The regulating forces overtime will then be the needs of the community and the market advancement at a particular time. JTC as the master developer will uphold the vision of one-north by overseeing the overall mix ratio of one-north and the respective districts.

The flexibility of the land zoning enables an effective constant review of the masterplan as the ground gets developed. In one-north, the planning parameters defined upfront are established as core references. As the industries and communities in one-north evolve, the plans are constantly reviewed and refined to ensure its relevance. The original vision and base plan will be the guiding lights for the masterplan reviews. The planning process for one-north is therefore highly dynamic, and requires close collaboration between the planners, the developers, the industrialist, the users, and the community.

Another key impetus embedded in the plan is the intentional seeding of non-contiguous development. By seeding the key clusters apart from one another, the spaces between the Xchanges serve not only as grounds for growth and renewal, but also as flexible grounds for constant flow of new programs catering to the evolving needs of the growing communities. These lands could be allocated for short tenure uses such as short term incubator centre, or experimental project such as testing ground for the personal transporter SEGWAY, or one-off public events such as musical performance or scientific exhibition, or even serve as interim public space such as community parks.

## **UNIQUE IDENTITY**

Fine grain mix use, seamless connectivity, and constant rejuvenation, these 3 key planning strategies will not suffice in making one-north a unique place for the creative talents to pursue their dreams. The physical environment where the one-north community resides needs to be original and inspiring. The plans draw on the intrinsic strength of the site, and adopt the following place making strategies to achieve a truly unique one-north.

## **CONSERVING AND EMBRACING THE UNDULATING TOPOGRAPHY**

Despite the high density of one-north, the original ground topography determines the ground platform for the new developments. New developments have to design their building to embrace the undulating topography. Couple with the open and porous design requirement, this giving rise to multiple layering of public space throughout the site. The primary open space, the Buona Vista Park weaves through the most contrasting parts of the topography, offering a unique public front for the visitors to one-north.

## **CONSERVATION AND ADAPTIVE REUSE OF EXISTING OLD BUILDINGS AND ROAD**

The site that one-north is sitting on was originally a strategic British military during late 1940s to 1950s. There are many colonial military barracks and living quarters left behind since the British left Singapore, namely, Rochester Park, Wessex Estate, Nepal Estate, Slim Barracks, and Colbar. These become great ingredients for place making. Clusters of these living quarters have been designated as heritage district where the existing low density will be kept for most part of it. Insertions of high density developments are done to frame or heighten the valuable heritage clusters as well as injecting programs that will draw greater public experience of these heritage elements. These historical components would act as a natural counter balances for the high density of the future developments. They would provide contrasting spatial patterns and offer alternative ambiances of colonial settings amidst the modern developments in one-north. New

uses attractive to the creative community in one-north would be introduced to these spaces to enliven the historical meanings within a contemporary culture.

An old sub-standard road, the Portsdown Road, lined with lush mature trees was also retained as heritage road. The road winds through the site and provides an old scenic drive through the modern development of one-north.

### **INDIGENOUS TREE PLANTING**

As construction takes place, it is inevitable that mature trees are being cut to make way for the new urban fabric. However, one of the attractions of the site is its lush greenery and rich species of horticulture. The site is also 2 degree cooler than other parts of Singapore because of the lush canopies of the mature trees. To retain this unique green character while balancing the development needs, over 300 of existing trees that are of high horticultural or visual value are designated as heritage trees to be kept, even if they are within development parcel. The rests of the trees could be removed for development purposes with a condition of planting new indigenous tree and integrating the new trees in the building design. For each tree removed, the developer has to replant 1 to 3 trees depending on which level the replace trees are being planted. The higher floor the trees are planted, the lower the replacement ration will be required. This greening tool aims to make one-north a place where nature and urban concrete are integrated, not just on the ground, but also in the mid-air.

### **ARTS INTEGRATION WITH PUBLIC SPACES**

It is hard to imagine the absence of Arts in a highly creative environment. The developers in one-north are therefore encouraged to commission local or international artists to enliven the public thoroughfares within their development parcel. Incentives are in the pipeline for developers who actively participate in this concept of arts integration with public spaces.

### **CONTINUOUS ROOF CARPET**

The dynamic and sweeping roof form of Zaha Hadid conceptual rendition of one-north is highly seductive. It is however, more than just an eyes pleaser. The continuous roof carpet integrates the various building typologies and creates an identity at a large urban scale. It also introduces an additional layer of communal space in one-north. Typically the roof spaces of modern development are used to house the machines serving the building, and as it is remote from the eyes on the ground, they are largely untreated or designed as a distant icon. The continuous roof carpet in one-north, on the other hand, aims to promote distinctive spatial forms for urban activities in the sky.

