



**Nanyang Polytechnic**

**Innovation Excellence Award 2009 Winner**  
**Executive Summary**

**NYP**  
the **innovative**  
polytechnic

  
**INNOVATION  
EXCELLENCE  
A W A R D**  
2009 WINNER

# Organisational Excellence Achievements

2009



Hewitt Best Employer Award



Innovation Excellence Award

MIS Asia IT Excellence Award for KM

2007



Home Team Achievement Award

2008



Singapore HEALTH Platinum Award

2006



Distinguished Public Service Award for Organisational Excellence



Singapore HEALTH Gold Award

2005



People Excellence Award



Singapore Service Class



Singapore HEALTH Gold Award



Minister for Defence Award



Singapore Environmental Achievement Award



BCA Green Mark Platinum Award



Leading Corporate HR Award



Leading HR Practices in Health & Employee Wellness

2004



Public Service Award For Organisational Excellence



Singapore HEALTH Gold Award



ASEAN Energy Efficiency Award

Energy Efficient Building Award

2000



Singapore Environmental Achievement Award



Public Service Award for Organisational Excellence

2003



Singapore Innovation Class

1996



ISO9001

1999



ISO14001



Singapore Quality Class



People Developer Standard

This Executive Summary is presented in the context of the Innovation Excellence Award application. We invite you to visit Nanyang Polytechnic for a complete "Innovation Everywhere" experience.

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# FOREWORD

*"I dedicate this Award to all my wonderful colleagues and students in NYP as well as to our Board of Governors and all our valued industry and institutional partners whose support and contributions have made it possible for NYP to receive this prestigious accolade."*

Since its inception, NYP has crossed a number of milestones in our Innovation Journey and has won many accolades, including the Distinguished Public Service Award for Organisational Excellence, People Excellence Award and Hewitt Best Employers Award, amongst others.

Today, NYP has seven schools and about 1,300 staff offering 47 full-time diplomas to more than 15,000 students in a wide range of courses in various disciplines. NYP also offers a wide range of continuing education and training programmes to adult learners, at the advanced diploma, specialist diploma, diploma and certificate levels as well as customised professional development programmes. NYP continues to work with existing and new industry partners on innovative initiatives.

These achievements were made possible by NYP's Innovation Everywhere Framework which enables a culture of innovation to permeate and flourish throughout the organisation, resulting in breakthrough innovations in "Organisation", "Teaching and Learning", "People" and "Environment".

Much of the credit for NYP's success goes to all our colleagues for their strong commitment and support in our Organisational Excellence journey. Our borderless teamwork

is evident in the way we engage our partners, take on multi-disciplinary projects and manage challenges. It has enabled us to turn ideas into opportunities, to see opportunities in challenges and to achieve results far greater than the sum of our individual efforts.

We are honored to be conferred the Innovation Excellence Award 2009. I dedicate this Award to all my wonderful colleagues and students in NYP as well as to our Board of Governors and all our valued industry and institutional partners whose support and contributions have made it possible for NYP to receive this prestigious accolade.

This Award will be an inspiration for Nanyang Polytechnic as we take another step towards our vision to become a Premier Polytechnic of Global Distinction.

**Mr Chan Lee Mun**  
**Principal & CEO**  
**Nanyang Polytechnic**



**CHEMICAL & LIFE SCIENCES**  
REVOLUTIONARY



**ENGINEERING**  
INNOVATIVE



**HEALTH SCIENCES**  
CARING

# CONTENTS PAGE

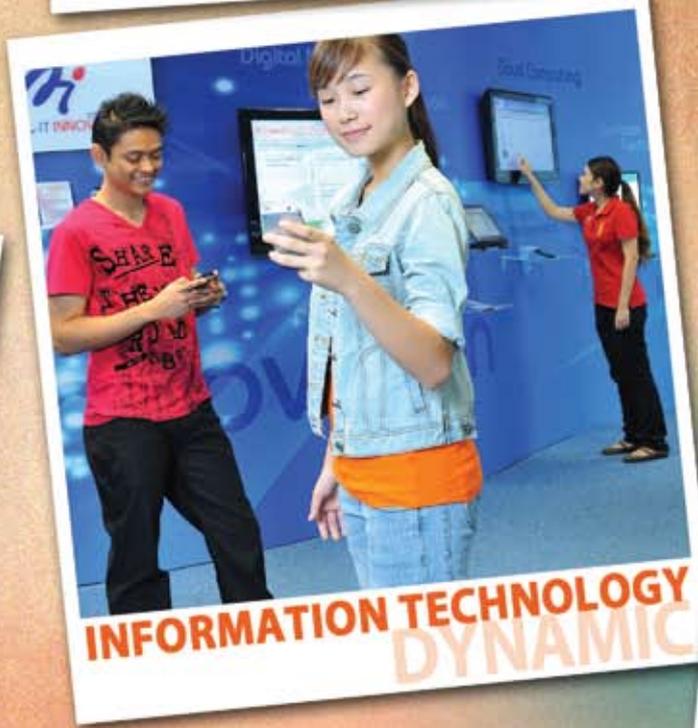
<b>ORGANISATIONAL PROFILE</b>	6
<b>CHAPTER 1 LEADERSHIP</b>	14
<b>CHAPTER 2 PLANNING</b>	19
<b>CHAPTER 3 MANAGEMENT OF INFORMATION</b>	22



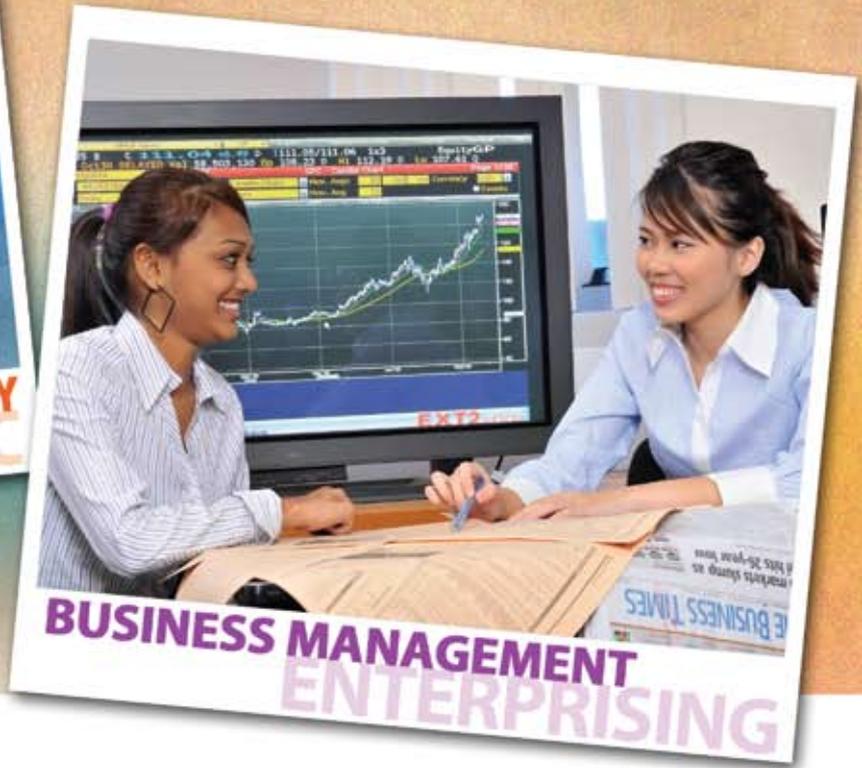
**INTERACTIVE & DIGITAL MEDIA**  
ENGAGING



**DESIGN**  
INSPIRING



**INFORMATION TECHNOLOGY**  
DYNAMIC



**BUSINESS MANAGEMENT**  
ENTERPRISING

**CHAPTER 4**  
PEOPLE

25

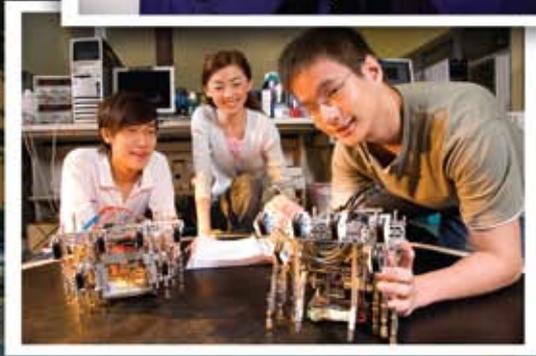
**CHAPTER 5**  
INNOVATION PROCESSES

29

**CHAPTER 6**  
RESULTS

33

# INNOVATION@ NYP



## Nanyang Polytechnic (NYP)

was established on 1 April 1992 to meet a national need for more technologists and professionals to support Singapore's technological, economic and social development. We provide pre-employment training for secondary school leavers and continuing education and training for adult learners; and support business and industry through professional and technical services.

NYP offers a wide range of courses in Engineering, Information Technology, Design, Business Management, Health Sciences, Chemical & Life Sciences and Interactive & Digital Media. NYP also offers continuing education and training programmes to adult learners, at the advanced diploma, specialist diploma, diploma and certificate levels as well as customised professional development programmes.





NYP brings the real world industrial environment to the Schools with the Teaching Factory® concept.

## Redefining Polytechnic Education

Today, polytechnics in Singapore are already among the best in the world. This happened as a result of design rather than natural evolution. NYP looked at what industry needed, leveraged on foreign governments to leapfrog shortcomings of the existing system and came up with a concept, the Teaching Factory®, to train technologists. This concept brings the real world environment into the polytechnic. This approach to training technologists includes building strong industry linkages with collaboration partners. Over the years, the approach has been permeated to other educational institutions.

## Innovation@NYP

NYP builds its strengths on two pillars – effective teaching and learning, and a pervasive culture of innovation. Effective teaching and learning is a result of effective pedagogy which in turn draws on the polytechnic's capabilities in innovation. This culture of innovation permeates every facet of the polytechnic's operations, including the way the polytechnic trains its students, focuses on capability development and promotes organisational learning.

### Strong Leadership

NYP has a strong leadership. Notably, management's commitment to building an innovative polytechnic has ignited in staff and students a passion for excellence. NYP prides itself on its "Borderless Culture" where there is widespread resource integration, with staff having different disciplinary skills and expertise working synergistically together. These have led to capacity creation, staff capability development and enhanced teaching and learning.

### A Pervasive Culture of Innovation

A pervasive culture of innovation, driven by our "can-do" and pioneering spirit is evident throughout the organisation. Senior management demonstrate and reinforce their commitment to innovation through continually coming up with new ideas and initiatives. Staff are involved in projects, applied R&D and other innovation-related activities such as competitions.



Bringing the real-world environment to NYP.



