

# SINGAPORE

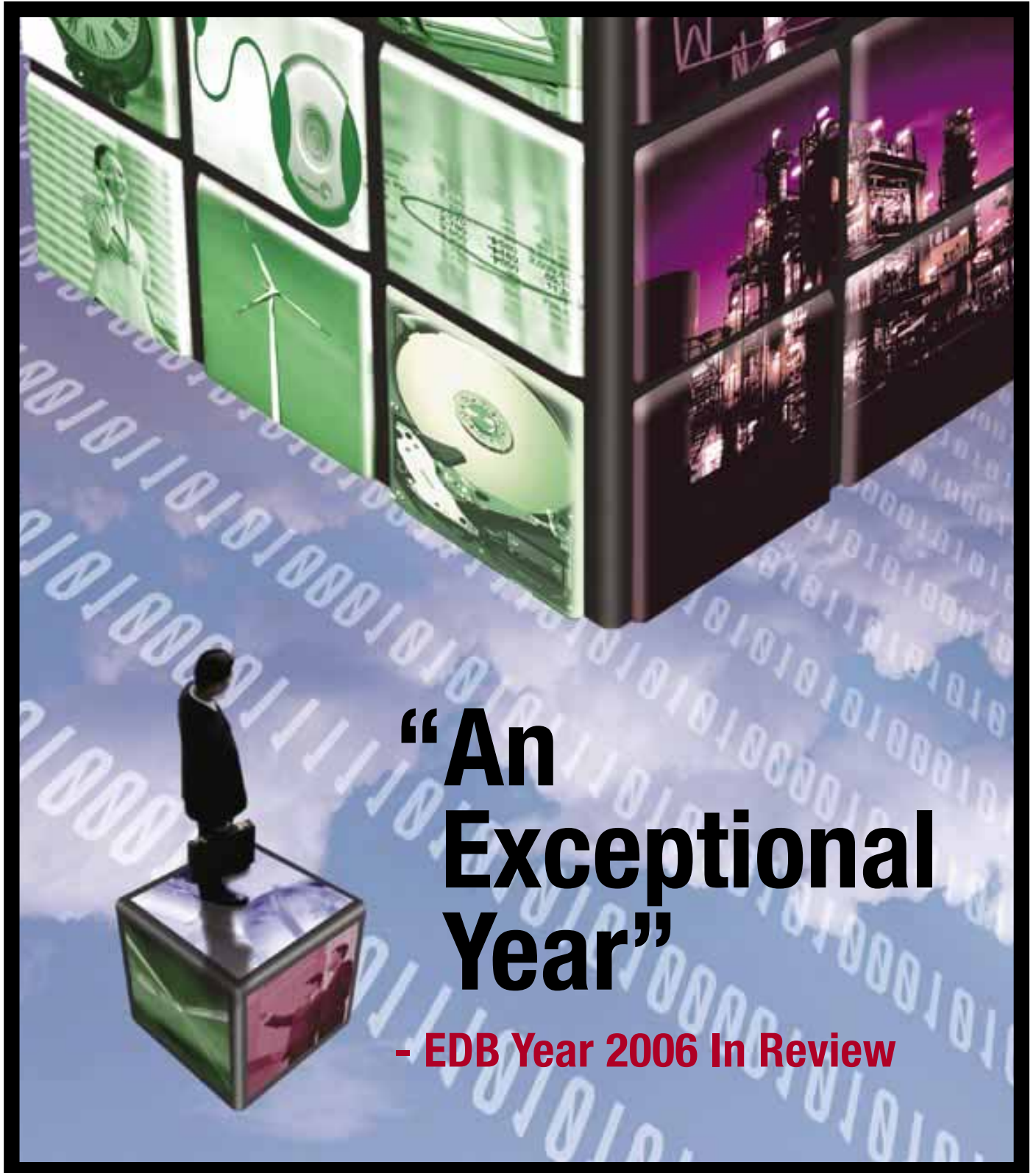
INVESTMENT NEWS

EDB  
SINGAPORE

March 2007

Focusing on Innovation and Investment Opportunities in Singapore

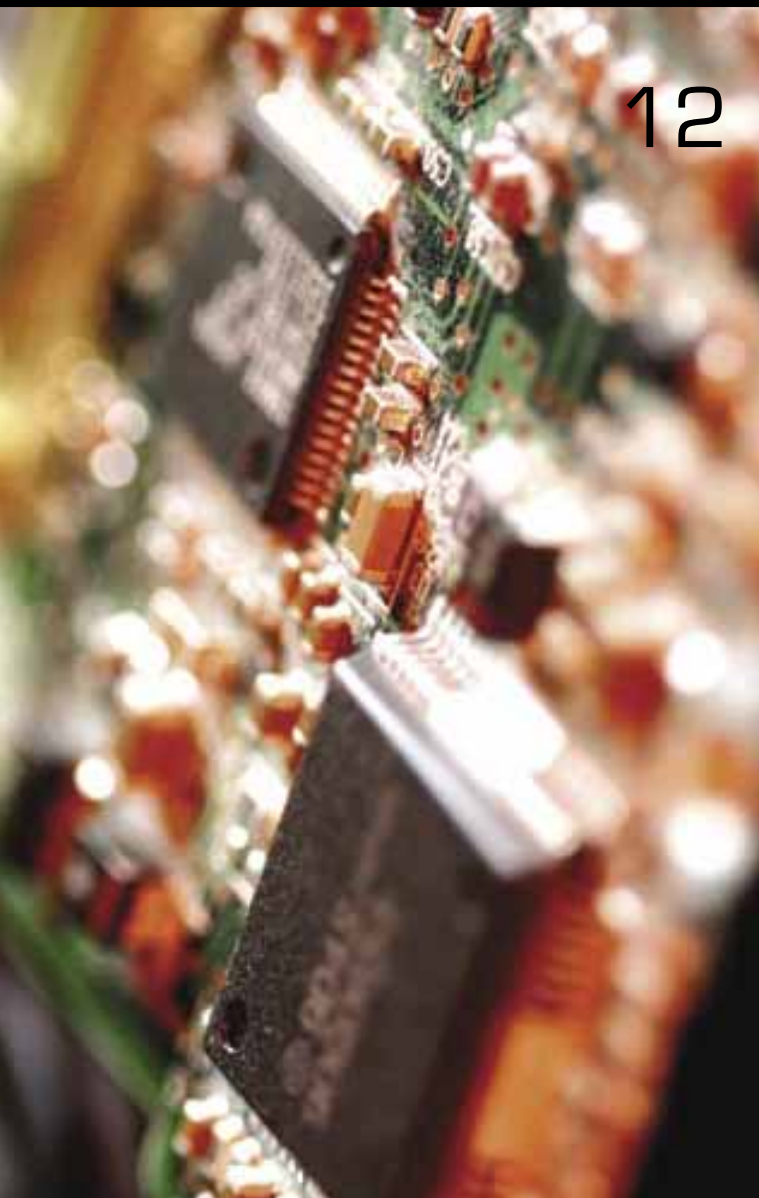
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**“An  
Exceptional  
Year”**

