



INSTITUTE OF SYSTEMS SCIENCE

National University of Singapore
Annual Report 2012



Vision

Provide Thought Leadership in Innovation

Mission

Developing Infocomm Leaders,
Driving Innovation

Strategies

Differentiate through inter-disciplinary practice-based education

Excel through synergised applied research and industry projects

Manage cost-efficient and overseas growth

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CHAIRMAN'S STATEMENT



In 2011, the revenue for Singapore's Infocomm industry rose by 18.5% to S\$83.42 billion, and Infocomm manpower increased by 1.1% to 142,900. 83% of Singapore enterprises used computers for their business operations, and 81% and 78% used Internet and broadband respectively. In fact, 100% of enterprises with more than 200 employees used computers, Internet and broadband.¹

All these figures point to one undeniable fact: Infocomm technology is fast transforming the economy and society into a hyper-connected world, so much so that anyone who ignores this growing force will be left behind. Technology advancement can disrupt industry incumbents that do not keep up. On the other hand, it can create new industries that blossom out of paradigm shifts and spur businesses into realms of unprecedented growth.

ISS has always tried to be at the forefront of each of these waves of change. For example, its Service Innovation team has played a strong role since its introduction. Its advisory services are popular among corporate clients as they embark on an interactive ecosystem to co-create value with customers, partners and stakeholders. About 250 trainees have attended its Service Innovation courses. ISS' Business Analytics team has also gained momentum. It has developed five new courses to equip companies with the capability to extract useful information from vast amount of data to acquire customers, make evidence-based decisions and predict future trends.

ISS strongly believes in co-innovation with public and private sector partners, leveraging on international expertise to complement its indigenous staff strength. ISS and IBM have jointly established a Centre of Excellence in Enterprise Social Business to catalyse the transformation of companies through social media platforms. In a joint research study with the Land Transport Authority, insights into the factors affecting the decision choices of commuters will help enrich their overall public transport experience.

¹ Source: Annual Survey on Infocomm Industry, Annual Survey on Infocomm Manpower, and Business Infocomm Usage Survey for 2011, published by Infocomm Development Authority of Singapore.

CHAIRMAN'S STATEMENT

ISS has demonstrated commitment to harness possibilities created as a result of technology innovation. In 2012, ISS Management Board member Ms Wu Choy Peng, and ISS Director/CEO Mr Lim Swee Cheang, were awarded the Singapore Computer Society's 2012 IT Leader of the Year and Hall of Fame respectively.

Lastly, I congratulate the ISS management and staff for their achievement, and express gratitude to the partners and clients for their support.

Dr Christopher Chia
Chairman, ISS Management Board

FROM THE CEO



The past year saw ISS relentless in its pursuit to reinforce its service offerings, engaging its customers, while managing cost-efficient growth. The culture of practice-based education was further strengthened to improve the trainees' ability in applying new skills at work. More courses were tailored and advisory services fine-tuned to organisations' requirements, while the applied research practice was formalised to drive programme excellence.

ISS aligns its direction with national manpower masterplan, such as the Infocomm Technology Roadmap (ITR) 2012 published by the Infocomm Development Authority (IDA). ISS already offers about 10 professional development courses supporting some of the ITR themes, and more will be launched in 2013 in the areas of Big Data, Cloud Computing, Social Media, Cyber Security, and New Digital Economy. Through the Workforce Skills Qualifications (WSQ) courses, ISS has trained 2,860 professionals and executives and issued 8,677 Statements of Attainment in 2012, exceeding the targets set by the Workforce Development Agency. The e-Government Leadership Centre has trained over 311 overseas public sector delegates and provided customised programs at various countries.

Seminars and conferences in critical technology areas also resonated well with the participants. The conference "Cyberia: Enhancing Cyber Security & Combating Cyber Terrorism" jointly organised with the Association of Information Security Professionals, and supported by IDA and the National Defense University's Information Resources Management College (NDU iCollege), attracted over 170 international delegates. The topics ranged from malwares to Advanced Persistent Threats (APTs), the evolution of both sophistication and capability of hackers, risk mitigation, authentication methods, and malicious activity detection.

I am pleased to report that the International Visiting Committee (appointed by NUS Provost Office) has given excellent ratings in its review of the Master of Technology (MTech) programme. In 2012, ISS included a new research stream on SCRUM agile methodology in the Software Engineering core units, to emphasise on incremental and iterative development. Similarly, Knowledge Engineering application areas were extended to case studies on hybrid

FROM THE CEO

techniques, and the data mining module was enhanced with greater focus on business intelligence and analytics.

Only as a learning organisation can ISS continue to bring greater value to its customers. As such, the ISS staff continued to upgrade themselves. Ms Esther Tan, Chief for Systems Analysis Programme, received her doctorate in 2012 from the Nanyang Technological University, following the footsteps of Ms Virginia Cha, Research Chief who had obtained her doctorate the year before.

ISS is greatly encouraged by the achievement in 2012, and humbled by the endorsement from its customers and partners. On behalf of ISS management and staff, I thank the stakeholders for your unstinting support and look forward to your continuous guidance.

Mr Lim Swee Cheang
Director/CEO

ISS MANAGEMENT BOARD

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(Chairman)
Senior Advisor
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Congress;
Executive Chairman
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PROF TAN ENG CHYE



(Ex-Officio Member)
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MS LYNN NG



Director (CET Office)
Higher Education Division
Ministry of Education

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Officer
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Chief Executive
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Group Director
Innovation &
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A/PROF TEO HOCK HAI



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National University of
Singapore

MR VINCENT WONG



Chief Executive Officer
IDA International Pte Ltd

MS WU CHOY PENG



Group Chief Information
Officer
Singapore
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ISS MANAGEMENT BOARD

ISS thanks the following members for their valuable contributions.

MR SEAH CHIN SIONG



Deputy CEO
Singapore Pools (Pte) Ltd
(until 31 December 2012)

**MR STAVROS N
YIANNOUKA**



Former Executive Vice Dean
Lee Kuan Yew School of
Public Policy
National University of
Singapore
(until 14 April 2012)

MS TERESA LIM



Former Managing Director
IBM Singapore Pte Ltd
(until 14 April 2012)

MR WILSON TAN



Chief Executive Officer
CapitaMall Trust
Management Limited
(until 14 April 2012)

2012 SNAPSHOTS

- 8,677** Statements of Attainment (SOA) issued
- 4,362** Infocomm professionals trained
- 2,860** National Infocomm Competency Framework (NICF) headcounts trained
- 446** Master of Technology (MTech) applications received, 166 enrolled, 103 graduated
- 311** delegates trained in the e-Government Leadership Centre (eGL), 120 countries in the alumni
- 180** Graduate Diploma in Systems Analysis (GDipSA) applications received, 62 enrolled, 107 graduated
- 47** Workforce Skills Qualifications (WSQ) courses offered
- 24** presentations at international events
- 9** seminars organised
- 8** research papers published/accepted

2012 SNAPSHOTS

SINGAPORE COMPUTER SOCIETY'S IT LEADER AWARDS



Mr Lim Swee Cheang, ISS Director/CEO (third from left); Guest-of-Honour Dr Yaacob Ibrahim, current Minister for Communications and Information (fourth from left); Ms Wu Choy Peng, former NOL Group CIO (fourth from right); Mr Alphonsus Pang, former SCS President (third from right); and other award recipients.

Board member Ms Wu Choy Peng and Director/CEO Mr Lim Swee Cheang were honoured at the Singapore Computer Society's IT Leader Awards 2012. Ms Wu was conferred the IT Leader of the Year. Mr Lim was inducted into the IT Hall of Fame.

INTERNATIONAL COLLABORATION WITH FOREIGN GOVERNMENTS



Government officials from Panama Tourism Authority, Institute for Career Formation, Public Registry, City Hall, and National Authority for Government Innovation, in Singapore for a 4-day study visit.

Under the Memorandum of Understanding (MOU) signed in April 2011 with the Directorate of Public Service Management from Botswana, Africa, the e-Government Leadership Centre (eGL) agreed to assist Botswana Public Service to establish e-Government capacity building programmes, including joint organisation of training and exchange programmes to facilitate know-how transfer and idea generation among public service members in Singapore and Botswana. In 2012, the eGL conducted six classes in Botswana, an increase from just one class the year before.

As a follow-up from another MOU signed in August 2011 with the National Authority for Government Innovation, Republic of Panama, the eGL and the Singapore Ministry of Foreign Affairs jointly organised an e-Government study visit in May 2012, to help Panama harness technology to innovate their public service and administration.

2012 SNAPSHOTS

ISS-IBM ENTERPRISE SOCIAL BUSINESS CENTRE OF EXCELLENCE



(First row, left) Ms Janet Ang, IBM Singapore Managing Director, and (first row, right) Mr Lim Swee Cheang, ISS Director/CEO, signing a Memorandum of Understanding. (Second row, from left) Ms Sandy Carter, IBM Vice President, Social Business Evangelism and Sales; Mr Ronnie Tay, IDA CEO; Mr Wong Hong Kuan, WDA CE; and Dr Christopher Chia, ISS Chairman

On 19 April 2012, ISS, together with IBM, set up Singapore's first-ever Enterprise Social Business Centre of Excellence. Supported by Singapore Workforce Development Agency (WDA) and Infocomm Development Authority (IDA), the Centre serves to catalyse the transformation of Singapore's workforce and ensure that Singapore would be future-ready to leverage on social media platforms. The Centre aims to improve productivity, promote innovation and create communities for competitive advantage.

