Introduction

Rising 16 storeys from a square site bounded by Victoria Street in the north, North Bridge Road in the south, Middle Road in the east and the small filter lane of Bain Street in the west, stands a 102.8 metre tall building – Singapore’s latest experiment in learning architecture. A gigantic tripod connected by two sky bridges covering 58,783 sq metres of gross floor area (GFA) is now to be known as the New National Library Building (NNLB). This building marks the fulfilment of the Library 2000 dream of „expanding the learning capacity of the nation.” The paper therefore seeks to outline the perspectives and design principles that governed the construction as well as the deployment of services within the building in the context of L2000.
The infrastructural planning for the building began with a public consultation process. As early as May 1999, seven civic groups were set up to gather public views and feedback on the construction of the NNLB. These comprised of disabled persons, older citizens, young people, community self-help groups, business community, arts community and researchers. The strategies that emerged from the library’s discussions about its public spaces share a common goal of eliminating architectural and administrative barriers to collaboration. The consultation concluded the following:

- **A Place for the People**
  The NL Building should provide an open, hospitable and conducive learning and research environment for the people of Singapore.

- **A Civic Institution**
  The NL Building should be an enduring civic institution with a distinct character, reflecting Singapore’s multicultural heritage and to support a creative and connected Singapore.

- **A Flexible and Functional Building**
  The NL Building should be a fully flexible and functionally clear building.

- **An Efficient Building with Integrated Systems**
  The NL Building should be an efficient building with integrated, user friendly and intelligent building systems.

In October 1999, a design competition was followed by an exhibition on five conceptual design schemes by participating architectural houses. The tender was finally granted to TR Hamzah and Yeang Sdn Bhd, Malaysia, who demonstrated their mettle in being able to satisfy the intricate requirements of a converged arts+heritage+library design. The need for an integrated service concept was Singapore’s response to institutional changes taking place in Canada, European Union and the United States. The Smithsonian Institution is a good example of a system of libraries, museums and arts activities that reach Americans, guide discovery and present treasures in an integrated manner. With ongoing debates on the need to merge the archives, museums and libraries to provide the user with a seamless flow of knowledge, NLB began working on a design that converged learning spaces and integrated the user experience.

### Converging Spaces, Integrated Learning

This NNLB building represents the converging spaces of arts, heritage and libraries stacked vertically up with two connected wings of programming zones where collaboration and high interaction takes place. The architecture integrates public and entertainment space, with that of reference and research converged in a single building.

### Plaza

The positioning of the library as a fusion space – a „meeting point“ and intersection of sorts is clearly represented in the breezy, open ground street-level plaza. It is the focal point of public participation with an elevated stage for public performance and exhibitions. It houses a café, dining area and a book-drop which is open 24/7, 365 days. The plaza is an internal street that connects the main thoroughfares of North Bridge Road and Victoria Street, assumes the form of a giant void deck with soaring ceilings, capacious volume and quasi-atrium concept designed as a vital point of congregation.

### Central Lending Library

The National Library embraced an open-access concept where public lending services are integrated with national...
reference services. With 134,000 books for loan, half of which are fiction titles, it represents NLB’s largest fiction collection. It also houses 80 newspaper titles from around the world, popular magazine collection, family and parenting collection and a children’s section. The Central Lending library accounts for more than a sixth of the total collection size of the NNLB.

National Arts Council Drama Centre
The Drama Centre occupies levels 3-6 with 615 seats and a black box of 120 seats. It has state-of-the-art audio, visual and lighting equipment. Its physical integration with the library is an expression of the convergence of arts with learning as a single experience.

Lee Kong Chian Reference Library
The Lee Kong Chian Reference Library is seven floors with an estimated 500,000 reference titles and staffed by specialists. The Singapore and Southeast Asian collections are given pride of place in a triple-volume space extending vertically over two storeys or even three storeys in some areas, in order to mark its significance. The rare collections are housed in humidity controlled conditions in a specially designed heritage room. Gracing the reader on these triple-volume space is a Book Wall with special carrels for researchers.