NYP Staff are involved in applied R&D and other projects.



Building strong partnerships, like this partnership NYP signed with Sony Computer Entertainment Asia and Premium Agency to set up a Games Resource Centre. Signing the MOU are (from left), Mr Tetsuhiko Yasuda, President of Sony Computer Entertainment Asia, Mr Chan Lee Mun, Principal & CEO/NYP and Mr Katsunori Yamaji, CEO/Executive Producer of Premium Agency Inc.

NYP consistently commits funds to R&D and innovative projects that exceed national benchmarks. Staff are empowered through multiple platforms to contribute ideas that create value for the organisation. We have 100% participation for the Staff Suggestion Scheme. Besides SSS, staff are involved in either WITS, IQC or Six-Sigma. Many of our WITS and Six-Sigma projects have won top awards at the NIQC competition, attesting to the quality and innovativeness of the projects.

## Teaching & Learning

NYP has continuously developed and implemented new and innovative training and pedagogic systems. We bring the real world industrial environment to the schools with our Teaching Factory® pedagogical concept. The concept allow us to produce graduates that are immediately productive on entering the workforce.

## Capability Development

NYP's innovative approach to capability development has allowed us to continuously develop capabilities in new and diverse fields such as Biologics, Green Technology, Nanotechnology, Integrated Media, Information Security and Aerospace Technology. Innovative approaches include our recruitment & selection process, multiple pathways for staff development, tacit knowledge sharing platforms, integrated knowledge management system and partnerships with industry.

Our innovative approaches to building strong partnerships with international and local partners through industry communities, centres of innovation, industry projects, applied R&D and incubators have helped us to keep abreast of the latest in technology and knowledge and to feel the pulse of the industry, enabling us to continually tailor our training programmes to be relevant to the needs of industry and the nation. Our industry partners also provide real life industry projects that are developmental in nature. Such a real-life training environment further engenders teamwork, innovation and staff capability development.

INNOVATION@  
NYP

# Organisational Environment

## Nature of Main Products and Services

NYP offers the following products and services:

- Pre-Employment Training (PET) programmes – full time diplomas for school leavers
- Continuing Education & Training (CET) programmes: Advanced Diplomas, Specialist Diplomas, Part-time Diplomas, Certificates and customised professional development programmes for adult learners
- Business and Industry projects that strengthen our capabilities and provide the application and development oriented learning environment



*Preparing students for work and life.*

## Our Mission

We provide quality education and training to prepare students and adult learners for work and life, equipping them to be life-long learners and to contribute to the technological, economic and social development of Singapore.

We will harness our resources, expertise, creativity and innovation to support the development of business and industry and to complement Singapore's globalisation efforts.



*Innovation & Enterprise is one of NYP's core values.*

## Our Vision

*To be a Premier Polytechnic of Global Distinction*



*Outstanding campus support facilities and state-of-the-art teaching labs and provide a conducive learning environment for NYP students and staff.*



*An all-rounder education*

## **Our Core Values**

- **“Can-do” Spirit**  
Positive mindsets, grasping opportunities, willingness to try something new and rising to new challenges.
- **Borderless Teamwork**  
We work seamlessly across schools and departments to achieve synergy and maximise organisational capability.
- **Development Orientation**  
Sense of dynamism, growth, the pioneering spirit, never being satisfied with the status quo, looking ahead and planning for the future.
- **Innovation & Enterprise**  
Being inventive and creative, creating opportunities, being entrepreneurial and being business-oriented and business-friendly.
- **Nurturing & Caring Culture**  
We help our students acquire new knowledge, develop new skills and maximise their potential. We support our colleagues in their work as well as encourage their growth and success in their careers at NYP.



*Opportunities Unlimited*



Equipping NYP students with relevant skills and knowledge to enhance their employability.

## Our Stakeholders

NYP's stakeholders are the Government (MOE), Industry and Singapore Society. NYP's customers are our students, adult learners and industry.

Stakeholders	Key Requirements
<b>Government (MOE) and Singapore Society</b>	<ol style="list-style-type: none"> <li>1. Present and future Singapore industry's manpower needs are met to support national development.</li> <li>2. Produces students who are responsible citizens contributing to the technological, economic and social development of Singapore.</li> <li>3. Support for development of Singapore as an education hub to augment talent pool.</li> </ol>
<b>Industry</b>	<ol style="list-style-type: none"> <li>1. Graduates with relevant skillsets, up-to-date knowledge, positive attitude and are adaptable and innovative.</li> </ol>
Customers	Key Requirements
<b>Students (Pre-Employment Training)</b>	<ol style="list-style-type: none"> <li>1. Competence in relevant skills and knowledge, employability and enhanced career potential.</li> <li>2. Excellent facilities, nurturing &amp; innovative environment and quality services.</li> <li>3. Opportunities to develop leadership potential, entrepreneurial and global mindset.</li> </ol>
<b>Adult Learners (Continuing Education and Training)</b>	<ol style="list-style-type: none"> <li>1. Competence in relevant skills and knowledge, employability and enhanced career potential.</li> <li>2. Excellent facilities, innovative environment and quality services.</li> </ol>
<b>Industry</b>	<ol style="list-style-type: none"> <li>1. Projects and services customised to the needs of industry.</li> </ol>

Stakeholders' and Customers' Requirements

## Organisational Directions

### NYP++ Model of Excellence

Our senior management takes the lead in developing the innovation capability of the polytechnic. What differentiates us is the NYP++ Model for Excellence comprising Culture, Concept, Capability and Connection (4Cs). This model forms the foundation for our organisational excellence effort. From the 4Cs, we derive our Innovation Everywhere Framework and all other aspects of organisational development.

**Culture:** NYP has fostered a pioneering and can-do spirit among its staff. Senior management actively promotes teamwork where Schools and corporate departments work seamlessly together on joint initiatives or multi-disciplinary projects/programmes. We are a Borderless Organisation where there are no “walls and boundaries”. This makes possible learning, sharing and resource integration, engendering innovations across the entire organisation.

**Concept:** The Teaching Factory® Concept, a hallmark of NYP, is an entirely new approach to technologist education. This Concept brings the real world environment into the polytechnic. The Teaching Factory® is widely recognised by many organisations. These include the World Bank, the Suzhou Industrial Park Vocational Institute of Technology and numerous educational institutions throughout China that have adopted this model as the basis for their technical educational reform.

**Capability:** Developing capability has always been a key priority. NYP continually enhances and expands staff capability at individual, functional and organisational level, integrating and synergising many cross-functional and multi-disciplinary teams. Staff work closely with industry to keep abreast of advances in technology and industry practices. NYP is the first educational institution to be conferred the People Excellence Award in 2005. We are one of the recipients of the Hewitt Best Employers in Singapore 2009.

**Connection:** In keeping with its belief of “Working with Industry, Training for Industry”, NYP has forged many strategic alliances with industry leaders. These world class organisations value NYP as their preferred partner to collaborate in developing innovative solutions using new and emerging technologies.



ORGANISATIONAL  
DIRECTIONS

CHAPTER 1

# LEADERSHIP



*Walking the talk – NYP's Senior Management, like Principal & CEO Mr Chan Lee Mun (centre) taking the lead in developing the innovative capability of the polytechnic.*

Lead by its Principal & CEO Mr Chan Lee Mun and the Senior Management team, NYP is relentless in pursuing innovation. What drives innovation at NYP is the need to:

- Provide training that employers value in our graduates so that they hit the road running
- Form value-adding and win-win partnerships with industry leaders
- Provide an effective, up-to-date, practice oriented training environment in the face of rapid technology advancement and equipment obsolescence
- Attract staff with sound theoretical knowledge and practical experience and ensure they keep abreast with developments in their respective disciplines and industry sectors.

Our “Innovation Everywhere Framework” is the primary strategy which sets the stage for nurturing and cultivating the innovation spirit within NYP. The development of our unique teaching pedagogy, The Teaching Factory® Concept, enables students within meaningful training environments that emulate the real-world workplace on campus. Other innovative pedagogies and our borderless teamwork have resulted in breakthrough innovations in the areas of teaching and learning, organisation, people and environment.

Guided by the vision, clear strategies and supported by a strong culture, the leadership and the management team ensure that the governance structures, policies, systems and practices are in place for the polytechnic to sustain innovation excellence.



Mr Edward Ho, Deputy Principal/Development and NYP's Chief Innovation Officer (centre), takes the lead in helping to promote a culture of innovation. Mr Ho congratulates NYP students for their outstanding performances at WorldSkills Competition.



Our first batch of students taking Retail Marketing at University of Stirling spent a semester in the UK campus. They are with Principal & CEO Mr Chan Lee Mun (left) and Mr John Tan, Deputy Principal/ Technology (second from right) who stopped by for a visit.

### Innovation Everywhere Framework

NYP's senior management takes the lead in developing the innovative capability of the polytechnic through our NYP++ Model for Excellence and deploying the innovation systems through our Innovation Everywhere Framework. At NYP, we have developed innovative attributes that are fundamental and unique to being an innovative educational institution:

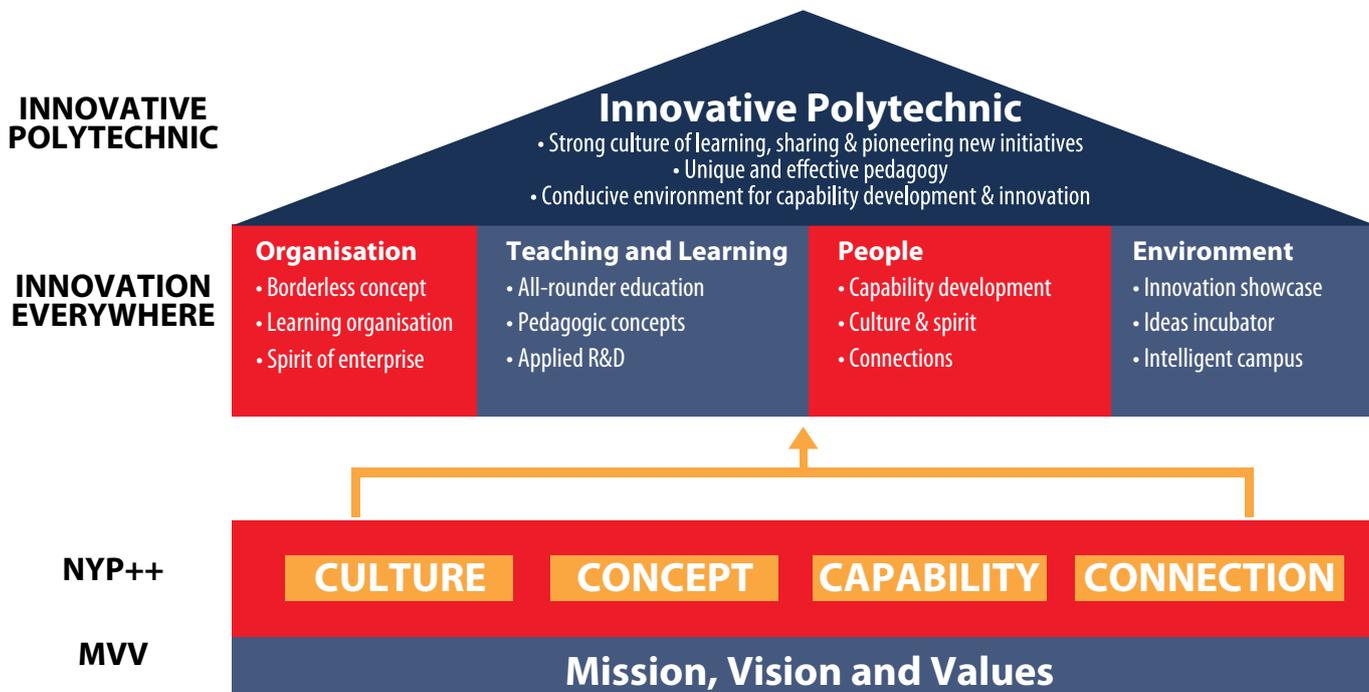
- Strong organisational culture of learning, sharing & pioneering new initiatives
- Unique and effective training pedagogy
- Conducive environment for capability development & innovation