To widen and deepen the capabilities of the Infocomm professionals, its training curriculum is aligned with the National Infocomm Competency Framework (NICF). Holistic continuing education and training pathways are developed through modular and qualifications programmes. Through this partnership, ISS has launched the new NICF-Enterprise Social Business Bootcamp-Leveraging

Social for Business Outcomes. The course will impart knowledge about IBM's Social Business AGENDA framework, as a foundation to help businesses transform into a Social Business.

"It is our goal that this collaboration will serve as a platform for C-Suite leaders, government leaders and community leaders to explore and to create a bold unique Enterprise Social Business Agenda," remarked Ms Janet Ang, Managing Director of IBM Singapore Pte Ltd.

2012 SNAPSHOTS

EVENT HIGHLIGHTS

24 April



The Soft Side of Enterprise Architects

This inaugural seminar for the Architecture Community of Practice (ACoP) Forum was attended by 60 IT professionals aspiring to be multi-disciplinary enterprise architects.

7 June



Software Design in the 21st Century

Mr Martin Fowler, Chief Scientist at ThoughtWorks and co-creator of Manifesto for Agile Software Development, spoke to 374 IT professionals on the distinction between utility and strategic software. The event was organised with ThoughtWorks.

6 July



Cutting Edge Business Analytics

Industry experts emphasised to 60 attendees that intimate knowledge and effective use of clients' data could mean the difference between success and failure for organisations.

19 July



Real-World Enterprise Architecture

Dr Sampath Dhamodaran, Regional Head in Enterprise Architecture at CIMB Bank (Singapore), shared his experience with 37 IT architects.

23-24 August



Guest of Honour Mr Lim Chuan Poh, Chairman of Agency for Science, Technology and Research (A*STAR) and Chairman of National Infocomm Security Committee of Singapore.

Cyberia: Enhancing Cyber Security & Combating Cyber Terrorism

This conference was jointly organised by ISS and the Association of Information Security Professionals (AISP), and supported by the Infocomm Development Authority (IDA) and the National Defense University's Information Resources Management College (NDU iCollege). Over 170 military leaders, public and private sector executives and academics from the United States, United Kingdom, China, Japan, Thailand, Singapore, Malaysia, Philippines and Indonesia attended.

2012 SNAPSHOTS

1 November



Enterprise Architecture: The Cornerstone of Innovation

Industry practitioners expounded on the importance of a solid architectural foundation to support innovation for business.

30 November



Asian Innovators: Developing the Next Generation

Policy makers, human resource executives and organisation development managers discussed about the nurturing of innovation drivers within enterprises.

9 November



Complexity and Sense-Making

Professor Dave Snowden, Founder and Chief Scientific Officer of Cognitive Edge, proposed a framework to derive decisions under different situations.

10 December



Technology Radar: What's Hot and What's Not

Another talk co-organised with ThoughtWorks, the presenters spoke on new leadership thinking, management renewals, as well as key principles for survivability, sustainability and growth.

2012 SNAP SHOTS

PARTNERS

Partnerships forged with local and global companies, associations and government agencies enable ISS to tap on international expertise and deliver quality programmes and services to its customers.

“Our collaboration with NUS-ISS has been a great success. The dedication and focus on results by the NUS-ISS team is a testament to the professionalism and calibre of the organisation, and we look forward to a deep and long-lasting relationship with NUS-ISS in the years to come.”

– Mr Pete Deemer, CEO, GoodAgile Pte Ltd



GoodAgile delivered Certified ScrumMaster course in Singapore through ISS



IBM and ISS jointly set up the Enterprise Social Business Centre of Excellence and signed a Memorandum of Understanding on Service Science, Management & Engineering curriculum development and research



International Information Systems Security Certification Consortium appointed ISS to deliver Certified Information Systems Security Professional (CISSP®) and Certified Secure Software Lifecycle Professional (CSSLP®) Review Seminars and examinations



Jointly organised seminars and promoted AGILE methods and practices in Singapore



Association of Information Security Professionals appointed ISS to develop and conduct the AISP Qualified Information Security Professional course and examination



IT Management Association and ISS co-organised the annual IT Best Practices Seminar



Singapore Computer Society appointed ISS to conduct Certification in IT Project Management (CITPM) Preparatory Course, Certification in Outsourcing Management for IT (COMIT) Preparatory Course and Certification in IT Business Continuity Management (CITBCM) Preparatory Course and administer the qualifying examinations



Infocomm Development Authority, NUS Lee Kuan Yew School of Public Policy and ISS jointly set up the e-Government Leadership Centre (eGL) located in ISS



National Defense University's Information Resources Management College partnered with ISS to jointly deliver IT Management Executive Development Program for MINDEF



Singapore Workforce Development Agency appointed ISS as the Continuing Education and Training Centre to develop and deliver courses aligned to the National Infocomm Competency Framework (NICF)



Lucid IT delivered COBIT®, ITIL®, PRINCE2® and P3O® certification courses in Singapore through ISS

“UXC Lucid IT is the largest Australian-owned ICT professional services and training company with its Asian headquarters located in Singapore. We are proud to partner the Institute of Systems Science in Singapore for the delivery of a range of public courses in IT project management, service management and other important disciplines. We are also a guest lecturer on the ISS Master of Technology Elective – IT Service Management programme. Our long standing partnership with ISS is built on integrity and mutual respect and ensures students receive the highest levels of professionalism and the best possible learning outcomes.”

– Mr Stephen Berry, Regional Manager, South-East Asia, Lucid IT Pte Ltd

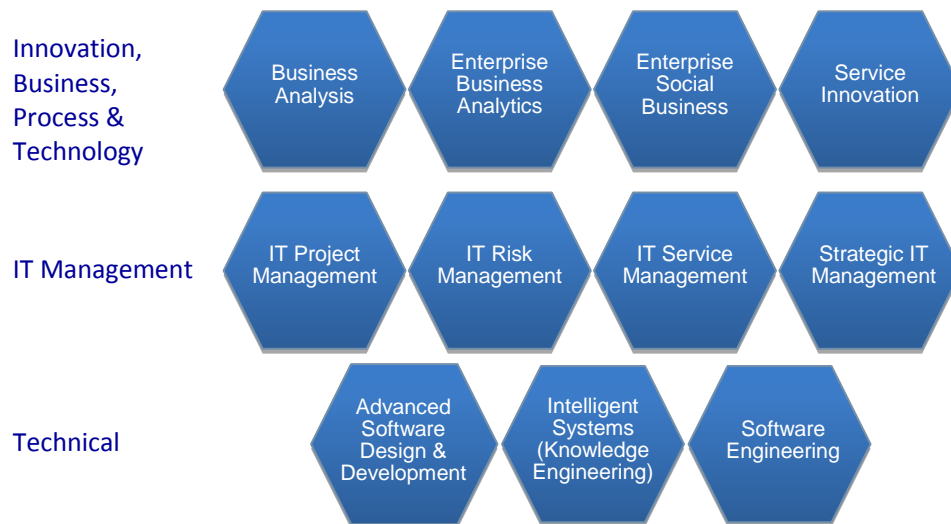
2012 SNAP SHOTS

PRACTICE-BASED EDUCATION

ISS incorporates Practice-Based Education into the graduate and professional development programmes to:

- ❖ Improve training effectiveness based on the degree of practice by individual students and corporate customers.
- ❖ Engage and understand the needs of its customers and market through survey and advisory services.
- ❖ Raise the degree of practice by its customers through consulting and applied research.
- ❖ Improve its curriculum, course content and methodologies.

Several changes were made to the various practices to ensure the objectives are met, thereby leading to greater engagement with customers and more customised training and services.



2012 SNAP SHOTS

APPLIED RESEARCH

Visiting Fellows Providing Research Guidance



Professor Irene Ng joined ISS as an Adjunct Professor for the Service Innovation Cluster in 2011. She is the Professor of Marketing and Service Systems and Director of the International Institute of Product and Service Innovation at the Warwick Manufacturing Group of the University of Warwick, United Kingdom. Prof Ng is one of the six UK government-appointed Service Fellows at the Advanced Institute of Management, Cambridge, while serving as a Fellow at Wolfson College, University of Cambridge.



Professor Sharon Dawes has been a Courtesy Visiting Fellow for the e-Government Leadership Centre (eGL) since 2010. She is the Founding Director and Senior Fellow at the Center for Technology in Government, and Professor Emerita of Public Administration and Policy and Informatics, at the University at Albany, State University of New York. As a Senior Fellow, Prof Dawes develops international research and innovation partnerships with academic institutions and government agencies in Asia, Europe and other countries.

ISS Plugged into Global Research Community



(Standing) Professor Peter Foldesi and (sitting centre) Professor Laszlo T. Koczy

ISS actively participates in the exchange of ideas and insights. On 8 June 2012, two Hungarian researchers visited ISS to share their research on “Optimizing nonlinear

and NP-hard logistic problems considering uncertainty and time dependency”.