### **BENT URBAN GRID**

Instead of impressing a regular grid upon the site, a bent grid system is adopted. The bent grids embrace the irregular site boundaries, the undulating site topography, and the independent heritage elements. It offers the visitors with progressive enticement and the community with daily serendipity.

### **DESIGN BASED DEVELOPMENT GUIDELINES**

All the above ingredients could cohesively produce a truly special physical environment for one-north. It requires close collaboration and active deliberation between the regulators, the design



professions, and the developers. These concepts are therefore translated into a design based development guidelines as a key reference to the developers and their design consultants. The guidelines capture the key concepts but did not dictate the architecture styles and solutions. It spells out the core driving tools for the urban vision, leaving enough rooms for the creativity of the private developers and professionals.

A Design Review Panel comprises both local and international developers and design experts was set up to deliberate each development proposal before building permits are being granted.

The conceptually design guidelines couple with this active design review process hope to promote diverse creative architecture responses within a coherent urban morphology.

### **A WEB OF ENABLING PLANS**

The plans presented, are essentially a complex web of land use, IT, Transport, Pedestrian, Social, Business network, Zoning, Topography and Heritage conservation, landscaping and green ecology, arts installation, and urban morphology. This web of ingredients establishes the soil for an inclusive and innovative environment where the unplanned could emerge and flourish.

#### **QUOTE:**

“There is the near extinction of what the plan excludes, the unplanned. While this may seem to have been the intention, there are a number of unintended consequences that we wish to avoid. In trying to curb mosquitoes, we sometimes turn to using chemical fogging. But when we do so, we have to recognize that we kill not only the mosquitoes that we don’t want, but also affect the butterflies and dragon flies that make a garden.”

- Professor Simon SC Tay

The plans attempt to harness the unplanned by optimizing the engagement of the community within this urban morphology. It is indeed the PEOPLE in one-north that gives the place its soul. It is the community that will make one-north truly distinctive. We hope to attract the talents of various trades; Innovators, students and professionals, technopreneurs, researchers, venture capitalists, corporate lawyers, investment bankers, business consultants, e-commerce specialists, and even media stars and artists. These diverse talents have to be fun and love fun, to make one-north a happening place.

### **WHERE R WE NOW**

Lets take a look at what have been achieved on the ground since the masterplan of one-north was launched in 2002, 3 years ago.

#### **Phase zero**

Established at the same time when the master plan competition was called in 2001, Phase zero is a incubator park for any creative businesses, ranging from inforcomm, media, to e-accounting. It was built from design to occupation within 7 months, and took the concept of container and garage studio to provide the start up talents a more informal place of dreaming up ideas and doing business. It provides a wireless environment, with centralized common corporate services such as secretariat, mailing, server housing, and reception services for all the startups. Networking events, including venture capitalist meetings are also organized periodically. The incubator is enjoyed very good occupancy rate since its opening. Tenants are only allowed a short tenancy

of not more than 2 years. We hope that one of the start ups graduated from here will move on to become the next creative technology of Singapore.

## **Biopolis and BM-2**

The Biopolis at Life Xchange is the first major development that has completed in one-north. Within 14 months from the launched of the masterplan, the S\$500 million, 1.8 million sqft biomedical facilities was built and houses 7 public biomedical research institutes and major private biomedical company R&D centres. Also located here is Johns Hopkins Medicine Division of Biomedical Science, in close collaboration with the public research institutes and the private companies in Biopolis. The biomedical sciences industry is now being developed as the fourth pillar of Singapore's manufacturing sector, with world-class capabilities across the whole value chain of activities. Rapid scientific advances are opening up new knowledge frontiers and growth opportunities in the biomedical sciences industry. Singapore's goal is to develop the biomedical sciences to achieve the same level of success as the other three industry pillars - electronics, chemicals and engineering.

The clustering of the industry, the seamless infrastructure, hassle-free funding, the frequent collaborations between scientists, and opportunities for these scientists to try their hand at drug discovery (something left strictly to the pharmaceutical industry overseas), attracted many established scientists to Biopolis. Among those renowned scientists at Biopolis is British scientist Alan Colman who, in 1996, delivered Dolly the sheep, the world's first cloned mammal. Other scientific luminaries include Professors David Lane from Britain, Edison Liu from America, Yoshiaki Ito from Japan and Axel Ullrich from Germany.