Exhibition Floor
The Exhibition Floor is specially designed for donor collections and thematic exhibitions. In August 2005, the Zheng He exhibition featured the seven voyages of Emperor Zheng He and his influence in Southeast Asia. The main exhibition runs about six months before it is replaced by a new theme. In the sky bridges across levels 7-11, several smaller exhibitions create a buzz of interaction and activity. These include, the “Singapore Library” exhibition, chronicling the evolution of libraries and the “Singapore Literary Pioneers” exhibition paying tribute to early literary geniuses in Singapore.

Programming Spots
On Level 5, two programming rooms with a total seating capacity of 120 is available for both commercial and library programming activities. The seminar rooms extend to the courtyard where outdoor presentations and storytelling activities could be organised. Similarly in basement 1, the fiction collection opens to a green garden with a platform for regular storytelling activities.

The Millennium Library
The Millennium library of converged spaces had embraced the technical fundamentals of adaptability, connected façade and eco-efficiency. These together, bagged the building the Green Mark Platinum award by the Building and Construction Authority of Singapore in May 2005.

Adaptability
A primary feature of this new building is its adaptability. Government’s investment into a new library infrastructure meant that it had to be future-proof, engineered to stand a hundred years, adapt to weather changes, and flexible enough for reconfiguration of spaces to meet the future needs of the converged library environment. This was implemented in a couple of ways. The NNLB was designed to permit its interior space to be reorganised through the use of soft rather than permanent partitions. Even the external beams have been braced for possible future extension, if and when the gross floor area is increased as a result of new estate management or zoning policies. The corridors and promenades were constructed unusually wide at over six metres serving the same agenda: they can be sealed and blockaded into additional function rooms or exhibition spaces.
areas and yet meet the requirements of fire regulations
and handle the flow of user traffic.

The adaptability and design flexibility is evident even in the
minutiae of architectural details. The wall behind the stage
of the plaza is deliberately grooved with boxes for speakers
and can accommodate a large LCD screen for concerts
and associated large-scale musical gigs. Wooden panels
line the walls in the reference library with sound proofing
slots that reduce ambient noise to aid the purpose of quiet
study. Cabling is done beneath raised floors which does
not require ripping or hacking of walls to facilitate upgrad-
ing as the building progresses with its institution.

Connected Facade
The building embraces its immediate locale. The S$203m
building has no distinctive façade but interacts with sun
angles throughout the day to offer different faces that are
equally evocative at different times. From shadow lines
of the trellises on the North Bridge Road façade in the
late afternoon sun bouncing off its north-western face,
to the glowing transparency of lantern at night, the per-
spectival opportunities from outside is as manifold as the
views from within the building. Depending on where one
chooses to stand, the glass blazed building offers scenic
views of Marina Bay with colander-shaped roofs of the Es-
planade, skyline of the financial district or the spires of St
Joseph’s Church as its basks in the golden aura of twilight.
The curved glass of the building emphasizes the connec-
tivity between the interior and the exterior integrating the
façade of the InterContinental Hotel across the road, St
Joseph’s Church and North Bridge Centre. The only face
of the library not encased in a vast expanse of glass is
that which abuts Bain Street. The Western outlook could
also potentially intrude upon the privacy of the residential
flats at Brass Basah complex. The see-through glass walls
allow casual visitors a quick reconnaissance of the interi-
or of the library, but neither transgress the programmes
nor disrupt the quiet research of the reference library as
they ascend and descend the atrium even after the col-
lection zones are closed.

The building is highly accessible, optimised for conven-
ience that an island site offers. Unlike conventional build-
ings with a single point of entry, the NNLB has three points
of entry, with two drop-off points. At the junction of Middle
Road and Victoria Street is the Northwest and entry. At the
intersection between Middle Road and Northbridge Road
is the Northeast entry and the junction between Victoria
Street and Bain Street is the Southwest entry into the
building. Though it lacks a sense of arrival, the building
heightens curiosity and excites possibility.