Professor Peter Foldesi heads the Department of Logistics and Forwarding at the Szechenyi Istvan University in Hungary and is the General Secretary of the Multi-disciplinary Doctoral School of the Faculty of Engineering Sciences. **Professor Laszlo T. Koczy** is from the Szechenyi Istvan University and previously from the Budapest University of Technology and Economics (BME) Hungary. He is visiting professor at universities in Australia, Japan, Korea, Austria, Italy, Brazil, China, Finland and Poland.

2012 SNAP SHOTS

Research Projects

In recognition of ISS' pioneering work in the area of e-Government and Enterprise Architecture, ISS was appointed by Microsoft Global Government Industry to be the Principal Investigator to develop a "Connected Government Framework Using Enterprise Architecture". This would help governments worldwide formulate strategies to tackle their pressing challenges.

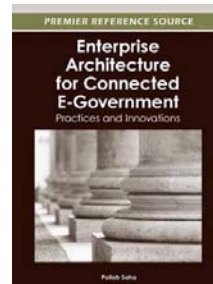
Two research projects with the Land Transport Authority (LTA) aim to improve public transport experience. The first is titled "An Integrated System's Perspective to Commuters' Travel Choices in Singapore". It looks at the factors affecting commuters' behaviour and would contribute to the field of transport innovation by expanding upon research on mode-changing decision making, the role of habituation in transport choices, and sunk cost psychology.

The other LTA research project is data-intensive. It aims to "Understand Commuting Patterns and Behaviours in Singapore" using public transport data. This second study is targeted to draw insights on how commuters navigate the public transportation in Singapore, and where opportunities for innovation may lie.

Other projects are "Axios – A Study of the Value Dynamics of Co-Creation", "Park Tap – An Investigation in Experiential Computing", and "Design Decision Tracer – A Tool to Trace Design Decisions, Requirements and Design Artefacts".

Publications & Presentations

In 2012, 8 ISS' research papers were published or accepted in international journals, including International Journal of Innovative Computing, Information and Control (IJICIC), Journal of Business and Industrial Marketing, as well as International Conference on Machine Learning and Cybernetics (ICMLC).



Evangelist for Enterprise Architecture Practice Dr Pallab Saha wrote a book "Enterprise Architecture for Connected E-Government – Practices and Innovations". IGI Global Premier Reference Source, ISBN 978-1466618244, June 2012. The book addresses the gap in current literature in terms of linking and understanding the relationship between e-government and government enterprise architecture.

ISS researchers and teaching staff spoke at international conferences and seminars in Bangladesh, Germany, Korea, Malaysia, Philippines, Singapore, Thailand and Vietnam. Their presentations covered a wide range of areas including business analytics, cloud computing, e-government, Infocomm security, IT service management, project management, service innovation, and technopreneurship.

	Total
Papers published or accepted in journals and conferences	8
Papers submitted but not published yet	2
Case studies	6
Research projects	5
Keynote/speech invites and presentations	9
Conference paper presentations	4
Internal research sharing seminars	10

2012 SNAP SHOTS

AUDITS

Several external audits were conducted by academia, government, industry and standards bodies for continued organisational excellence.

February In its review of the Master of Technology (MTech) programme, the Visiting Committee found the programme technically strong, industrially relevant, and internationally competitive compared with similar programmes. The Committee rated ISS excellent for its leadership and staff collegiality; mix of teaching and learning methods; willingness to experiment with new techniques; as well as responsiveness to comments and suggestions from students and external examiners.

Visiting Committee Members:

- Professor Paul Strooper, Professor of Software Engineering, School of Information Technology and Electrical Engineering, University of Queensland;
- Dr Marina Jirotko, Reader in Requirements Capture, Director of the Centre for Requirements Engineering, Associate Director of the Oxford e-Research Centre and Associate Researcher of the Oxford Internet Institute, University of Oxford; and
- Professor David Robertson, Head of School of Informatics, University of Edinburgh.



(From left) Mr Lim Swee Cheang, ISS Director/CEO; MTech Visiting Committee Members Professor Paul Strooper, Dr Marina Jirotko, and Professor David Robertson,; Mr Howard Russon, ISS Evangelist, Graduate Program Advisory; and Mr Leonard Nee, then ISS Deputy Director & Chief, Graduate Programme.

April Passed ISO 9001 Surveillance Audit for the provision of short courses, graduate programmes, consultancies and joint projects.

May Passed Project Management Institute (PMI)'s Quality Review. ISS was granted renewal of its status as a PMI Global Registered Education Provider.

May Passed Critical Infocomm Technology Resource Programme (CITREP) Site Inspection conducted by the Infocomm Development Authority, which covered Management Responsibility, Financial, Learner's Support System and Marketing.

June Passed Continuous Improvement Review and Recognition Exercise conducted by the Workforce Development Agency. ISS was granted renewal of its status as a Workforce Skills Qualifications (WSQ) Approved Training Organisation to continue training and assessment delivery.

STUDENTS



Students attend ISS programmes for varied reasons. Those in pursuit of higher Infocomm academic qualifications enrol in ISS' Master of Technology (MTech) and Graduate Diploma in Systems Analysis (GDipSA).

Some sign up for ISS' National Infocomm Competency Framework (NICF) and industry certification courses to upgrade their competencies.

Others attend the practice-based executive training courses to progress in their careers. Busy professionals and executives also attend ISS' seminars to be updated on project management best practices, latest technology trends and innovative business solutions.

Middle- and senior-level government officials from all corners of the world attend the eGL's courses related to Singapore's success in e-Government implementation.

The ISS students work in a wide range of industries, such as construction, finance, government, healthcare, Infocomm, manufacturing, media, military, oil and gas, pharmaceutical, service, telecommunications and transportation sectors.

They came from countries including Bangladesh, Brunei, China, India, Indonesia, Iran, Japan, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Turkey, United Kingdom, United States of America and Vietnam.

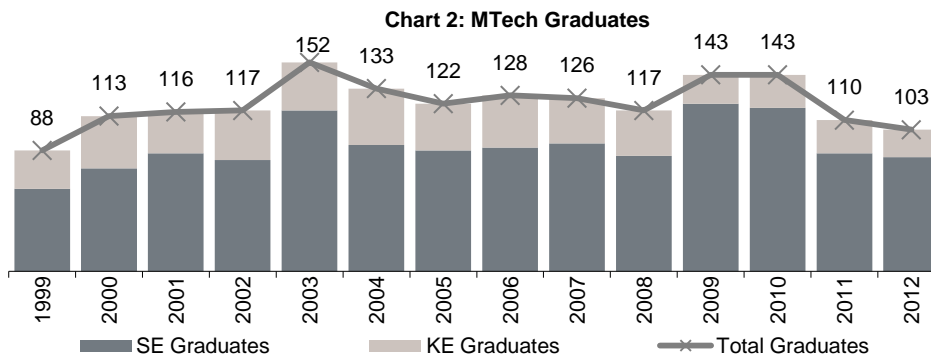
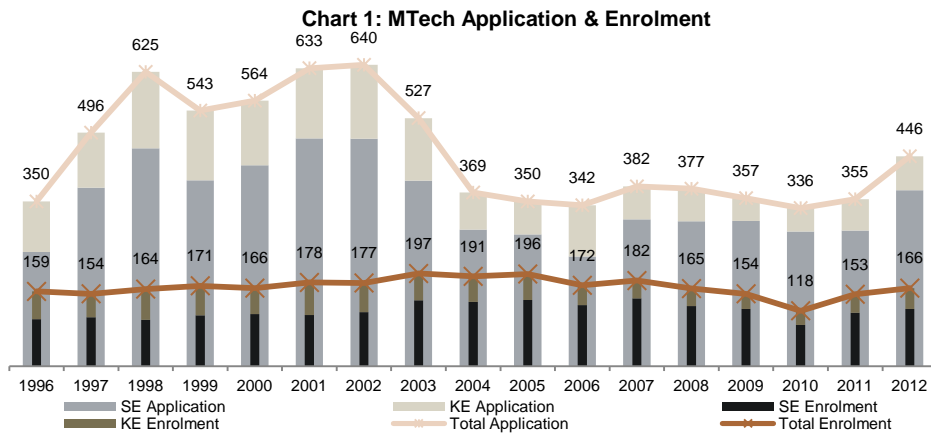
STUDENTS

MASTER OF TECHNOLOGY

ISS and the NUS Department of Electrical & Computer Engineering and School of Computing jointly offer a Master of Technology (MTech) programme that leads to an NUS Master degree with specialisation in Software Engineering (SE) or Knowledge Engineering (KE).

Started in 1996, MTech is offered both as a 1.5-year full-time and a 2.5-year part-time programme, the latter providing Infocomm professionals the opportunity to upgrade their capabilities and skills while pursuing their career. MTech courses are applied-oriented and focus on the professional and practical aspects of IT.

As part of course requirement, each MTech student must pass a team-based project, usually involving systems development to solve a real-life problem for a sponsoring organisation. While the project allows the student to apply his/her newly acquired skills, it also enables the sponsor to experiment with new technologies and innovative approaches.