### Strong Focus on Collaboration for Capability Development

Collaboration with industry partners helps the polytechnic keep abreast of the latest developments in education and industry. It enables us to provide value-added training & project development opportunities for students and staff.

We involve industry in innovation activities through collaborations in joint R&D, the setup of innovation/specialist centres & communities, technology incubator support for start-ups and local/overseas industry attachments.

CAPABILITY DEVELOPEMENT



**Teaching & Learning:** NYP’s unique “Teaching Factory® Concept” provides students with a total learning experience. It ensures that students gain new knowledge, learn new skills and develop competencies within contextually meaningful training environments that emulate the real-world workplace on campus. Complemented with NYP’s other innovative pedagogies such as the “Integrated Technology Teaching & Learning”, the Teaching Factory® is an excellent platform for industry projects and collaborations.

**Organisation:** NYP is a borderless organisation. It continuously affirms the concept of “borderless teamwork” as an essential ingredient for innovation. As a learning organisation, NYP has developed the award-winning Accumulated Experience Sharing (AES®) knowledge management system which provides a rich reservoir of intellectual resources and best practices to support its learning needs. NYP is also a connected organisation with a wide network of local and international collaboration partners in industry, government agencies, and institutions.

**People:** NYP strongly believes in capabilities development to support innovation. It provides many opportunities for people development to keep abreast of advances in science and technology. NYP has also developed its innovative “Staff Re-profiling” programme to strategically prepare its people for emerging technologies or for new responsibilities. The polytechnic harnesses and channels its capabilities and the can-do spirit of its people towards purposeful innovations like applied R & D projects and technology development.

**Environment:** NYP provides on campus an environment that is conducive for innovation to flourish. Facilities and institutional policies are designed to encourage and facilitate borderless and cross-disciplinary teamwork. Opportunities are created for students and staff to participate in projects and competitions to challenge and develop their innovative talents. Building links with international communities provide international exchange and attachment opportunities to engender cross fertilisation of knowledge and enhance the quality of innovation outcomes.

INNOVATIVE  
POLYTECHNIC

## Organisation Culture

A strong culture is the core for a sustained innovation orientation in any organisation. In NYP, we clearly expound our core values to engender our culture and spirit of innovation.

<i>Core Value</i>	<i>Behaviours Supporting Innovation</i>	<i>Practices to Support Innovation</i>
<b>Can-do spirit</b>	NYP encourages staff to have positive mindsets, to grasp opportunities when they knock and be willing to try something new	Providing time and resources for staff & students to research and develop ideas into tangible products through: <ul style="list-style-type: none"> <li>• 822 Plan to tap industry practitioners for adjunct teaching</li> <li>• Collaboration projects with industry to tap industry resources</li> </ul>
<b>Innovation &amp; Enterprise</b>	NYP encourages staff to constantly seek new and better ways of doing things, be inventive and creative, create opportunities, being entrepreneurial and business-oriented and business-friendly	<ul style="list-style-type: none"> <li>• Participation in local and international competitions such as Singapore Robotic Games and WorldSkills Competition</li> <li>• New strategic goals “Nurturing the Spirit of Innovation &amp; Enterprise” and “Selling our Ideas” launched in 2008 aim to further promote intellectual curiosity, reduce risk-adversity and the commercialisation of NYP’s technologies, systems and processes</li> <li>• Launch of three-level (Beginner, IP Management, Technology Transfer Specialist) manpower development programme in technology transfer and IP commercialisation for NYP staff</li> </ul>
<b>Borderless Teamwork</b>	NYP encourages staff to work seamlessly across schools and departments to achieve synergy and maximise organisational capacity	Developing in staff a broad NYP rather than School/Dept perspective through job expansion/ rotation to Schools and Corporate Departments and providing opportunities through multi-disciplinary projects and hybrid courses
<b>Development Orientation</b>	Staff strive to achieve dynamism, growth, pioneering spirit and never being satisfied with the status quo	Providing wide-ranging and varied learning opportunities through: <ul style="list-style-type: none"> <li>• Local and overseas attachments and collaboration projects with industry leaders</li> <li>• Staff re-profiling to enhance their market value and keep ahead of technology changes and manpower needs</li> </ul>
<b>Nurturing &amp; Caring Culture</b>	We help our students acquire new knowledge, develop new skills and maximise their potential. We support our colleagues in their work as well as encourage their growth and success in their careers at NYP	Encouraging self-directed learning, reflection and self-evaluation through: <ul style="list-style-type: none"> <li>• Sharing, Organisation Learning, Interaction &amp; Dialogue (SOLID) sessions</li> <li>• After Action Review (AAR) of significant events</li> <li>• New strategic goals launched in 2008 with a strong focus on the student population. Goals such as “Cultivating our Student Talents”, “Nurturing All-Rounder Graduates” and “Enriching the NYP Experience” aim to provide a balanced education, holistic development and groom our student talents to become high-achievers and future leaders of society</li> </ul>

# Programmes to Promote Innovation Culture

Various programmes are in place to promote an innovation culture across all levels of the organisation, including students.

Categories	Programmes to Promote Innovation Culture							
	Innovation Champions Executive Programme	Pedagogy	Industry/ Business Projects	In-House Projects	Competitions	Cross Functional Committees	Job Attachments	WITS, SSS, IQC, 6 Sigma, etc
Management	•	•	•	•	•	•	•	•
Academic Staff	•	•	•	•	•	•	•	•
Executives	•		•		•	•	•	•
Support staff			•		•	•	•	•
Students		•	•	•	•		•	

Programmes to Promote Innovation Culture

# INNOVATIVE CULTURE



NYP staff from various Schools and departments sit in cross-functional committees, thus promoting a good exchange of ideas and a culture of innovation.

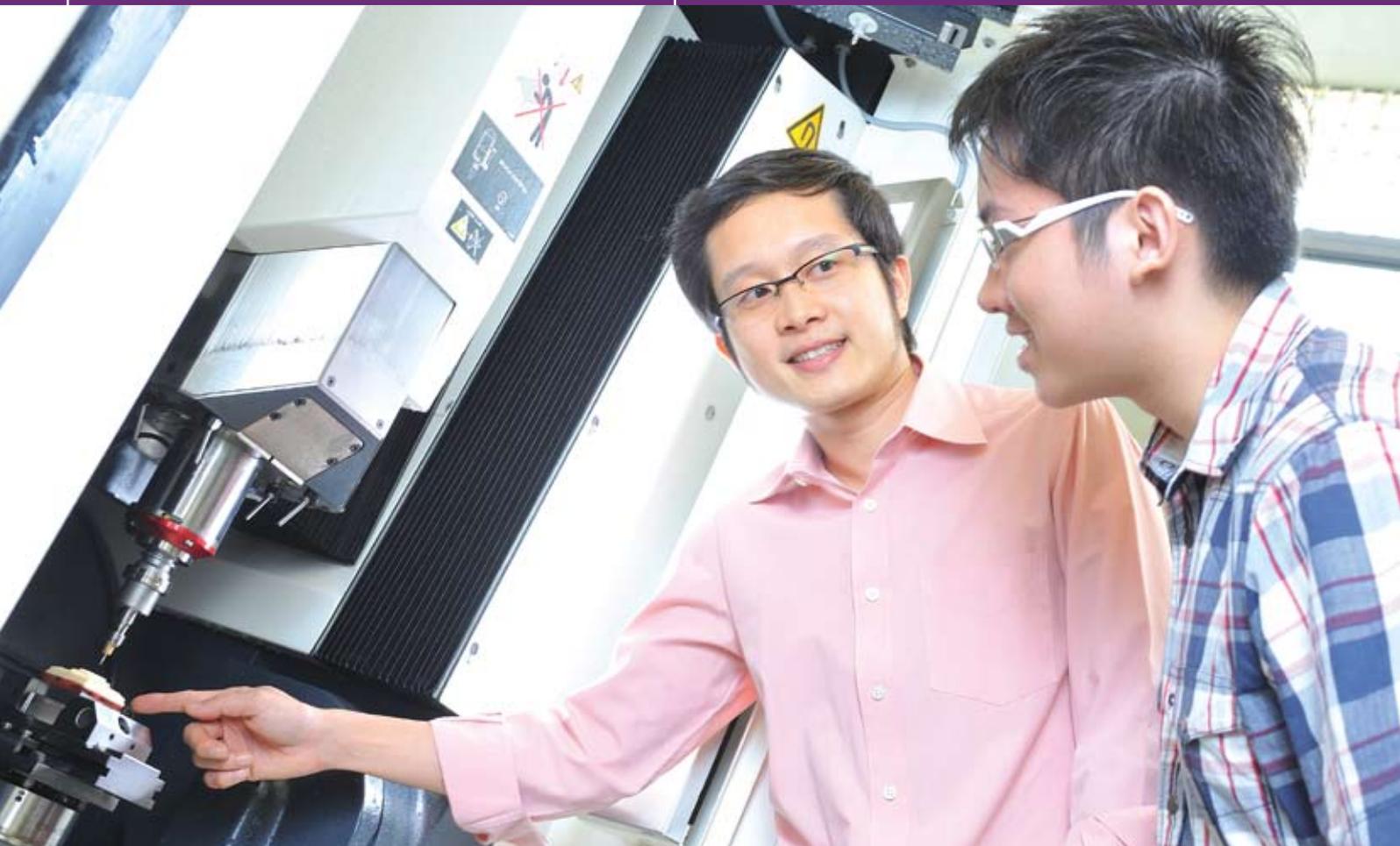
## CHAPTER 2

# PLANNING

## Strategy Development & Deployment

By the mid-1990's, we have established the bedrock and foundation of NYP's organisational excellence. We articulated our landmark six Strategic Thrusts which put into practice many of the timeless strategies that were appropriate then, today, and will continue to be into the future. Arising from the goals of providing application and development-oriented training and the focus on capability development was our distinctive Teaching Factory® Concept. Later strategic planning cycles brought on many more innovative concepts and initiatives such as Staff Re-Profiling, Borderless Schools, Integrated e-Learning and the Executive Programme Series for managers and senior officers.