Dr Udolf, who has worked in London and Dusseldorf, is looking at the use of adult stem cells to treat Parkinson's disease. For this work, he needs the genetic information in stem cells analysed, something the Genome Institute of Singapore (GIS) can help him with. But first, he needs the cells grown, which can be done at the Bioprocessing Technology Institute. Dr Udolf discovered the p53 gene that is believed to cause cancer.

Though there have been no major breakthroughs coming out of the Biopolis so far, but there are encouraging signs. In July this year, scientists at Biopolis made public their dramatic finding that a human protein previously thought to kill cancer cells actually helps them thrive. Around the same time, another team identified a human protein that may be one day be used to control the Hepatitis B virus. Another team of scientists are now part of an elite group tasked with unravelling the mysteries of the human genome. As part of the Encyclopaedia of DNA Elements (Encode) project set up in 2003 by the US authorities, this team has developed a technology to help scientists read genetic information 30 times faster than previously possible.

The Biopolis is an icon of the Government's unquestioned commitment to the science. It is not simply the buildings, but the thinking, organisation and personnel recruitment that give it content. Besides the building, Singapore is actively attracting top foreign scientists and breeding our own researchers. In 2001, the government launched a scholarship initiative to develop a cadre of Singaporean researchers. To date, more than 550 Singaporeans and Singaporeans-to-be have been sent to be trained at some of the world's best life science centres up to doctorate level.

On another front, the Biopolis has begun attracting investments to Singapore. At the Biopolis itself, 20 companies have set up R&D facilities. A government funded Bio\*One Capital fund has committed some \$95 million in investments in 16 biomedical projects, including a new dengue detecting biochip, which was launched in Aug 2005h, and a coronary stent, which was awarded

the European Union's CE Mark last year. Two notable private sector heavyweights have set up shop at the Biopolis. Swiss drug giant Novartis set up the Novartis Institute of Tropical Diseases and began research on dengue and tuberculosis in July last year. It boasts a budget of US\$122 million (\$\$200 million) to be spent over 10 years. Last September, British pharmaceutical giant GSK announced that it was setting up an R&D crucible at the Biopolis, the \$62 million Cognition and Neurodegeneration Centre, to find a cure for debilitating diseases of the brain.

The 1.8 million sqft space in Biopolis is nearly fully taken up. Work on Phase 2 of the Biopolis started in February this year and is due to be completed by October 2006. By 2010, Singapore aims to be home to 15 world-class biomedical sciences companies and the region's hub for clinical trials and drug development.

### **Fusionpolis**

Fusionpolis, a 24 storey, 1.2 million sq ft research, office, living, and retail development will form the first anchor development for Central Xchange. It is due to complete by 2007. This xchange is meant to be a 'fusion' place for the convergence of Computing and Communication technologies (IT) and Creative activities. The collaboration between the creative industry and science and technology promises not just commercial profit, but a chance to contribute to the sustainable development of creative talents, institutions and audiences.

Key tenants committed to setting up their operational base in Fusionpolis are the Singapore Science and Engineering Research Council Institutes, the Media Development Authority, a high tech experimental supermarket, a Fitness Club by the Europe largest fitness club operator - Fitness First. It will also house numerous retail stores such as niche fashion boutiques, bookstores, electronics showcase like Sony Centre or Apple Centre, mid to high end restaurants, Science and technology museum, rooftop swimming pool, public sky gardens and sky playground for children, as well as a number of companies in info-comm technology and digital media. The facilities boasts high power provision (300VA/m<sup>2</sup>), large cable risers for inter-floor connectivity, ICT on tap, WiFi hotspots and satellite equipment. There will also be a 400-500 seat flexible performance theater that could be used as auditorium, lecture theater and exhibition hall.

### **INSEAD expansion**

Situated next to Fusionpolis, the world renowned French business school is expanding their presence in Singapore which will see their student intake double to 7000 by 2007.

### **NTU City Campus**

The Citicampus comprises 150,000 sqft of higher educational space for adult Continuing Education and a Alumni Clubhouse of National Technology University of Singapore. It also offers a business incubation centre, theme park swimming pool, outdoor spa retreat, book café, pre-school, bowling alley, wine bar, theatres and function rooms. When opens in 2006, it will bring to one-north constant in flux of working professionals and their families.