STUDENTS

Two teams of students bagged the 2012 best project prizes for helping to automate the business processes of their sponsoring organisations.



(From left) Six MTech (SE) students in WWW Cargo Pte Ltd: Tin Lai Wai, Aye Thet Mon, Zhang Shudong, Varun Tak, Pragati, and Ng Siew Leng.

WWW Cargo Pte Ltd used to rely on shared network drives for its cargo management operation. The staff had to navigate through folders and files, and could not concurrently or remotely access the data they needed. Moreover, they had to manually update customers on changes to cargo records.

Six students of MTech (SE) designed the Enterprise Cargo Management System to replace the manual operations and transform the navigation of the system into a one-page view with rich user interface components and widgets. This allowed the staff to access information about their customers and suppliers from anywhere with a standard browser, while its customers were automatically alerted of any status change to his cargo order and thereby relieving the need for manual updating by the customer service staff.

“Our stand for this project has always been that this was not just an academic project but a critical business solution that would help our client to meet business challenges and improve their competitive advantage in a fast-changing environment. Hence, quality cannot be compromised. In the meeting room, we put up colourful visual charts that closely plotted the progress of the project to motivate and keep us on our toes. The charts definitely encouraged more communication on the go. And any difficulty meeting any particular deadlines was highlighted and resolved earlier rather later.”

During the fabrication process, wafers had to undergo screening before they were assembled into electronic devices. Occasionally, a good wafer was wrongly diagnosed as a reject when the test equipment was badly set up. This wafer would be passed when retested after the fault had been rectified.

Engineers in GLOBALFOUNDRIES (Singapore) Pte Ltd relied on their experience to decide whether a wafer failed by the equipment should be retested. Given the huge volume of visual and electrical data that needed to be scrutinised, performing such checks proved to be time-consuming, costly and prone to human error.

Four students of MTech (KE) designed a diagnostic system for GLOBALFOUNDRIES (Singapore) to emulate human decision-making process. They combined a hybrid Neural Network and Rule-based Engine to develop the Wafer Diagnostic Programme. The new system would perform a first level assessment to sieve out the “true” failures from the “false” failures. Coupled with the engineers’ intrinsic knowledge, the system helped them in making the assessment with greater confidence.



(From left) Four MTech (KE) students involved in the project with GLOBALFOUNDRIES (Singapore) Pte Ltd: Chew Poh Kwee, Hui Kong Meng, Tran The Anh, and Tai Jia Jun.

“What we have done is to transform a technically demanding data analysis application into a format close to a logical, rule-based fuzzy form, creating a framework that is intuitive to understand. We incorporated the ability to use generic assessment rules, or specialised customised rule-set, depending on how much the user has acquired in terms of device knowledge and process yield characteristic, to deduce and reason.”

STUDENTS

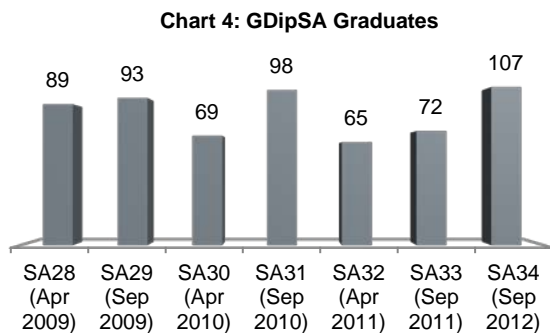
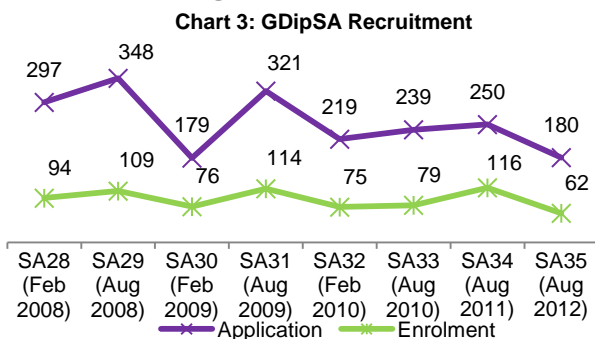
GRADUATE DIPLOMA IN SYSTEMS ANALYSIS

Launched in 1981, the ISS Graduate Diploma in Systems Analysis (GDipSA) is a 13-month full-time programme designed to convert university graduates with non-IT background into Infocomm professionals, charting a new career path in the Infocomm industry.

Students learn the techniques for requirement gathering, analysis, design, programming, and soft skills like communications, teamwork and project management. In addition to academic training, the students are assigned projects to gain hands-on practice.

Industrial Attachment, a crucial component of the programme, requires the students to undergo internship at companies for a real-life environment. This is a necessary transition to prepare the students for an Infocomm career.

ISS offers additional programmes to improve the employment prospects of the GDipSA graduates. The enrichment topics include interpersonal skills, professionalism and business ethics, personal grooming and etiquette, as well as business English and resume writing.



According to the GDipSA Post-Course Survey 2012, 95% of the students found the industrial attachment programme useful in applying the subjects taught in a working context. One such student was Mr Chen Shilong who was instrumental in transforming the property inspection operation at Keppel Land.



Keppel Land's Problem

All properties of Keppel Land must be inspected before they were handed over to their owners. During each on-site inspection, inspectors examined all the units within a property using different inspection templates as checklists. After the on-site inspection, the inspectors passed the defect list to the data entry clerk, who then transferred the defects into the system. Photographs of the defects were manually downloaded. This process was unproductive and subject to human error. To address this issue, in 2005, Keppel Land developed a web-enabled Android tablet to be used by its inspectors. However, the tablet was eventually found to be unusable as internet connection was often unavailable at project sites. The tablet was also expensive and had limited functionalities.

Shilong's Solution

The early model tablet was turned into a workable device that allowed inspectors to record defects, mark floor plans, write comments and take photographs during their inspection rounds, without an internet connection. At the end of the inspection, all data entered by the inspectors were downloaded directly into the Defect Management and Handover

STUDENTS

System, eliminating the need for data entry clerks, and therefore reducing the probability of a human-induced error. Time was saved during and after the inspection.

Outcome

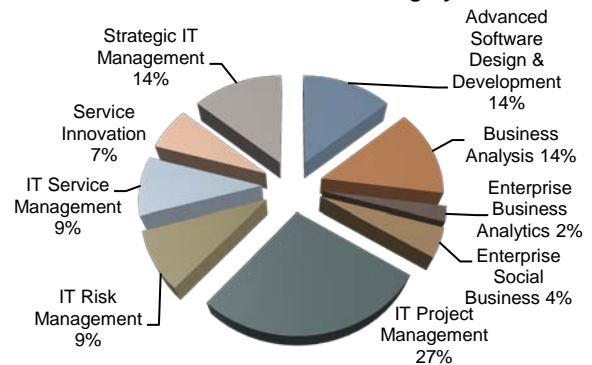
Keppel Land was very pleased with the result and planned to use the device that Shilong developed for its properties in China. Yenny Thio, Assistant Manager of Keppel Land and Shilong's supervisor, commented, "... He didn't just deliver, he gave us much more than we expected. He did all the paperwork and even prepared for us a video that can be used for training. Throughout, his attitude was good. He was diligent, updated us regularly on the project status and progress and kept us continually in the loop."

For his distinguished contribution to Keppel Land, Shilong won the 2012 Accenture Prize for the best internship project. He was extremely delighted, "It reminds me that I should keep putting my heart into the software that I build, and all other things that I do." Shilong has completed the GDipSA course and is now studying full-time in the MTech programme.

NATIONAL INFOCOMM COMPETENCY FRAMEWORK

ISS commits to uplift the competencies of Singapore's Infocomm talent pool through training courses and career services. The National Infocomm Competency Framework (NICF) is used as the foundation to design, develop and deliver Workforce Skills Qualifications (WSQ) courses. These are funded by the Singapore Workforce Development Agency (WDA) and the Infocomm Development Authority (IDA). The trainee is awarded a Statement of Attainment (SOA) to certify his competency after he successfully completes the course and passes the assessment. ISS currently offers 47 WSQ courses in 9 different practices. In 2012, ISS trained 2,860 professionals and issued 8,677 SOAs, exceeding the targets set by its funding agencies.

Chart 5: NICF Course Category



Training Effectiveness

According to ISS Post-Course Survey 2012, employers and employees unanimously agreed that the trainees were able to apply the skills that they newly acquired from the WSQ courses in their workplace. The trainees were given greater or new job responsibilities after training. The quality of their services and products improved, thereby creating positive impact on the companies' business costs. ISS received a high satisfaction rating of 95% from its trainees.