The current Strategic Plan 2008/09 is premised on the 4 key areas identified in our mission- Pre-Employment Training, Continuing Education & Training, Innovation & Enterprise, and Internationalisation and will see us through the next 3 to 5 years. The ten new strategic initiatives enhance our abilities in delivering an industrially relevant education and equipping our graduates with the relevant knowledge, skills and mindsets for the new economy. With the Innovation Everywhere Framework, plans are aligned to our strategic directions while resources, policies and systems ensure effective and efficient implementation.



*Students benefit by working in a network of specialist and innovation centres.*

## Innovation Strategies Alignment to Organisation's Objectives

Each phase of NYP's strategic development results in innovations in the areas of organisation, teaching and learning, people and environment. Our Waves of Innovation reflects the key achievements and initiatives.



Waves of Innovation@NYP

### Building Linkages with Industry Partners

NYP will continue to cultivate long-term, high value added partnerships and strong regional and global links with governments, institutions and industry leaders. By leveraging on our capabilities, we will continue to create value for industry and agencies in areas like Continuing Education & Training courses, applied R&D projects, communities, incubators and business projects.

Our connections with reputable companies in relevant industries are also of immense benefit to staff and students in terms of learning and training opportunities, work placements/attachments and overseas development programmes.

A key tenet of the Teaching Factory® concept is the ability to attract industry partners who provide real life industry projects that are developmental and of high learning value to staff and students.

### Applied R&D Projects

Staff, through industry projects, competitions, customised courses and applied R&D projects, work together with our industry partners to develop innovative solutions using new and emerging technologies.

### Industry Communities

Our ability to continuously host start-up companies and provide a comprehensive supportive eco-system is seen in various "Industry Communities" setup with key industry partners. Since 2003, NYP has grown 6 communities, with more than 200 technopreneurs/start-ups and partners, resulting in many valuable spinoffs.

### Building Links to the International Community

NYP continues to support Singapore in its technical assistance initiatives through the offering of manpower development programmes to participants from the region. We share our innovative management concepts and pedagogy with overseas agencies and organisations. These programmes have also enabled NYP to create more international exchange and attachment opportunities for students and staff.

### Patent Development

NYP has in place processes that allow IPs created to be appropriately protected. The Centre of Technology Innovation & Commercialisation (CTIC) serves as a one-stop centre where it will work closely with the schools and industry partners to offer services and support in areas like IP protection and management, licensing and commercialisation, business development and collaborative partnerships.



The various specialist labs set up with industry partners such as (from top to bottom) : the NYP-HP Green ICT Solutions Centre , NYP-Microsoft Centre for Integrated Media and Telematics, The Centre for Software Quality & Security and the InfoSecurity Innovation Centre.

### Resources for Innovation Activities

The following are examples of the network of innovation and specialist centres, labs and communities initiated and housed in NYP to spur technology development, grow start-ups and technopreneurs and provide technical consultancy and training.

<i>Focus</i>	<i>Network of Specialist Centres and Innovation Centres</i>
<b>Product Design &amp; Innovation</b>	Wireless Technology Centre Embedded Technology Centre IC Design Centre MEMS Technology Centre Imaging Technology Centre Infocomm Technology Centre Telematics Technology Centre Bio-medical Electronics Centre Bio-medical Engineering Centre Industrial Design Centre Rapid Prototyping Centre
<b>Accountancy, Finance, Business &amp; Law</b>	International Business Centre Business Process Outsourcing Services Knowledge Management Development Centre Market Research Centre
<b>Advanced Manufacturing</b>	Precision Engineering Centre Engineering Design Centre Robotics Automation Centre Animatronics Project Centre
<b>Media &amp; Design Innovation</b>	Centre for Games Innovation Centre for Animation & Interactive Media
<b>Electronics</b>	Centre of Innovation for Electronics (COIE)
<b>Technology Innovation</b>	Centre for IT Innovation (CITI) Bio-Informatics Group
<b>Communities</b>	IC Design Community Wireless Community Games Creation Community Embedded Systems Community MedTech Concept Security Technology Community

Network of Innovation Centres

## CHAPTER 3

# MANAGEMENT OF INFORMATION

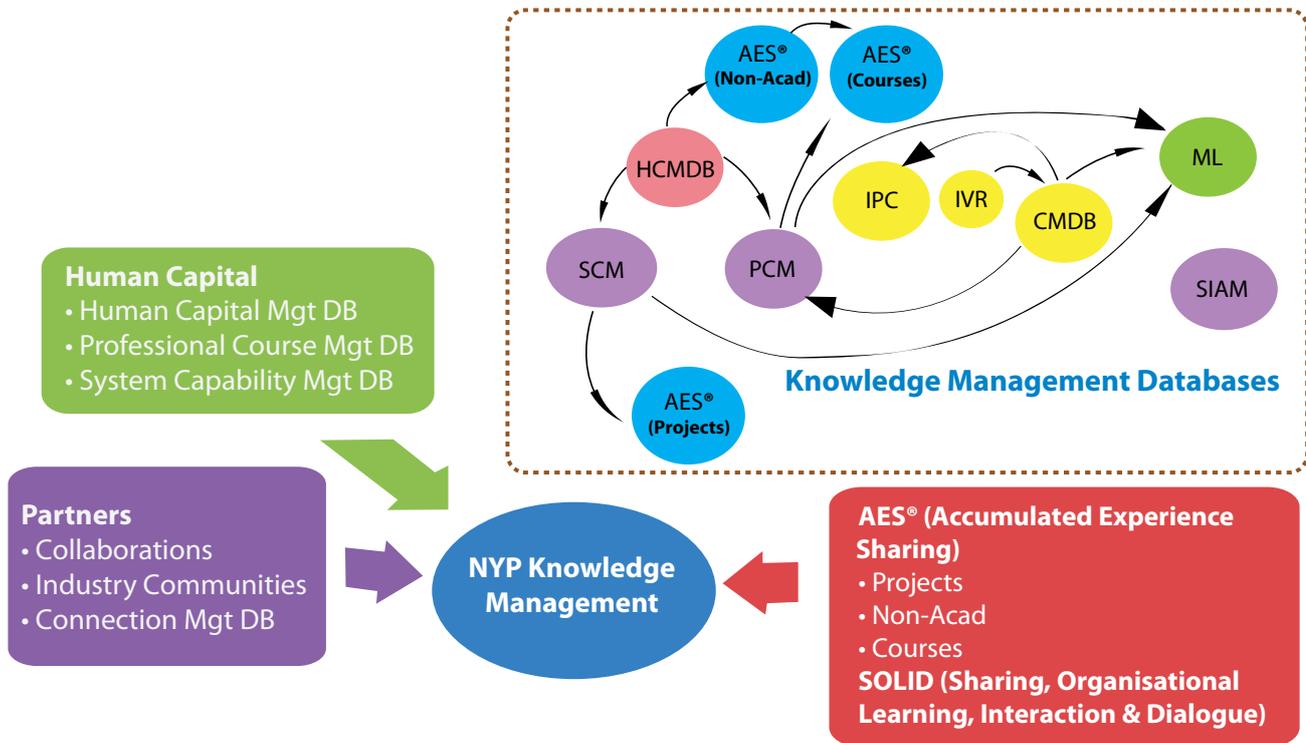


*Staff and students accessing our award-winning AES® system.*

NYP prides herself as being a Borderless Organisation. This makes possible learning, sharing and resource integration, engendering innovation across the entire organisation. Sources of information include government agencies, customers, industry partners, internal staff, external environmental scanning as well as rigorously benchmarking top industry players locally and internationally.

Our Knowledge Management System, consisting of our award winning AES®, comprehensive tacit knowledge databases and community sharing platforms, is shared in an explicit, transparent and user-friendly manner and is used as part of our planning and improvement cycles in conjunction with the outcome of our benchmarking studies.

# BORDERLESS ORGANISATION



An Integrated NYP KM system

**NYP captures and shares explicit and tacit knowledge to encourage innovation and learning**

NYP’s accumulated experience from industry projects is a key intellectual capital. The development of the Accumulated Experience Sharing (AES<sup>®</sup>) system represents NYP’s pioneering approach to knowledge management where knowledge and experience gained from industrial projects are encapsulated and shared as case studies across the organisation.

NYP has also established a culture that recognises the importance of capturing tacit knowledge and sharing it. Staff have many different platforms to acquire and share tacit knowledge on emerging technologies, innovations and industry practices. Platforms such as SOLID, in-house seminars with invited industry speakers as well as internal and external publications serve the purpose of sharing a broad spectrum of tacit knowledge for continuous improvements and organisational learning.



The AES<sup>®</sup> system, where knowledge and experience are captured and shared as case studies.