### **Wessex Estate**

Wessex, one of the heritage area identified in one-north, contains 26 pairs of black and white semi-detached bungalows and 29 blocks of black and white walk-up apartments. Together with the rich landscape and tranquil environment, it has attracted an interesting mix of people who are staying in there. This includes lecturers, drama and theatre actors and writers, designers,

architects and artists, engineers, doctors, accountants, professional clowns and students among many others. Some of the existing residents have been staying there for more than 30 years. The existing tenants in Wessex form a community of bohemian, and enjoy their own network of creative exchanges at an old run down wooden shack. When a major expressway along the boundary of one-north was to be constructed a year ago, the gathering place for the Wessex community, the COLBAR was threatened to be demolished and vanished in history. Together with the community, we re-constructed the COLBAR with its original materials, and re-located it nearer to Wessex estate. It continues to be the key gathering place for the Wessex community. Arts and Design incubators, as well as offices of design based creative profession will be injected into Wessex, with the expectation that the bohemian environment and culture will act as a catalyst for the growth of a design community in one-north.

### **Condominium at Slim Barracks**

At Central Xchange, a 400-units residential development will begin construction in Jan 2006 by private developer. It will provide the initial critical mass of live population in one-north.

### **Hotel and South Park Quadrant**

Also on its way is the hotel and mixed use development in Vista Xchange. The development will inject a 400-room hotel, 250 units of live apartments, and 140,000 sqft of office and commercial retail space, and 30,000 sqft of space for civic institutions such as library.

### **Rochester Heritage cluster**

Next to the hotel and south park quadrant at vista xchange, a cluster of black and white bungalows have been retrofitted into F&B outlets, providing a unique social node for the increasing one-north community.

### **Buona Vista Park phase 1**

The linear one-north park is the key public recreation space for the community of one-north. It is meant more than just a green area for recreational purposes, but also intended to as effective connectors between the Xchanges. It will provide sustainable and diverse relief and recreational opportunities for the dense and highly charged urban fabrics, increasing the potential for social and cultural integration. It design embraces existing unique strengths such as the undulating terrain, the lush and diverse green, the heritage elements, and the tropical weather of Singapore.

### **Testbedding of new products**

one-north actively pursue the culture of innovation by embarking of testbedding projects with the private sector. On the ground are the following testbedding projects:

CNG car – a test bed CNG refueling station is being built in one-north

Segway – the state of the art personal transporter is being test bed in one-north and use as a reference for the transport licensing authority to evaluate its application in Singapore.

IMTS (Intelligent Modal Transport System) – the Toyota driverless computer driven magnetic guided bus system test track is being built in one-north.

## IMPLEMENTATION FRAMEWORK

The development of one-north is a top down government initiative with active participation of the private sector. It is set up with the following implementation framework:

**E-21 Ministerial Committee**, chaired by Deputy Prime Minister, this committee oversees the development of R&D, Science and Technology, and Enterprise development from the macro perspective. It also presides over the steering committee of one-north.

**one-north Steering Committee**, chaired by Minister. Members of this Committee consist of the top management of various agencies and ministries involved in one-north. This Committee looks at resolving policy-related issues which cut across several agencies and/or ministries.

**one-north Resource Advisory Panel**, chaired by the Permanent Secretary of the Ministry of Information and the Arts. The purpose of this Panel is to provide inputs and advice from the private sector perspective.

**one-north Review Committee**, chaired by JTC CEO. Members of this Committee look at resolving technical and related issues spanning across multiple agencies.

**one-north Software Remaking Committee**, chaired by the Permanent Secretary of the Ministry of Trade and Industry. The objective of the Software Remaking Committee is to promote collaboration among various agencies to collectively test bed their new ideas or approaches in one-north. It also allows agencies to push and implement policies that they would like to experiment.

In the seeding of one-north, the government exemplifies its commitment to the project through directly developing the key biomedical cluster, Biopolis, and ICT-media cluster, Fusionpolis. Moving forward, to make one-north self sustainable, the private sector has to be offered a greater role in realizing the vision of one-north. As such, there is a conscious effort towards broadening the ownership of one-north by actively promoting private sector participation through models such as government-private partnership and by tendering land out to private developers. The government will only be developing key strategic facilities that the private sector is not keen to take up due to higher risk factor or lack of commercial returns, e.g. High risk development like Biopolis, or non-profit development like a library or a museum. In this area, we have a lot to learn from the European community.