Chart 6: Employee Post-Course Survey

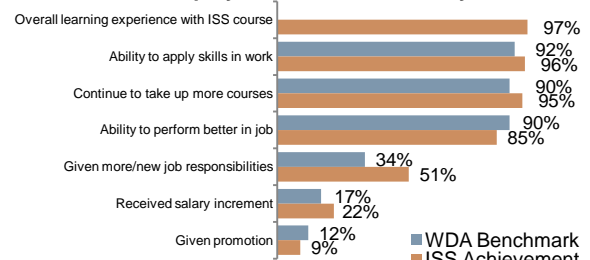
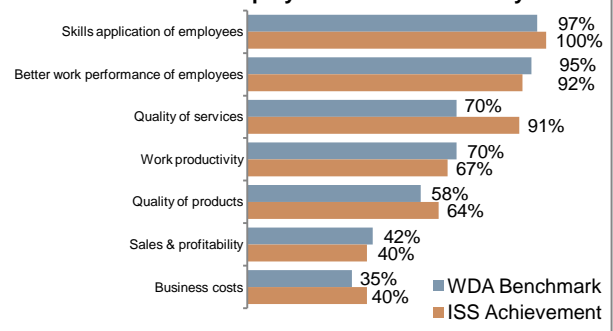


Chart 7: Employer Post-Course Survey



STUDENTS

Career Services

ISS provides personalised one-on-one transitional career coaching sessions to help unemployed trainees hone their interview skills and identify jobs that match their strengths and experience. In 2012, 33 participants attended 10 coaching sessions. Feedback from the participants was positive.

- 👉 *“Great, a must for all in-transition or not.”*
- 👉 *“Yes, it has benefitted me. Should recommend to more people who are looking for jobs and unemployed.”*
- 👉 *“It was a good session. I would recommend it strongly to others.”*
- 👉 *“The coach has helped me crystallise my thoughts and career direction. Her good advice has helped me validate my thoughts and overcome some of my fears. The tips on CV writing are very useful.”*
- 👉 *“Very targeted evaluation on personal strengths and aspirations. Explorative in consultancy on how to achieve aspirations.”*
- 👉 *“Yes. The session is really useful. Coach made me think a lot on my managerial skills and resume writing.”*
- 👉 *“Yes, it was helpful. I was able to take a step back and analyse my goals vis-à-vis my strengths, weaknesses, skills and experience and operationalise the steps I need to take as I seek employment.”*
- 👉 *“Good initiative to help people who are unemployed.”*

PROFESSIONAL EDUCATION

ISS constantly refreshes its course offerings by adapting existing courses to address skill gaps and shortages, and creating new courses in emerging competencies jointly with like-minded customers and partners.

Fifty practice-based courses targeting the senior executive, middle management and professional levels are offered, to keep them abreast of the latest Infocomm innovation and best practices. These courses are funded under various training incentive schemes.

In 2012, 4,362 trainees attended ISS professional development courses. Since its establishment, about 75,000 Infocomm professionals from 150 countries have been trained.

Approved Education Providers for International Certifications



STUDENTS

International and Local Students Gave the Thumbs-Up

- 👍 *"I love the way enterprise architecture has been applied by the Singapore government. I enjoyed the insights into how the Singapore government operates and the level of collaboration between agencies. One of my key takeaways from the talk is how in Singapore, government enterprise architecture is not a federally regulated requirement – there was no big stick driving the e-government initiative and no beating people over the head with metrics like we have in the US – and yet it is working better because people have bought into the programme."* – Principal of Technical Project Management at AOL
- 👍 *"I am a contractor for a government agency. And in our agency, we don't even like to share data across divisions. It would be great if we can use the Singapore model. Personally, I would go back to the agency I work with, and I am going to talk about the insights I gained from the talk to see what we can do about improving the sharing of data across divisions. So this has been time very well spent."* – Management Consultant
- 👍 *"We are in the process of planning for next year and there is a high probability of us returning to Singapore and to the Institute of Systems Science."* – Associate Professor leading the delegation
- 👍 *"I researched all the available courses and found that they all focused on how to pass TOGAF. The ISS course is different in that the course is broader in focus – it covers everything you need to know as a practitioner – and it takes a practical approach. For someone who intends to use TOGAF, this is important... The calibre of the lecturers is just top class, far exceeding my expectations. It isn't just that they have the industry experience and the knowledge but more importantly, they have the ability to impart this knowledge to a varied audience. They prepared us to be able to do TOGAF, not just understand it theoretically."* – A principal solutions architect from Turkey
- 👍 *"It has been super intensive in a good way. It is not easy in terms of the assignment and the amount*

you have to absorb in such a short time... Still I can't wait each day for the next instructor to walk into the classroom because one after the other, each has been phenomenal. They are all so good. It is a well thought-out course that is well prepared and taught by world-class lecturers." – An information systems and business processes manager from Indonesia

- 👍 *"The course has opened horizons to me and will have a huge impact on the next stage of my career. Before, I had a limited view of how I can contribute at the design level. This course helped me attain an enterprise mindset and allowed me to see my organisation from a bird's eye point of view."* – A department head of IT infrastructure from Brunei



Twenty students on the Master of Science in Technology Management programme from the George Mason University, United States of America, visited ISS to learn about Singapore government's approach to enterprise architecture, as part of their international study tour.



The Certified Enterprise Architecture Practitioner course attracted both local and foreign participants.

STUDENTS



“This course pulls all the concepts and areas for IT security together in one area.”



“Instructor’s domain knowledge and sharing – that keeps us engaged throughout the course.”



“Provides both concept + hands on (trainer show/demo on PAAS, IAAS) to enforce the concept and understanding.”



“It gives me the knowledge to understand more of our customers’ behaviour and to develop a good system, enabling the management to make better decision and be more aware of how the business is performing.”



“It is related to a lot of practical experience in our workplace.”



“I find the course well-structured and helpful. I have been recommending to my colleagues and friends to take it. Thank you for the effort in making the course a nice one!”

“I would like to express my sincere thanks to you for guiding me throughout the course and with all the follow-up questions.”



“1. Class is not too huge. 2. Lecturer is great at his job and delivers tip-top training. 3. I find the course really good and practical.”



“Many case studies, very applicable, not academic at all. Comprehensive materials with links and pictures, not wordy and boring.”



“The whole process from ideation to pitch gives an idea and feel of the technopreneurial process.”

STUDENTS

SEMINARS

A series of update seminars covering a wide spectrum of issues in innovation, technology and management were well attended by IT professionals and executives.



- 👉 *"This forum is a good place to share thoughts and helps to address problems."*
- 👉 *"The industry information and insights are good."*
- 👉 *"The skill of a future EA mentioned during presentation was quite interesting."*
- 👉 *"Excellent delivery and overview!"*



- 👉 *"The sharing of real life experience is very refreshing."*
- 👉 *"Interesting questions raised during the Q&A and personal experience shared by speakers."*
- 👉 *"Dr Sam's open sharing was very useful, thought-provoking and relevant."*



- 👉 *"Very clear exploration about General Software Design and Agile."*
- 👉 *"Really good to have briefing on such topic, from persons who actually do it."*
- 👉 *"Learn more about agile development and continuous delivery."*
- 👉 *"Excellent and thought-provoking."*
- 👉 *"Great effort, looking forward for more events."*
- 👉 *"Good workshop and would like to participate in many more in future."*
- 👉 *"Good insight."*
- 👉 *"Great talk."*

CYBERSECURITY & CYBERTERRORISM CONFERENCE

CYBERIA: ENHANCING CYBER SECURITY & COMBATING CYBER TERRORISM

- 👉 *"All presentations and panel discussions are good."*
- 👉 *"Got an opportunity to meet and hear from professionals from different parts of the world who have varied experience. Best – workshop sessions."*
- 👉 *"Like the technical portion (workshop) best."*
- 👉 *"With regards to the conference, I liked best the updated information presented by both the speakers and the seminar presenters."*
- 👉 *"Diverse range of topics on cyber security is excellent."*



- 👉 *"The examples provided practical insights."*
- 👉 *"Key point on how business analytics methods help various organisations."*



- 👉 *"Good mix between theory and practical advice; balanced for the audience diversity (start-up, corporate, educators); ultimately, good perspective."*
- 👉 *"Showing us what innovation really is. The differentiation of creation (idea) with innovation (process)."*
- 👉 *"Very motivating speaker."*
- 👉 *"Hugely entertaining."*

CORPORATE CLIENTS

ISS' guiding principles for corporate client services are to impart knowledge, skills and best practices through a train-and-mentor model, so that clients can eventually operate on their own. Through proactive engagement, ISS continually seeks feedback to ensure its services remain highly valued by the industry.

A blend of customised education and advisory services is offered to meet the unique needs and challenges of individual organisations, including government agencies and private companies. ISS provides customised education in areas such as Business Analytics, Project Management, Service Innovation, and Strategic IT Management. In 2012, 600 employees from 16 major corporations benefited from the training and workshops.

Advisory services were conducted on two key areas, namely, Development and Appraisal of Capability Maturity Model Integrated (CMMI)[®] and Enterprise Architecture Development. These include interviewing key client staff, facilitating workshops and discussions, conducting just-in-time training, performing reviews and assessments, and providing guidance leading to successful project outcome.