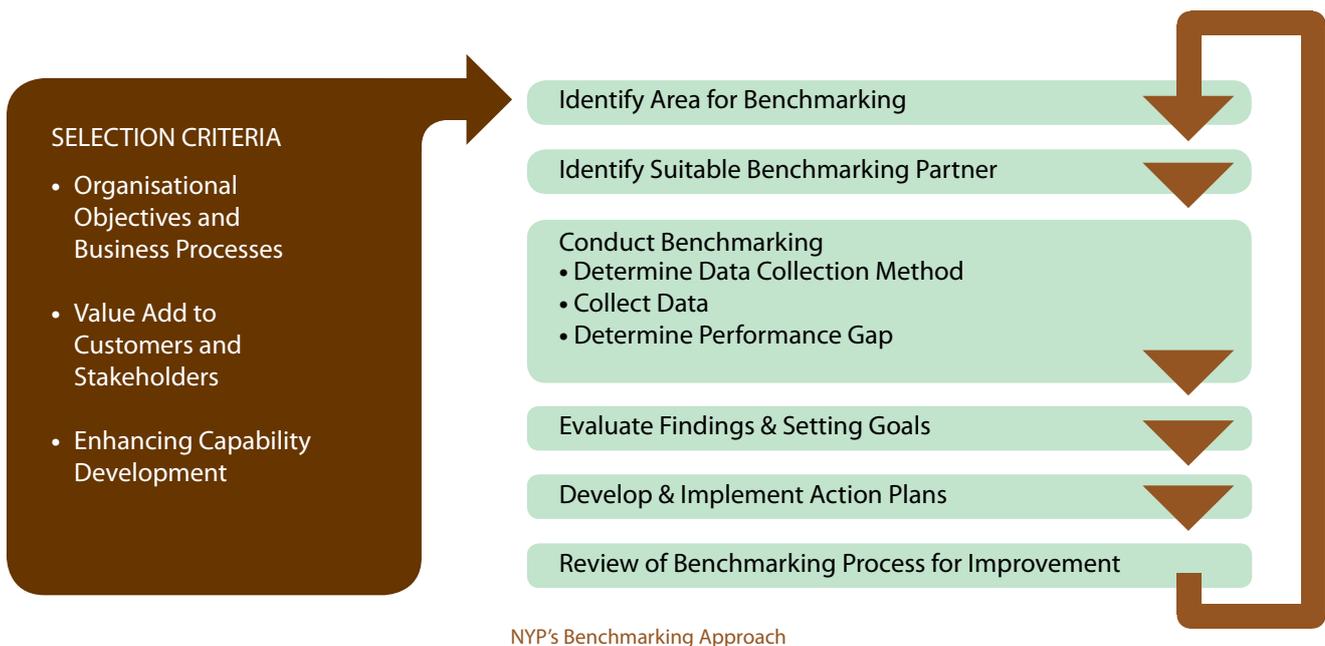
## Benchmarking and Comparison

NYP selects comparative and benchmarking information via knowledge of business and market trends, environment and technology scans, networking studies and reflective practice. Our selection criteria include:

- Organisational objectives and business processes;
- Value add to customers and stakeholders;
- Enhancing capability level of the organisation.

Four types of benchmarking are carried out in the organisation. They are:

- **Internal benchmarking** where best practices are shared through information sharing platforms such as Accumulated Experience Sharing database.
- **Competitive benchmarking** where NYP has benchmarked ourselves against the other educational institutions.
- **Industry benchmarking** where process owners (e.g. schools) have conducted benchmarking in their core areas e.g. technology development.
- **Organisational level** processes where NYP teams have visited other best-in-class organisations to learn best practices (e.g. in the area of IP commercialisation).



# BENCHMARKING AND COMPARISON

## CHAPTER 4

# PEOPLE



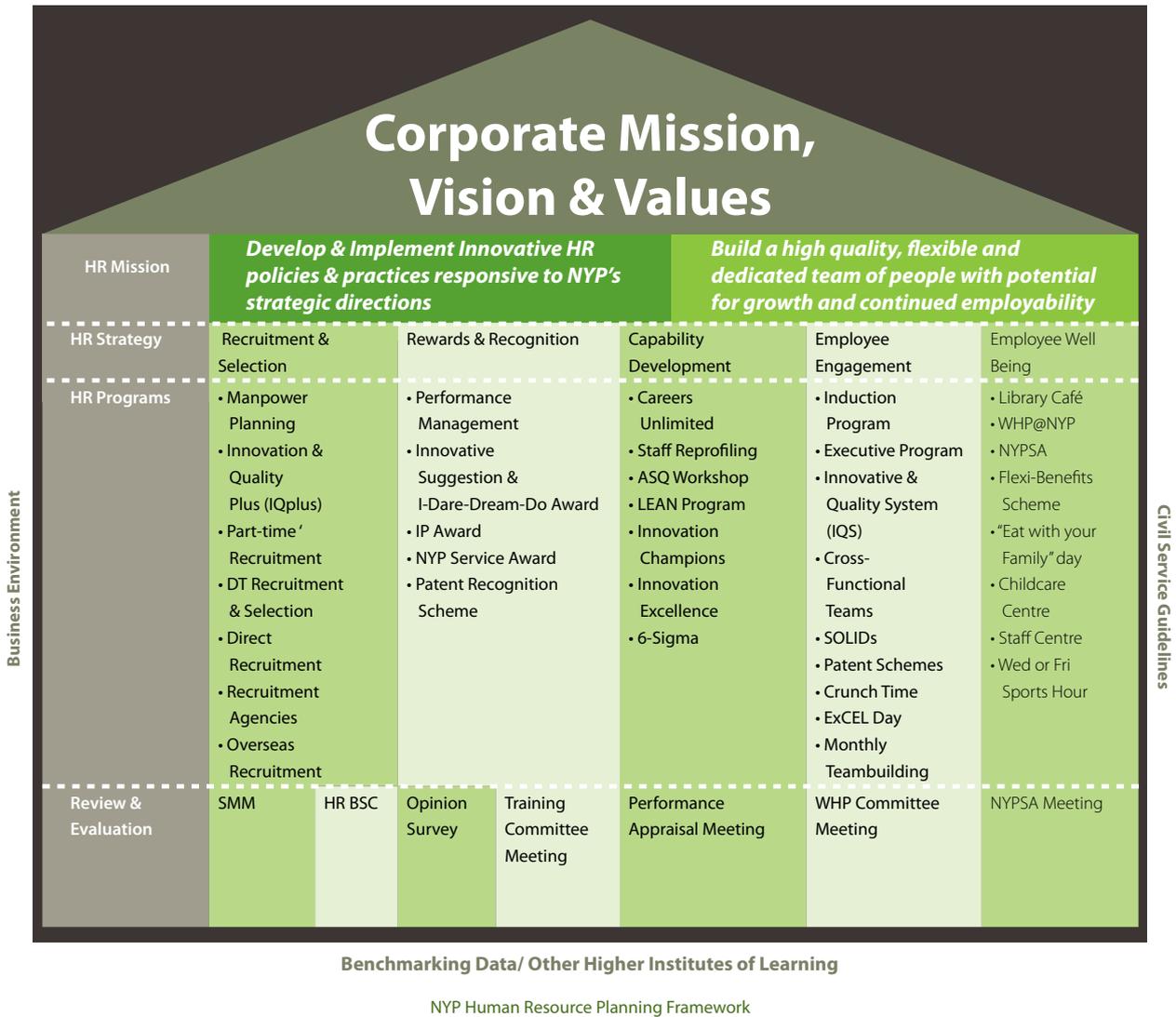
*Mr Chan Lee Mun, Principal & CEO of NYP, receives the Hewitt Best Employers in Singapore Award 2009 from Ms Julia Smith, Country Leader of Hewitt Singapore.*

## Human Resource Planning

HR planning is an integral part of NYP's strategy and work-planning process with strategies formulated in five areas and programmes to support NYP's innovation strategies of Innovation Everywhere. Our comprehensive HR strategy begins with recruiting the right people, developing their capabilities, providing for a challenging and engaging work environment that is complemented with a fair rewards and recognition system to build the pool of high quality, flexible and dedicated people that we have today.

NYP has been recognised for its progressive HR practices. Many organisations have used NYP as their benchmark with more than 35 sharing sessions conducted for local and overseas organisations over the past three years. Awards conferred on NYP in the HR include People Excellence Award (2005), SHRI Corporate HR Award (2005), Finalist HRM Awards – Best Use of Technology (2005) and Hewitt Best Employers in Singapore (2009).

# TRAINING & DEVELOPMENT



## Recruitment & Selection

The Innovation & Quality-Plus (IQplus) framework aims to bring on board candidates with innovative traits through a rigorous interview process via a structured interview approach to assess candidates' competencies in specific areas, including candidates' innovation/entrepreneurial orientation.

## Employee Involvement & Commitment

There are various mechanisms in place to engage staff in innovation excellence . They include:

**Innovation & Quality System (IQS)** - The IQS is an integrated platform and common receptacle for all staff's innovative ideas, suggestions and projects. It is tracked at 3 levels:

**Level 1: Innovative Staff Suggestion System (i-3S)** - captures all ideas/suggestions from staff which can be deposited into the on-line system. The ideas are then evaluated by an Evaluation Committee. Criteria for assessment include business impact, service to internal and external customers, originality of the idea and effort by the suggestor.

**Level 2: I Dare-Dream-Do (i-3D)** - captures innovative suggestions/ideas that can be realised as projects, with quantifiable impact on the organisation.

**Level 3: Innovative People, Projects & Patents (i-3P)** - captures breakthrough ideas, R&D projects and patents that have a quantum impact on the organisation. Such ideas are taken up by CTIC, or appropriate schools/departments.

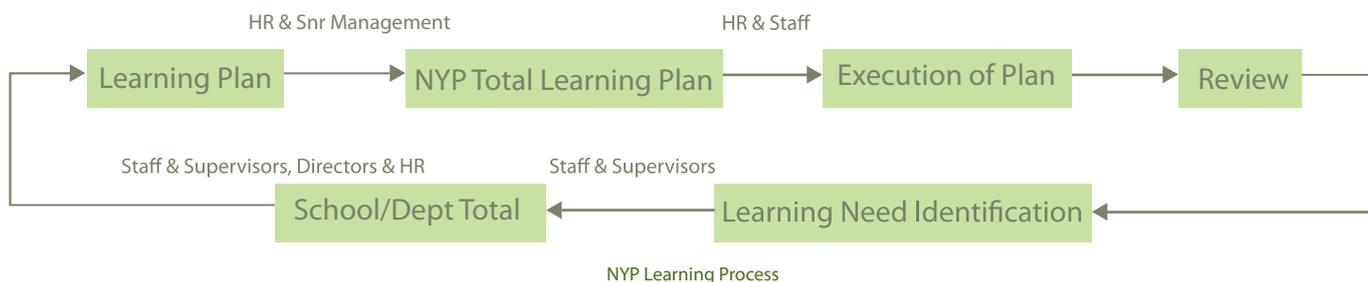
**ExCEL Day** -- ExCEL Day is organised on an annual basis. It is a day when staff celebrates the organisation's journey in innovation and quality excellence and staff's contributions in innovation are recognised.

**SOLID** -- SOLID sessions are organised for staff to share their tacit knowledge. In some instances, SOLID sessions are organised as "Crunch Time" where brainstorming for ideas and solutions are conducted.

**Rewards & Recognition** -- Staff are rewarded for their participation in innovation activities. For the IQS, there are 3 levels of reward. Level 1 for staff suggestions, Level 2 for ideas that can be realised as projects and Level 3 for break-through ideas and projects that can be patented.