Eco-Efficiency
The atrium and the double volume of the plaza and inter-
 nal street were the outcome of computer generated fluid
dynamics simulation and wind-tunnel tests to ensure natu-
ral ventilation and a thorough breeze in that semi-alfresco
area. The main block and the two wings are oriented to
minimise solar impact. The curved wing block is angled to
achieve a more ideal North-South orientation as well as
addressing the street direction of Victoria Street.
The transitional spaces and the atrium spaces are criti-
cally located in configuring the built form to make full use
of wind and natural ventilation.

The surrounding tropical greenery called for large over-
hangs, canopies, sunshades, sky terraces and intelligent
use of materials. The curved roof combines form and func-
tion uniquely. The consciously overhanging eaves of the
roof prevent drips over the full-length glass window, easing the maintenance of double glazed windows.

Double-glazed windows, reduce noise pollution, save energy by containing air-conditioning and reducing condensation. Protruding fins or blades, reduce glare and when interfaced with clear glass permits vistas from every vantage point. They serve to ensure that the glass bubble lifts don’t overheat while simultaneously reconciling aesthetics and architectonics as a wraparound, unifying the blocks and giving a cohesive and connected look.

The building has 14 garden terraces, blurring the boundaries between nature and nurture. The two sunken gardens in the basement, letting in light and greenery, reducing mould and humidity, making the underground experience a pleasant one. The building has a plethora of skycourts or urban greenery throughout the two towers, insulating the interior, bringing down the ambient temperature for greater energy efficiency. On levels 5, 7, 9 and 10 are garden terraces shielding the building from the rising and the setting sun. Among palms, creepers and assorted foliage, visitors can soak up the scents of the spice and herb garden while curling up with a favourite book. At level 14, two stretches of garden terraces engage staff in therapeutic working environment.

Carpets, wall fabrics and wooden fixtures are either made of recycled, reused materials or sustainable forested local timber, contributing to an environmentally friendly, low-impact design while guaranteeing comfort conditions. Light sensors dim or switch off lights when there’s enough natural light entering the library. Motion sensors activate escalators, automatic blinds work to reduce glare and heat from the sun and rain sensors shut of sprinklers when there’s enough water supply for the roof-top gardens. The building also has a state-of-the-art sanitation system involving water control management. Information technology too has been very sensitively integrated and deployed in an unobtrusive way into the security, mechanical and electrical systems of the library. With high-speed multimedia cabling and wireless infrastructure networks, the NNLB edifice guarantees a borderless green global village, epitomising the library of the new millennium.

Conclusion

The building is not without its symbolism. The landmark site has its four corners flanked with by religious buildings, commercial complexes, heartland HDB (Housing Development Board) flats and the international spin of the Intercontinental Hotel. The stretch of North Bridge road was part of the old civic district of Singapore and was her commercial heart before Orchard Road overtook its pride. Surrounded by the different facets of Singapore’s social rubric, the National Library mirrors the trajectory of a society coming a full circle, representing the brand new hub as well as the rejuvenation of the socio-cultural landscape, a veritable place for the people of Singapore. The NNLB was conceived in the last millennium. With the Library 2000 focus of the National Library Board, the building will be reconfigured to provide for more collaborative spaces. As Lao-Tse once said in „The Space Within“, Lao-Tse (570–490 B.C)

Thirty spokes share the wheel’s hub;
It is the center hole that makes it useful
Shape clay into a vessel;
It is the space within that makes it useful
Cut doors and windows for a room;

It is the holes that make it useful.
Therefore, profit comes from what is there
Usefulness from what is not there.

It is imperative therefore that the usefulness of the building comes from the purpose it serves. In the case of the NNLB building the form has created the space within – therein lies its relevance and usefulness to the people of Singapore.

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