CORPORATE CLIENTS

CUSTOMISED EDUCATION



Object-Oriented Programming Using Java; Building Enterprise Applications Using Java



Business Process Re-engineering; Business Process Mapping



Basic System Administrator; Data Analysis Workshop; Software Engineering Process Areas



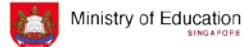
Business Process Re-engineering; Strategic IT Masterplanning, ICT and Governance



Data Modelling & Design Introduction; PMP® for Project Managers



IT Management Executive



Business Analytics



Delivering the Strategy through Successful Project Management



Team Building – Service Innovation



Enterprise Social Business Bootcamp



Jumpstart Workshop on Service Innovation



Design Thinking in Service System – Conception



Extreme Innovator



Project Management for Information Systems

- 👉 *“This course has provided an in-depth of what an administrator should do and know.” – Employee of Housing & Development Board about “Basic System Administrator”*
- 👉 *“Instructor has good knowledge and is able to share his expertise with us. No difficulties understanding his teaching. It is good that content relates back to HDB context. We have a better understanding when applying it back to HDB context.” – Employee of Housing & Development Board about “Data Analysis Workshop”*
- 👉 *“IT portfolio management is very relevant for me as I need to manage the entire division properly under my care. By applying the knowledge, it gives me more confidence to take on a more senior role.” – Employee of Infocomm Development Authority about “Strategic IT Masterplanning, ICT and Governance”*
- 👉 *“Good overview of what BA is all about and the value/impact it has on organisation to improve its business outcomes.” – Employee of Ministry of Education about “Business Analytics”*
- 👉 *“The learning experience was both intellectually enriching and fun. It brought out the creativity in everyone and got us playing, learning and working as a team.” – Group Head of NCS about “Team Building – Service Innovation”*
- 👉 *“My takeaway is to work on strategies in building innovation culture, including perhaps work on suitable models in ideation process / capability building.” – Participant of OCBC about “Jumpstart Workshop on Service Innovation”*
- 👉 *“The concepts can be tested to further explore ideas before implementation.” “See the value of a fact/evidence approach to management and continuous improvement.” “Learnt a structured approach to look into a design challenge including Concept Mapping and Creating Hypothesis.” – Participants of Singapore Pools about “Design Thinking in Service System – Conception”*
- 👉 *“It is very amazing to see that some good innovation came out within such a short time.” – Director, Customer Experience, Singtel about “Extreme Innovator”*
- 👉 *“Great taste of tools and methodology to think innovatively.” “The environment is good and very liberal. A lot of people can speak out. A lot of opportunities, ideas and innovation surfaced. Everybody is really talented.” – Participants of Singtel about “Extreme Innovator”*
- 👉 *“I’d like to commend all the instructors for their enthusiasm and sharing of their experiences to bring the learning materials to life.” – Employee of Urban Redevelopment Authority about “Project Management for Information Systems”*

CORPORATE CLIENTS

ADVISORY SERVICES



Provided training and advisory service to Inland Revenue Authority of Singapore to upgrade their software engineering and management practices reaching world-class levels.



ISS completed first round of audits at the Land Transport Authority Fare Systems.



Majlis Ugama Islam Singapura: Provided mentoring and advisory support in architecture organisation, governance, metrics, competency management, process, assets and artefacts. Also conducted evangelisation sessions to develop business case and initiate enterprise architecture development within the organisation.



ISS conducted preliminary appraisals of software engineering and management practices at Philip Securities Pte Ltd.



Synergy Marine: Tested and carried out an engineering assessment of a maritime operational system to support an arbitration case.



ISS conducted preliminary appraisals of software engineering and management practices at Wincor Nixdorf Pte Ltd.



Workforce Development Agency: Provided advisory service for the development of Data Reference Model and Data Hub.

👉 *“Useful and valuable advices were given for the implementation of CMMI practices. The recommended practices were also practised with minimum overheads introduced. The workshops conducted helped to enhance the understanding amongst our staff on the expectation of the CMMI model. Reviews for preparation of the CMMI appraisal provided guidance for INFOD’s readiness for the final appraisal.” – Inland Revenue Authority of Singapore*

👉 *“We approached NUS-ISS to provide us with a gauge of our organisational processes and practices through a Standard CMMI Appraisal Method for Process Improvement (SCAMPI) assessment... ISS consultants were able to provide very useful findings that enable us to independently develop, improve and institutionalise our processes and practices for a Class A appraisal. The excellent results are also proving to be valuable in our engagement with business partners.” – Philip Securities Pte Ltd*

👉 *“Through our engagement with ISS, we know what it takes to attain CMMI Maturity Level 3; and more importantly what we need to do to get there. We’ve benefitted a lot from your professional consultancy as we intend to use this as our compass for process improvement.” – Wincor Nixdorf Pte Ltd*

OVERSEAS GOVERNMENT

The e-Government Leadership Centre (eGL) ended its 6th Year achieving its objectives:

- To provide public sector e-Government leadership education;
- To conduct research and provide thought leadership on the use of Infocomm Technology (ICT) for the development and implementation of public policies;
- To provide advisory services on e-Government, ICT governance and ICT management for the public and public-related services; and

The eGL's holistic training programmes incorporate principles, policies, ICT Management best practices and trends. To address growing demand over social media and urbanisation, the eGL included new segments such as 'Impact of Social Media' and 'Moving towards Intelligent City' in its training programmes.

The eGL's programmes have benefitted 311 delegates in its 6th year of operation from 1 August 2011 to 31 July 2012, and a total of 1,782 delegates from 120 different countries to date. The extensive number of countries that the eGL has interacted with signifies its influence on e-Government development practices globally.



As a following up from the Memorandum of Understanding (MOU) signed in 2011, the eGL conducted several classes and study visits for Botswana and Panama. The eGL's experience and expertise in Government Transformation has also been well sought after. For example, the eGL provided advisory services to the Brunei Narcotics Control Bureau.

OVERSEAS GOVERNMENT

Botswana



e-Government Project Initiation for Steering Committee Members

16 – 17 October 2012

Organized By:



Panama



Panama e-Government Study Visit

7 to 10 May 2012



Brunei



Customised Change Management Training Programme

5 – 8 March 2012

Organized By:



- ☞ *“I was able to grasp the considerations in undertaking Business Process Re-engineering and Change Management Process.”*
- ☞ *“I was able to identify with what I face in the organisation. I will be able to supervise and relate well with the project securing teams.”*

- ☞ *“I think all the lectures have been useful, mainly the messages, suggestions and recommendations we have obtained from the experienced and knowledgeable presentations.”*
- ☞ *“I learnt about the concepts of the enterprise architecture and how to apply it.”*

- ☞ *“Every area of this programme is very useful.”*
- ☞ *“The workshops are really helpful to make me understand the programme.”*
- ☞ *The BPR is very useful because it is more effective, relevant and easier as a reference for the new system.”*

In 2012, the eGL also saw a growing demand from China. It conducted six classes for the Chinese officials from cities such as Guangzhou, Jiangmen and Shandong, compared to four in the year before. Some of these classes were done through our partners at Civil Service College and the Nanyang Technological University School of Humanities and Social Sciences.



OVERSEAS GOVERNMENT

The eGL conducted a 5-day “Customised Enterprise Architecture Training Programme” for the Department of Information Technology and Telecom, Ministry of Information and Communication, Bhutan. The eGL arranged their visits to the Integrated Health Information Systems Pte Ltd and the Singapore Land Authority. The Bhutan delegates included division chiefs, ICT section heads and ICT officers.



The eGL concluded a study commissioned by Singapore’s Building and Construction Authority Academy. Two teaching cases and a white paper were developed and a paper was presented at the 16th Pacific Asia Conference on Information Systems in Vietnam [14 July 2012], under the topic of “Exploring the Environments of Transformed Government Service: A Case Study of Building Construction Approvals in Singapore”. The eGL continues to enrich and enhance its training programmes through research and integrating sector-specific components.

MANAGEMENT & STAFF

Management

Lim Swee Cheang	Director / CEO
Yum Hui Yuen	Deputy Director
Dr Leong Mun Kew	Deputy Director

Chief

Swarnalatha Ashok	Advanced Software Design & Development
Tan Tzann Chang	Advisory Practice
Dr Carol Anne Hargreaves	Business Analytics Practice
Richard Tan	Information Office
Charles Pang	Knowledge Engineering Programme
Goh Boon Nam	New Initiatives & Strategic Planning
Daniel Boey	Project Management Practice
Dr Virginia Cha	Research Practice
Gloria Ng	Service Innovation Practice
Stuart Smith	Service Innovation Practice
Joseph Teo	Singapore e-Government Leadership Centre
Kumar Ashok	Singapore e-Government Leadership Centre
Tan Sok Sin	Singapore e-Government Leadership Centre
Dr Esther Tan	Systems Analysis Programme
Loong Chay Ching	Teaching Excellence Practice

Administration Director

Theresa Veronica Chan	Business Development
Tan Bee Leng	Finance
Mona Chee	Human Resource, Administration & Facility Management
Cassandra Mervyn	Marketing Communications
Shirley Sing	Professional Studies Programme Operations

MANAGEMENT & STAFF

An international and multi-disciplinary team made up of industry practitioners with diverse background in research, development, teaching, consultancy, innovation and management forms the core assets of ISS. The team comprises 51 full-time teaching and consulting members, and 38 support staff. Teaching staff members have an average of 22 years of working experience. More than half possess Masters educational qualification, and 22% have PhDs.