**Cross functional Activities** -- Schools and Departments work seamlessly together on joint initiatives or multi-disciplinary projects/programmes. Through such borderless teamwork, we maximise organisational capability.

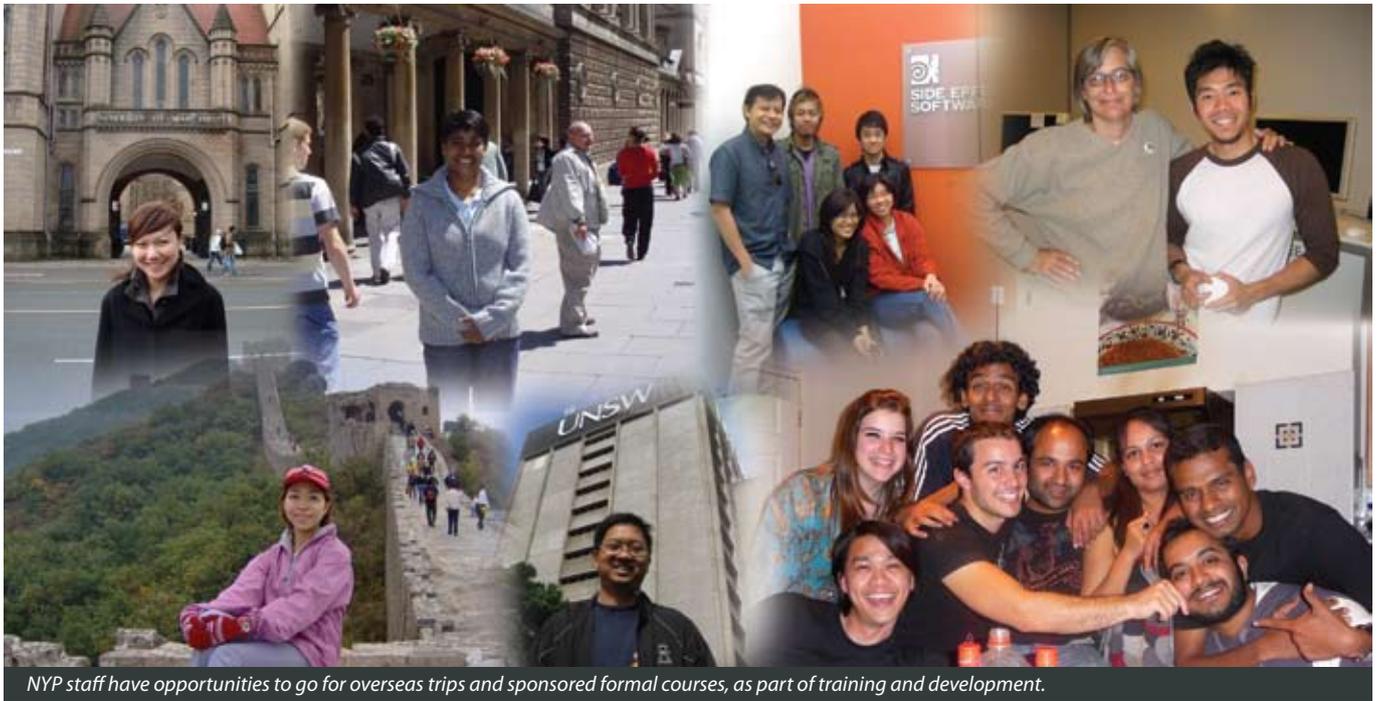
**Cross-cultural Learning** -- NYP continually builds up human capital by upgrading staff to maximise their capabilities. Developmental opportunities include overseas study trips, attachments / secondment to other organisations and sponsorships for formal courses.



NYP has a strong tradition of capability development, key to our investment in human capital. We develop staff capabilities in innovation through a structured Learning Needs Identification exercise where staff, in consultation with their reporting officers, charts out their learning roadmap.



*Staff participating enthusiastically in EXCEL Day, which is an annual day to celebrate NYP's journey in innovation and quality excellence.*



NYP staff have opportunities to go for overseas trips and sponsored formal courses, as part of training and development.



Dr Hannah Gardner (top) and Dr Zuruzi Abu Samah are the only polytechnic staff to be awarded the National Research Foundation Proof-of-Concept Grant Scheme.

**Careers Unlimited**

Careers Unlimited is our career development framework that offers multiple pathways for staff development. These avenues include staff re-profiling, job rotations, sponsorships, upgrading programmes, transfers/secondment and international programmes, industry projects development.



Careers Unlimited

CHAPTER 5

# INNOVATION PROCESSES



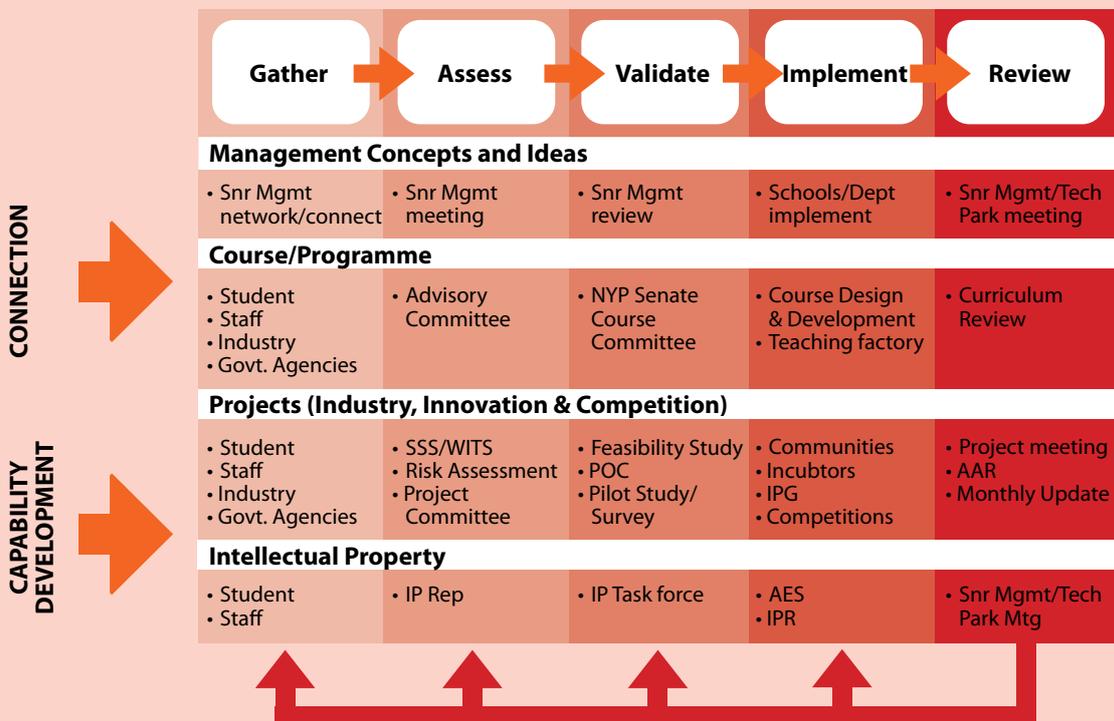
Industry Project Group developing systems for companies.

## Innovation Management

In NYP, we see innovation as an application of imagination, information, ideas, knowledge, experience, or technologies to create & deliver greater or new value.

We have 5 innovation clusters – management concepts/ideas, course/programme development, industry projects, innovation/competition projects and IP development. Our systems, policies and processes are designed to encourage ideas to flourish, to empower our people to explore and build upon their ideas while at the same time resource, guide and manage the steps to bring ideas to fruition. We also customised our innovation management process to suit the unique needs of each cluster.

Through our successful partnerships with world class organisations, key industry players, government agencies, NYP is able to develop new products and services in different fields and build up strong capabilities.



Innovation Management Process

<b>Innovation Clusters</b>	<b>Key Objectives</b>	<b>Review Platforms</b>
Management Concepts/ Ideas	To advance innovative ideas from initiation to implementation using appropriate platforms at senior management level and school/departmental level.	Overall process for idea generation, gathering, screening and validation is reviewed and improved by Senior Management through SM Meeting
Course and programme development	To support needs analysis, design, validation and development of new courses. To provide a balanced development and well-rounded education for students.	Course design & delivery processes are reviewed at the School Management Review Meeting, Curriculum Review Committee, ISO 9001 internal and third party assessments
Industry projects	To identify viable industry projects together with our partners. The risk assessment of projects includes capability, resources and schedule. Senior staff with relevant expertise provides guidance and contributes ideas to add value to projects.	Project design processes are reviewed at the Project Committee Meeting and School/ Department Management Meeting
Innovation and competition projects	To assess and validate proposed innovation projects by school and/or senior management. Committees and task forces are then established to spearhead and manage innovation projects in different areas.	Process reviewed by School Management Committee
IP development	To protect NYP's innovations and intellectual assets; promotion of IP awareness and staff development.	Process reviewed at IP Committee and Tech Park Development Committee

### Innovation Clusters



*The making of champions: competitions such as the WorldSkills Competition enable our students to be further nurtured. Above: Viridis Liew and Tan Thiam Shui (second from left). Both Viridis and Thiam Shui were Albert Vidal winners for being the top scorer of WorldSkills Competition in 2005 and 2009 respectively.*

## Process Management and Improvement

The key business processes in the areas of teaching concepts are put in place and integrated to support the quality and on-time delivery of our products and services across the polytechnic. All these processes are continuously improved for higher performance through quality assessments and reviews initiated by process owners.

## Innovative Outcomes

Some examples of innovative outcomes are highlighted below:

<i>Key Business Areas</i>	<i>Breakthrough Improvements (Examples)</i>
Teaching Concepts/ Pedagogy	Teaching Factory, Integrated Teaching and Learning (SEG), Teaching Enterprise (SBM), CITI (SIT), 360 Project Teams (SDN), Teaching Clinics (SHS), BioInnovation Centre (SCL(LS)), Pilot Plant (SCL(C)), Games Village (SIDM), Simulation Centre (SHS)
e-Learning	Human Centric, Systems & Technology, Learner-Centric, i.e-Learning, 100% notebook classroom delivery, Web-based Collaborative Forum, Course Management System, HeuCampus
CET Courses	Advanced Diploma in Nursing (Perianaesthesia) (08) Specialist Diploma in Fund Management & Administration (07-08) Specialist Diploma in Clinical Trials Management (07)
WSQ	PE Diploma in Mould Tool Making (09) Certificate in Mechatronics & IT (09) Certificate in Integrated Jigs & Fixtures Design (09)

First IHL to offer these programmes

Breakthrough Improvements at NYP

<i>Courses / Programmes Selected</i>	<i>Impact</i>
Ten new Diploma programmes and three enhanced Diploma programmes in Academic Year 2009	Since April 2009, NYP has offered ten new diploma courses and three enhanced diplomas. These diplomas were developed within a short timeframe to address Singapore's manpower needs in growth areas such as Green Technology, Biologics, Nanotechnology and Financial Informatics.
Diploma in Nursing (Accelerated)	The 2-year accelerated Diploma in Nursing programme addresses the increasing demand for professional nurses. This is the first accelerated Diploma in Nursing programme.
Diploma in Media Studies and Management	The course, developed within a short timeframe, has been launched by the School of Business Management to address the needs of the media industry.
National Precision Engineering Scholarship	In 2007, a MOU with EDB was signed to support the National Precision Engineering Manpower Development Initiative. The MOU gave rise to a Diploma in Digital & Precision Engineering within a short timeframe of one year. EDB will award up to 600 National Precision Engineering Scholarships to polytechnic students pursuing the three-year Diploma.
Advanced and Specialist Diplomas	Advanced and Specialist Diplomas that upgrade professionals with niche skill sets. These diplomas were developed within a short timeframe.