In 2012, Dr Esther Tan, Chief for Systems Analysis Programme, was conferred a Doctorate in Philosophy from the Nanyang Technological University. Dr Tan's thesis was titled "Organizing Social Contextual Information for Display on Mobile Devices". Five other ISS staff are currently pursuing doctorate in various subjects.

- * Suriya Priya Asaithambi
"Variability Management and Traceability for Software Product Line Testing"
National University of Singapore
- * Fan Zhenzhen
"Computational Linguistics"
Nanyang Technological University
- * Heng Boon Kui
"Model-Driven Development"
National University of Singapore
- * Ouh Eng Lieh
"Variability Management in Software-As-A-Service Models"
National University of Singapore
- * Joseph Teo
"e-Government"
University of Western Australia

Staff are constantly encouraged to practise lifelong learning and to upgrade themselves to their highest potential. In 2012, 19 staff attained their professional certifications. ISS also has a network of 50 adjuncts from academia, industry and government organisations to augment its intellectual capital.

ANNEX A: ACTIVITIES OF ISS PRACTICES

Innovation, Business, Process and Technology

Business Analysis

- Added NICF- Software Testing.
- Provided customised training in business process re-engineering to DBS and IDA.
- The eGL provided advisory services to the Brunei Narcotics Control Bureau.

Enterprise Business Analytics

- Offered 3 new courses NICF- Customer Analytics, NICF- Statistics for Business, and NICF- Optimisation and Resource Utilisation.
- Provided customised training to MOE.
- Presented research insights at conferences in Philippines and Malaysia.
- Organised seminar on “Cutting Edge Business Analytics”.

Enterprise Social Business

- Set up the Centre of Excellence in Enterprise Social Business with IBM.
- Added a new course NICF- Enterprise Social Business Bootcamp-Leveraging Social for Business Outcomes.
- Provided customised training to NTUC Media.

Service Innovation

- More than 240 participants trained under the 3 courses NICF- Design Thinking in Service Systems – Conception, NICF- Design Thinking in Service Systems – Design, and NICF- Leading in Service Innovation.
- Provided customised training to NCS, OCBC Bank and Singapore Pools.
- Published a research paper in the Journal of Business and Industrial Marketing.
- Presented research insights at conferences in Germany, Vietnam and Malaysia.
- Organised seminar on “Asian Innovators: Developing the Next Generation”.

IT Management

IT Project Management

- 1,020 students were trained under the IT Project Management Practice in 2012.
- Added a new course NICF- Managing Successful Programmes (MSP®).
- Presented at the Project Management Institute (PMI) Singapore Chapter’s 8th Annual Regional Symposium 2012 that was attended by 800 professionals.
- Provided customised training to IHIS, NUS Business School and URA.
- In addition to delivering a course, ISS provided consulting services to Getech Automation to review and recommended changes to their project management process.

IT Service Management

- Partnered IT Service Management Forum (itSMF) International to survey and analyse the state of global IT service management.
- Presented on ITIL® service strategy implementation through enterprise architecture at the itSMF Singapore Annual Conference.

ANNEX A: ACTIVITIES OF ISS PRACTICES

IT Risk Management

- Added 2 new courses NICF- Certified Information Systems Security Professional (CISSP®) CBK Review Seminar and NICF- Certified Secure Software Lifecycle Professional (CSSLP®).
- Jointly organised conference on “Cyberia: Enhancing Cyber Security & Combating Cyber Terrorism” with AISP.

Strategic IT Management

- Added a new course NICF- Data Governance & Protection.
- NICF Specialist Diploma in Enterprise Architecture approved by WDA.
- Set up Architecture Community of Practice (ACoP) to promote advancement of architecture practice among the network of practitioners specialising in enterprise, business, information, application, technology and solution architectures. Organised 3 ACoP forums to facilitate sharing and learning from industry experts.

Technical

Advanced Software Design & Development

- Added a new course NICF- Cloud Economics & Technology for Practitioners.
- Added agile software engineering to MTech core curriculum.
- Provided customised training in building enterprise applications using Java EE to CPF.
- Made presentations on cloud computing, variability testing and software evolution at numerous conferences.
- More than 400 Infocomm professionals attended 3 seminars co-organised with ThoughtWorks.

Intelligent Systems (Knowledge Engineering)

- Added a new Text Mining elective course to the MTech Knowledge Engineering programme.
- Undertook a consultancy project with Singapore Pools.
- Contributed 2 journal articles and 2 conference papers.

Software Engineering (SE)

- Upgraded the MTech SE core courses to include Agile management, incremental development and Agile technical practices, such as continuous integration and test-driven development. The new versions of these core courses were taught for the first time throughout 2012.
- Revamped the MTech SE project to organise around Rational Unified Process (RUP) based on incremental development, rather than RUP waterfall lifecycle. The new format was launched in August 2012.
- Evolved the MTech SE project concept so that full-time students could undertake their project as an internship in a local organisation. The first internships started in December 2012 at CrimsonLogic.
- Proposed and designed new MTech electives on Software Prototyping, Software Maintenance and Evolution, and Agile Software Project Management.
- Proposed and designed a new short course entitled NICF- Essential Practices for Agile Teams.

ANNEX B: PAPER PUBLICATION

1. Guo Lei [ISS Postdoctoral Fellow for Service Innovation], Irene Ng [ISS Visiting Fellow Professor]. "The Antecedents of Salespeople's Relational Behaviours". *Journal of Business and Industrial Marketing*, March 2012.
2. Lo Sio-Long, Ding Li Ya [ISS Member for Intelligent Systems & Technology]. "Incremental Learning of Concept Cluster on Background Net for Fuzzy Granulation of Document Representation". *ICIC Express Letters*, Volume 6, Number 3, March 2012.
3. Lo Sio-Long, Ding Li Ya. "Learning and Reasoning on Background Net – Its Application to Text Categorization". *ICIC Express Letters*, Volume 6, Number 3, March 2012.
4. Lo Sio-Long, Ding Li Ya. "Probabilistic Reasoning on Background Net: An Application to Text Categorization". *International Conference on Machine Learning and Cybernetics*, July 2012.
5. Lo Sio-Long, Ding Li Ya. "Learning and Reasoning on Background Nets for Text Categorization with Changing Domain and Personalized Criteria". *International Journal of Innovative Computing, Information and Control*, Volume 9, Number 1, January 2013 (accepted).
6. Lo Sio-Long, Ding Li Ya. "Background Net Approach for Text Categorization based on Contextual Association as Term Co-occurrence". *ICIC Express Letters*, Volume 7, Number 2, February 2013 (accepted).
7. Swarnalatha Ashok [ISS Chief for Advanced Technology Applications Practice], Ding Li Ya. "A New Approach to Cope with Software Evolution using Knowware System Concepts". *ICIC Express Letters*, Volume 7, Number 2, February 2013 (accepted).
8. Edvardsson, B., Gorla Ng [ISS Chief for Service Innovation Practice], Choo, Z.M., Firth, R.J., and Ding, Y. "Why is service-dominant logic based service system better". *Journal of International Quality and Service Sciences* (accepted & forthcoming).
9. Virginia Cha [ISS Chief for Research Practice], R. Yi, M. Frese. "Is effectuation really enough? An examination of the relationships between logic, experience, and innovativeness in entrepreneurial decision making". *Journal of Business Venturing*, June 2012 (submitted).
10. Virginia Cha. "New Rules for 21st Century Innovation: Singapore as World's e-Lab". *IDA ICT Study Group*, August 2012 (submitted).

ANNEX C: SPEAKING ENGAGEMENT

1. IDA-NLB Public Lecture Series, Singapore [26 January 2012]: Deputy Director Dr Leong Mun Kew shared about “Cloud Computing: A Dose of Reality – the Customer’s Perspective on the Cloud”. Dr Leong provided a glimpse into the mind of the buyers for cloud services. He opined that it is important to understand the issues and concerns of the business customers as organisations develop cloud applications.
2. Learning@SingTel, Singapore [16 February 2012]: Chief for Research Practice Dr Virginia Cha presented her research findings on “Copying as an Innovation Model? Shanzhai as a Form of 21st Century Innovation”. She introduced the 4F framework of Shanzhai innovation – Frugal, Fast, Faddish and Fit – in the context of mobile phone products.
3. Asia Pacific ICT Summit, Singapore [14 March 2012]: CEO Mr Lim Swee Cheang was the moderator for the panel discussion on “Little Red Dot as a Digital Hub”. The session discussed the policies, infrastructure and programmes to help businesses leapfrog onto the digital platform. CEOs of IDA and MDA, Chairman of SITF were the panel members.
4. IT Service Management Forum (ITSMF) Singapore Annual Conference, Singapore [16 March 2012]: Chief for New Initiatives & Strategic Planning Mr Goh Boon Nam shared his experience in “Implementing ITIL[®] Service Strategy through Enterprise Architecture”.
5. InnovFest, Singapore [19 April 2012]: Dr Virginia Cha was a panel speaker in the discussion on “Software Licensing Trends” that looked into the impact of software technology on innovative startups.
6. The 12th International Research Conference in Service Management, France [29 May-1 June 2012]: Dr Guo Lei and Ms Saisudha Rajagopal of the Service Innovation Practice co-authored with Prof Bo Edvardsson and presented the paper on “Resource Integration in Medical Tourists’ Pre-Purchase Decision Making: An Examination of Social Resource Integration and Emotional Discomfort” at the conference.
7. AMA SERVSIG International Service Research Conference, Finland [7-9 June 2012]: Dr Guo Lei and Mr Ding Yi of the Service Innovation Practice co-authored with Prof Irene Ng the paper on “The Use of Information Technology as Value Co-Creation” presented at the conference.
8. 21st Annual Frontiers in Service Conference, USA [14-17 June 2012]: Dr Guo Lei and Evangelist for Enterprise Architecture Practice Dr Pallab Saha presented on “Government Data as a Platform for Innovation: A Study of Singapore’s Open Data Initiative” at the conference.
9. FutureGov Forum, Thailand [20 June 2012]: Dr Leong Mun Kew responded to the question “Is Government Ready for the Cloud” and highlighted the five questions that need to be asked and answered when government organisations go to the Cloud: What is it? Why do I care? Who else is doing it? How can I do it? How much will it cost?
10. The 16th Pacific Asia Conference on Information Systems, Vietnam [14 July 2012]: e-Government Leadership Centre Director Mr Joseph Teo presented on “Exploring the Environments of Transformed Government Service: A Case Study of Building Construction Approvals in Singapore”.
11. Alibaba Open Sesame, Vietnam [27 July 2012]: Member for Service Innovation Practice Mr Geok Seong Wah talked about “Service Innovation in a Globalized Market”.
12. Business Management Conference, Philippines [10-11 August 2012]: Chief for Business Analytics Practice Dr Carol Hargreaves expounded on the “New Focus, New Challenges in Modern Businesses”.

ANNEX C: SPEAKING ENGAGEMENT

13. IBM Global Entrepreneurship Program Launch, Singapore [10 September 2012]: Dr Virginia Cha spoke about the Singapore entrepreneurial ecosystem in her talk on “Challenges & Opportunities for Entrepreneurship: An Insider Overview”.
14. International Conference on Statistics in Science, Business and Engineering 2012, Malaysia [10-12 September 2012]: Dr Carol Hargreaves addressed the question “Does the Use of Technical & Fundamental Analysis Improve Stock Choice? A Data Mining Approach Applied to the Australian Stock Market”. She presented her research on applying data mining techniques to technical and fundamental information for stock selection.
15. Business Intelligence Asia Pacific Summit 2012, Singapore [14 September 2012]: Dr Carol Hargreaves proposed “Business Analytics as a Framework for an Evolving Multi-Agent System”, whereby typical business analytics tasks such as prediction, evaluation and decision are carried out by individual intelligent agents in a multi-agent system with an evolving environment to cope with the target business application.
16. d.confestival Design Thinking the Future, Germany [21 September 2012]: Deputy Chief for Service Innovation Practice Mr Stuart Smith delivered a speech and took part in a panel discussion at this inaugural conference. He explained how NUS ISS used Design Thinking ideas and methods as a base from which to develop an indigenous approach to innovation.
17. CodeForScience Talks and Awards, Singapore [29 September 2012]: Dr Leong Mun Kew discussed the organisation’s and developer’s perspectives in “The Co-creation Journey”, and the importance to harmonise business outcome with personal need for a sustainable partnership.
18. SPMI (Project Management Institute Singapore Chapter) 8th Annual Regional Symposium, Singapore [4 October 2012]: Mr Goh Boon Nam shared his experience in “IT Portfolio Management using Enterprise Architecture and ITIL[®] Service Strategy” with over 800 professionals and managers from the IT, oil and gas, pharmaceutical, manufacturing, construction, service and public sectors.
19. Alibaba Open Sesame, Malaysia [17 October 2012]: Mr Geok Seong Wah talked about “Service Innovation in a Globalized Market”.
20. 18th IT Best Practices Seminar, Singapore [30 October 2012]: e-Government Leadership Centre Deputy Director Mr Kumar Ashok moderated a panel discussion on “Outsourcing makes things cheaper and faster, but not better – true or false?”.
21. Korea Entrepreneur Foundation Seminar on Startups in Asia, Korea [31 October 2012]: Dr Virginia Cha gave a speech on “Building a Vibrant Ecosystem for Startups in Singapore”, shedding light on angel investors, incubators and funding opportunities for startups in Singapore.
22. INET Singapore 2012 Conference, Singapore [16-17 November 2012]: Evangelist for Advanced Technology Applications Practice Dr Derek Kiong discussed “Safe Practices on the Internet with Open Source”. His presentation showed how virtualisation and execution isolation offered protection that was more superior to the standard use of anti-virus programs.
23. Digital World 2012 Conference, Bangladesh [7 December 2012]: Mr Kumar Ashok shared his views on “Role of Government CIO to Take Services to the Citizen”.
24. Service Research and Innovation Institute Annual Conference, India [12 December 2012]: Dr Pallab Saha was the invited speaker on “Architecting People-Centred Connected Government”.

ANNEX D: PROFESSIONAL & SUPPORT STAFF

Evangelist

Dr Derek Kiong	Advanced Software Design & Development
Dr Venkatraman Ramanathan	Advanced Software Design & Development
Dr Pallab Saha	Enterprise Architecture Practice
Russon Howard	Graduate Programme

Professional Staff

Suriya Priya Asaithambi	Advanced Software Design & Development
Yunghans Irawan	Advanced Software Design & Development
Ouh Eng Lieh	Advanced Software Design & Development
Michael Tan	Business Analysis
Chia Han-Leon	Enterprise Social Business Practice
Yu Chen Kuang	Enterprise Social Business Practice
Dr Ding Li Ya	Knowledge Engineering / Intelligent Systems Practice
Fan Zhenzhen	Knowledge Engineering / Intelligent Systems Practice
Dr Zhu Fangming	Knowledge Engineering / Intelligent Systems Practice
Lee Boon Kee	Project Management Practice
Felicitas Seah	Project Management Practice
Tan Liong Choon	Project Management Practice
Dickson Tsui	Research Practice
Choo Zhi Min	Service Innovation Practice
Ding Yi	Service Innovation Practice
Geok Seong Wah	Service Innovation Practice
Dr Guo Lei	Service Innovation Practice
Saisudha Rajagopal	Service Innovation Practice
Jagadeesh Balakrishnan	Software Engineering / Process & Quality Practice
Chia Yuen Kwan	Software Engineering / Process & Quality Practice
Dr Robert Firth	Software Engineering / Process & Quality Practice
Heng Boon Kui	Software Engineering / Process & Quality Practice
Angela Huang	Strategic IT Management Practice
Lim Hooi Ling	Strategic IT Management Practice
Tan Eng Tsze	Strategic IT Management Practice
Tan Lay Ngan	Strategic IT Management Practice

ANNEX D: PROFESSIONAL & SUPPORT STAFF

Administration

Brendan Chua	Admin & Facility Management
Leonard Xie	Admin & Facility Management
Betty Seow	Admin & Procurement
Lee Su Mei	Business Development
Andy Chang	Career Services
Lynnette Low	Director's Office
Joyce Phang	Finance
Loydrea Tan	Finance
Jenny Chan	Graduate Programme
Jessie Hoo	Graduate Programme
Lilian Lim	Graduate Programme
Matilda Selvaraj	Graduate Programme
Jaime Tan	Graduate Programme
Megan Wang	Graduate Programme Recruitment
Mohamad Zaidi Bin Sapuan	Human Resource
Joyce Leong	Marketing Communications
Sherlyn Lim	Professional Studies Programme Operations
Liong Wai Loon	Professional Studies Programme Operations
See Bee Leng	Professional Studies Programme Operations
Tay Li Ying	Professional Studies Programme Operations
Ten Yun Bee	Professional Studies Programme Operations
Wong Swee Lee	Professional Studies Programme Operations
Cheong Vin Mei	Singapore e-Government Leadership Centre
Lew Mei Ling	Singapore e-Government Leadership Centre

Quality Management

Chandrasekaran Paramasivam	Quality Assurance
Orsalia Justiwawan	Quality Assurance

IT Services

Setiaman Lee	Application Development Group
Cassandra Leong	Application Development Group
Peh Wee Kah	Application Development Group
Raymond Seah	Application Development Group
Daniel Barrett Lee	Systems Management Group

ANNEX E: GOVERNANCE

As an integral part of the NUS, ISS operates within the stringent NUS corporate governance framework, applying the university-wide policies, guidelines and rules to achieve academic rigour, first-rate performance and optimal day-to-day operation.

The ISS CEO is appointed by the NUS Provost and reports to him on operational matters. The following diagram depicts the ISS Organisational Structure:



The ISS Management Board Chairman is appointed by the NUS President, and the Board members are in turn appointed by the Chairman. The ISS Management Board provides strategic guidance to ISS senior management. The terms of reference are:

- To advise ISS on strategic business direction;
- To review ISS programmes and products to ensure they meet the changing needs of the industry and help ISS establish strategies to remain innovative with a leading edge;
- To advise ISS on appropriate organisational and personnel policies to support its mission and strategy;