Outcomes of the Course and Programme Development

<b>Innovation Outcomes (Selected Projects)</b>	<b>Accolades and Impact (includes Patent obtained or applied)</b>
Specialist Diploma in Fund Management & Administration	FICS accreditation as certified and awarded by The Institute of Banking & Finance (IBF). First polytechnic to be given the Accredited Financial Training Provider status by MAS/IBF.
Advanced Wireless Enabled Patient-controlled Analgesia (PCA) System	Meet the challenge of providing high quality and cost effective healthcare to their patients. Through intelligent software control of the infusion pump, patients receive the correct dosage of analgesics. Patient relief is available to the patient round the clock and also reduces the overall medication needed to control patient pain.
Software Development for Airport Aerobridge System	An automatic guidance system to locate the passenger door on the aircraft. First in the world to have an automatic docking aerobridge.
SMS Divert Software	Commercially launched by phone manufacturer for its phones from January 2006. A patent was filed on this software in 2004 both in Singapore and US.
Autism Therapy System	Developed a digital signal processing (DSP) based auditory system . The system is used in rehabilitation to address the learning disorders in children with autism.
Automated Positioning System for Microwave Transmitter	Developed an automated positioning system (APS) to enhance mobile communication in telematics applications such as in-vehicle navigation, track and trace intelligent transport systems and electronic road gantry systems.

Examples of Industry Projects

**Partners**

Over the years, many world class organisations and key industry players have setup innovation and specialist centres, business centres and incubators with NYP.

The involvement of partners in NYP’s innovation activities may be described by the 3-stage-partnering framework. Strategic partnership was predominant in the early stage, for example in the years of NYP establishment, which aimed to develop capabilities. As the partnership matures,

it evolved into collaborative partnership, which focuses on development of innovation activities together.

Partnerships, both strategic and collaborative, have led to significant training opportunities and exposure to industry best practices for staff and students .NYP has also established six industry communities in the areas of Security Technology, IC Design, Wireless Technology, Embedded Technology, Games Creation and Biomedical Technology.



Partnering Framework

## CHAPTER 6

# RESULTS



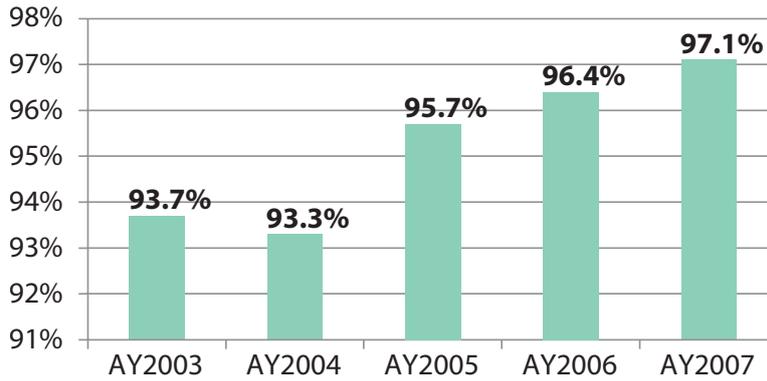
*NYP graduates are valued by the industry.*

Our leadership, the comprehensive, systemic approach of our Innovation Everywhere Framework have helped us put in place the right culture, conditions, competencies and connectivity needed for developing and sustaining innovation excellence in teaching and learning, organisation, people and the environment.

Outcomes of innovation at NYP differ from outcomes of innovation in businesses. For our innovations in pedagogy, we measure success by how well received our graduates are in industry – the time taken to secure employment and starting salaries commanded. We also measure pedagogic success in terms of the recognition NYP has received from local and international organisations and the number and type of high value-added projects with and for industry and companies as well as applied R&D, some of which has led to patents filed. We are also known for our strategic alliances with industry leaders as well as numerous industry partnerships and collaborations. Other measures of innovativeness include successes at international and national competitions.

### Satisfaction with Polytechnic Education

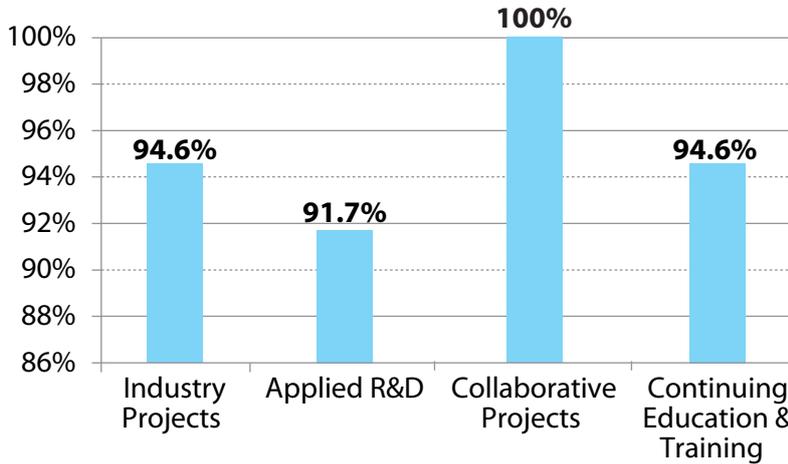
NYP has been successful in exceeding students' expectations on their NYP experience.



NYP's Students Satisfaction with NYP Experience

### Satisfaction with Industry Projects and Services – Industry

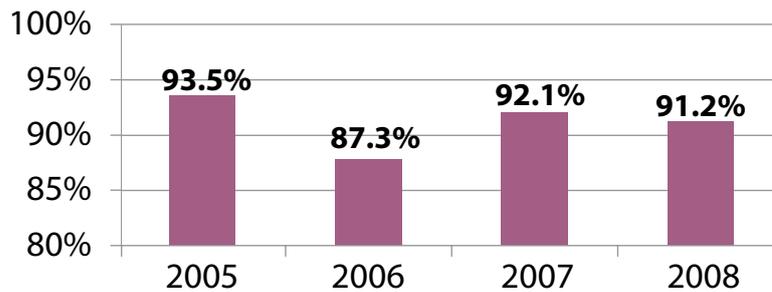
More than 92% of NYP's industry partners found NYP to be innovative in the services it provides.



Industry Partners' Response to NYP Innovativeness in Various Industry Sectors

### Employer Satisfaction

NYP produces more than 4,000 graduates yearly in a wide range of courses. Graduates from NYP have been consistently well received by the industry. Over the last 5 years, more than 90% of employers surveyed rated NYP graduates as good or better.

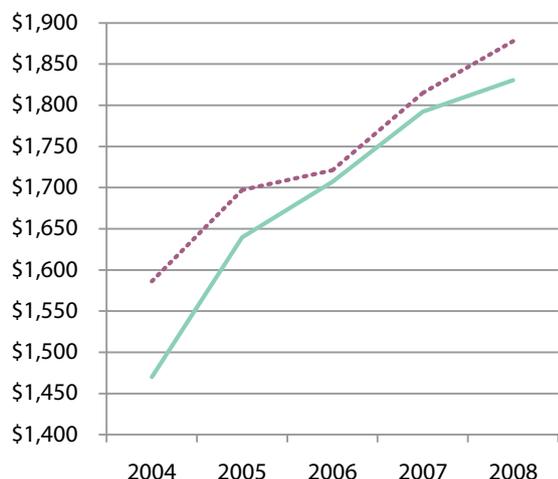


Satisfaction Expressed by Employers of NYP Graduates

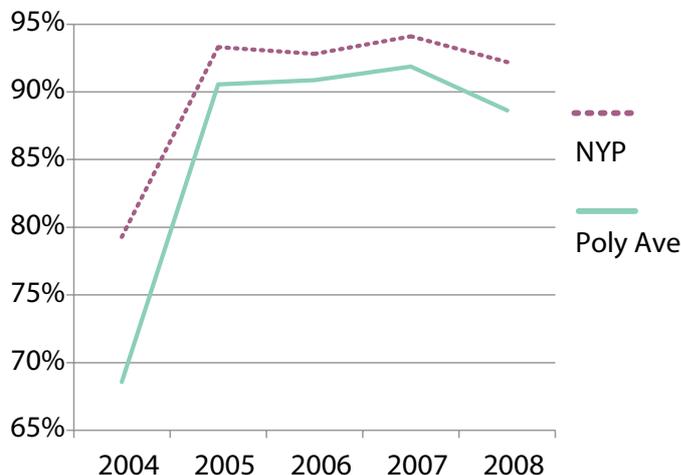
### Graduates' Starting Salary and Employability

A major indicator that affirms NYP produces graduates who are valued by the industry is the mean starting salary commanded by our graduates and the percentage of our graduates who are employed within 6 months of their graduation.

The mean starting salary has been increasing over the last five years. NYP graduates have often received the salary above the polytechnics' norm.



NYP Starting Salaries Compared with Other Polytechnics' Average



NYP Employment Rate Compared with Other Polytechnics' Average

### Awards Garnered by Students

NYP students continue to achieve success in both local and international competitions. Our students are able to outperform their peers consistently to clinch significant awards, strongly affirming the quality of our training and a learning environment which encourages innovation and creativity.

#### Tan Kah Kee Young Inventors' Award

NYP has also performed consistently well in this competition, which awards youth for innovative solutions. The number of awards that we have won is significantly higher than the combined average.

Open Category	Total Awards	NYP	Competitors* combined average
Silver	41	12	6
Merit	77	25	11
Commendation	107	28	15
Encouragement	12	3	2
<b>Total</b>	<b>237</b>	<b>68</b>	<b>34</b>

\* Competitors include polytechnics, universities, research institutions and others

Tan Kah Kee Young Inventors' Award (1997 to 2008), NYP compared with combined average

## International Competitions

Some of the recent international and local competitions where our students have excelled in are listed below.

### MicroMouse

- All-Japan International Micromouse 2007 (Expert Class)
  - Champion and 2<sup>nd</sup> Runner-up. The team was also presented the prestigious Mayor award for its overall outstanding performance. This was the first time the Mayor award has been conferred.
- IEEE APEC International Micromouse competition 2007 and 2008
  - 1<sup>st</sup> Runner-up
- All-Japan International Micromouse 2006 (Expert Class)
  - 1<sup>st</sup> and 2<sup>nd</sup> Runner-up & Special Prize
- UK Micromouse 2006 – Champion, 1<sup>st</sup> and 2<sup>nd</sup> Runner-up & Special Prize
- IEEE APEC International Micromouse competition 2006 – Champion and Special Prize

### FIRA RoboWorld Cup MiroSot World Cup Soccer

- 6 times World Champion

Category	Position	2003	2005	2006	2007	2008	2009
Middle League (5-a-side)	Champion		NYP	NYP	NYP	NYP	NYP
	2 <sup>nd</sup>		S Korea <sup>1</sup>	S Korea <sup>1</sup>	S Korea <sup>1</sup>	China <sup>4</sup>	China <sup>4</sup>
	3 <sup>rd</sup>		Austria <sup>3</sup>	China <sup>4</sup>	China <sup>4</sup>	China <sup>5</sup>	Slovakia
Large League (11-a-side)	Champion		NYP	NYP	NYP	NYP	NYP
	2 <sup>nd</sup>		SP	S Korea <sup>1</sup>	China <sup>4</sup>	China <sup>4</sup>	China <sup>4</sup>
	3 <sup>rd</sup>		S Korea <sup>1</sup>	China <sup>4</sup>	S Korea <sup>1</sup>	China <sup>6</sup>	China <sup>5</sup>
Small League (3-a-side)	Champions	NYP					
	2 <sup>nd</sup>	S Korea <sup>1</sup>					
	3 <sup>rd</sup>	China <sup>2</sup>					

MiroSot World Cup Soccer results (2005 to 2009)

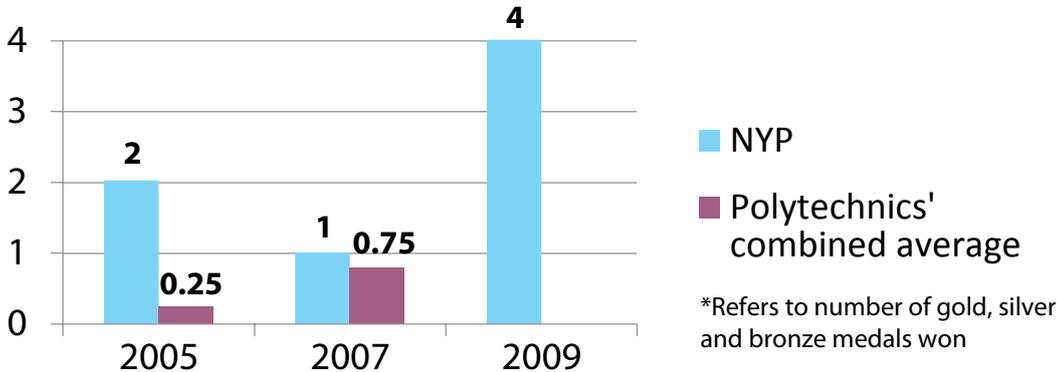
LEGEND					
S Korea <sup>1</sup>	■	Sung Kyun Kwan University	China <sup>5</sup>	■	Shi Da Xi'an Shiyou University
China <sup>2</sup>	■	Harbin Institute of Technology	China <sup>6</sup>	■	Qingdao University of Science and Technology
Austria <sup>3</sup>	■	Vienna Institute of Technology	Slovakia	■	Technical University of Kosice
China <sup>4</sup>	■	HeHai University of Technology	SP	■	Singapore Polytechnic

### HUROSOT World Cup Soccer

- 1<sup>st</sup> time participation & 1<sup>st</sup> Runner-up in 12<sup>th</sup> FIRA RoboWorld Cup USA 2007

**WorldSkills Competition**

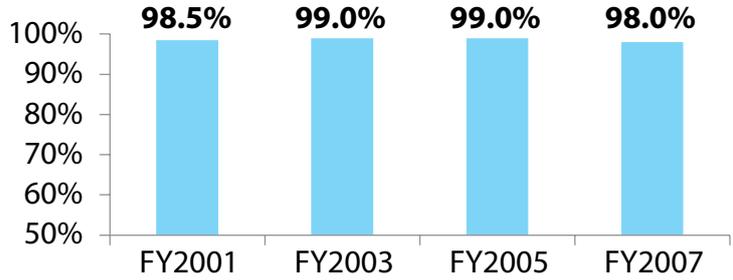
From 2005 to 2009, NYP has garnered the highest total of awards compared to the other institutions of higher learning. NYP’s competitors has also won the “Best of Best” Albert Vidal Award twice, in 2005 and 2009.



WorldSkills Competition: NYP Compared with Polytechnics' Combined Average\*

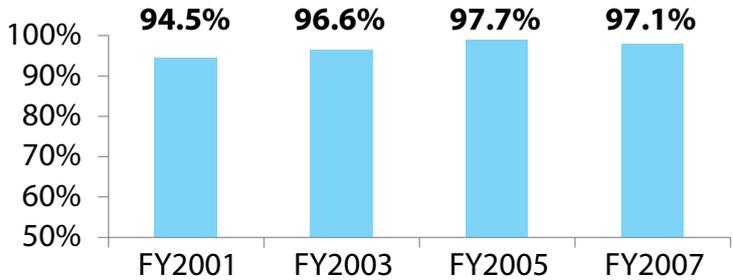
**Current Levels and Trends in Employee Satisfaction Indicators related to Innovation**

For four consecutive Staff Opinion Surveys, 98% of staff affirmed NYP as the employer of choice.



Staff Opinion Survey – Employer of Choice

More than 94% of Staff have also rated NYP’s environment and culture as conducive for innovation and creativity.



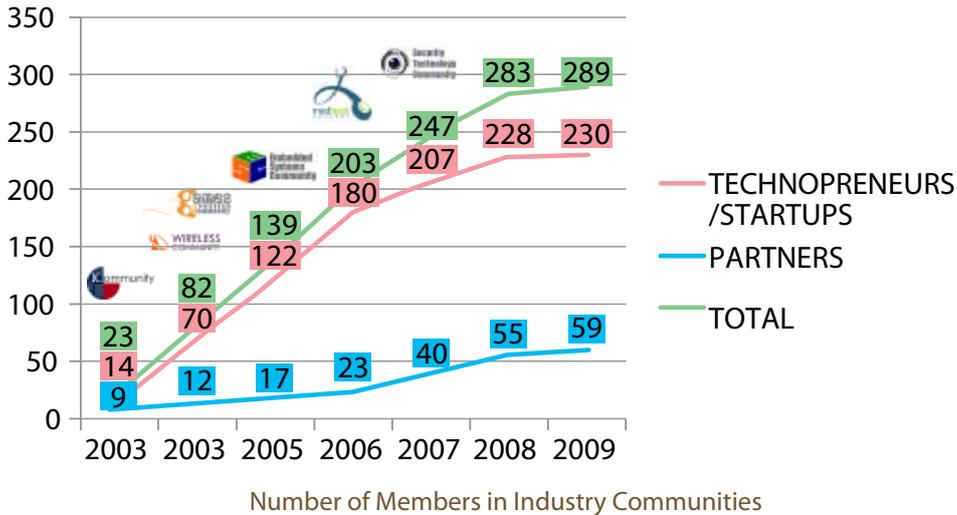
Percentage of Staff Who Rated Innovation and Creativity Good or Better

## Favourable comparison with competitors and benchmarks on operational results linked to innovation-focused strategies

### Industry Communities

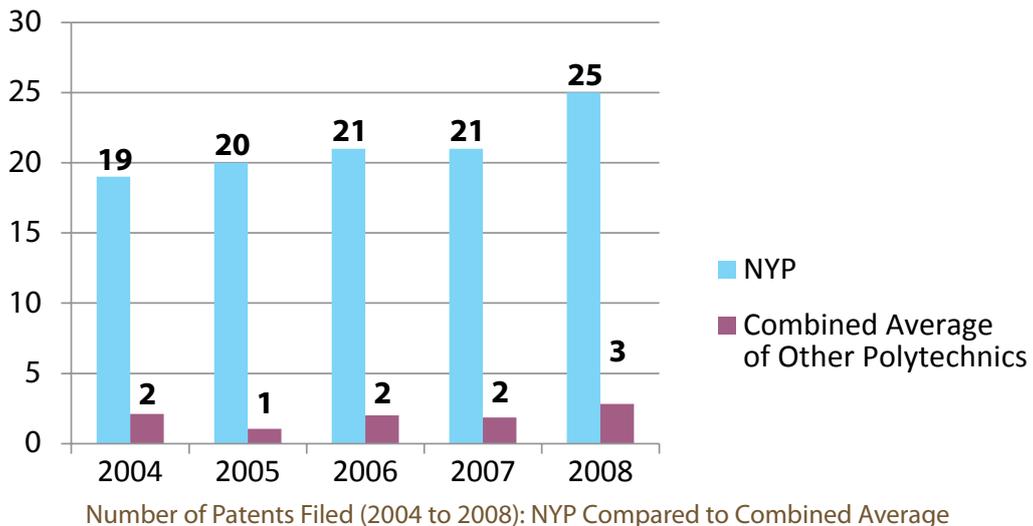
NYP supports business and industry through various programmes and initiatives. These include partnerships on joint R&D work, collaborations on industry projects and provision of professional and technical services.

In collaboration with government agencies and key industry partners, the Polytechnic is host to six industry “communities” comprising leading industry partners, technopreneurs and start-ups. Through these communities, NYP helps to catalyse the design, development and commercialisation of innovative products.



### Patents

A culture of innovation and creativity has culminated in more than 137 patents filed, and 65 patents granted (Singapore). NYP has filed 3 times more patents than the combined average of all other polytechnics.



# NANYANG POLYTECHNIC

is honoured to be conferred the

## Innovation Excellence AWARD 2009



**NYP**  
the **innovative**  
polytechnic

We dedicate this Award to our valued staff and students, and to our esteemed partners, whose support and contribution have made this possible.

This Award will be an inspiration for Nanyang Polytechnic as we pursue our vision to be a premier polytechnic of global distinction.





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