**- EDB Year 2006 In Review**

March 2007



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The nation's newly-established economic pillar has hit new heights with new R&D and manufacturing projects injecting impetus to the industry.

## Singapore Retains World's Most Globalised Nation Title

For the second year running, Singapore came out tops as the world's most globally connected nation in the recently published A.T. Kearney/Foreign Policy Globalisation Index 2006. The Lion City edged out countries such as Switzerland and the United States, which came in second and third respectively.

The annual index, now in its sixth year, uses empirical data to assess the impact of globalisation and the extent to which leading and emerging nations are becoming more, or less, globally connected.

The 2006 Index studied 62 countries, which account for 96 per cent of the world's gross domestic product and 85 per cent of the world's population. The countries were ranked in terms of 12 variables divided into four broad categories: Economic Integration, Personal Contact, Tech-

GLOBALIZATION INDEX 2006		
2006 Rankings	Country	2005 Rankings
1	Singapore	1
2	Switzerland	3
3	United States	4
4	Ireland	2
5	Denmark	7
6	Canada	6
7	Netherlands	5
8	Australia	12
9	Austria	8
10	Sweden	10
11	New Zealand	11
12	United Kingdom	13
13	Finland	9
14	Norway	14
15	Israel	17
16	Czech Republic	15
17	Slovenia	20
18	Germany	21
19	Malaysia	19
20	Hungary	23

Source: A.T. Kearney/Foreign Policy Globalisation Index 2006

nological Connectivity and Political Engagement. Singapore clinched top spot on the strength of its increased Political Engagement and Personal Contact.



(L-R) Erik Oja, VP and Head of Open Control Systems, ABB; Hemant Sharma, Regional Manager of Process Automation, ABB; Kenneth Tan, Executive Director, EDB; James Foo, President and Country Manager, ABB Singapore; and Michael Zhang, VP of Control Systems and Products Asia, ABB

### ENGINEERING SERVICES

## ABB Opens Regional Action Centre To Strengthen Leading Position

group ABB opened a dedicated Control Systems and Products Regional Action Centre (RAC) in Singapore on January 2007.

In addition to its marketing and business development functions, RAC will provide technical and training support for automation customers and regional sales support for control systems and products. These include ABB's range of control system solutions like System 800xA Extended Au-

tomation as well as individual control system components such as control hardware and software, I/O and related control system software applications.

Asia, leading power and automation technology

tomation as well as individual control system components such as control hardware and software, I/O and related control system software applications.

Asia is the fastest growing market for Process Automation Control Systems and Products and according to James Foo, President and Country Manager, ABB Singapore, this move will intensify the company's growth strategy by ensuring that "complete ABB control product portfolio is coherently positioned to customers and business partners in the region."

Besides the RAC, Singapore also plays host to ABB's Global Marine Engineering Centre, Centres of Excellence for its pulp and paper businesses and a Centre of Competence for its marine business unit, affirming Singapore's reputation as a key business and technology hub for businesses.

## World Class International Cancer Centre Opens In Singapore

Memphis-based The West Clinic and Singapore's Excellence Healthcare announced the opening of the new international cancer treatment centre. The first West Clinic centre outside North America, it aims to provide world class US-based cancer treatment and management, with US oncologists and oncology nurses caring for patients in Southeast Asia.

Dr. Steven Tucker, Medical Director, West Clinic Excellence, a leading oncologist who relocated to Singapore from Los Angeles says, "Singapore has demonstrated a strong commitment to deliver outstanding medical care and promote health and wellness. It has also established herself as a preferred location for medical travellers. Through this joint venture with Excellence Healthcare, we can finally bring The West Clinic's philosophy of community-based oncol-

ogy to Singapore, now more conveniently located all under one roof, and closer to patients in the region."



Dr Steven Tucker, Medical Director, West Clinic Excellence, at the PET/CT Scan Machine.

With The West Clinic offering technology such as the PACE System™, a state-of-the-art IT platform that allows interactive patient assessment, care and education, and Excellence Healthcare providing marketing expertise and knowledge of the region, this centre unites the best of both partners and affirms Singapore's standing as a world-class healthcare services hub in Asia.

## Singapore Is Best Seaport In Asia

Singapore has much to celebrate, having won a number of awards at the 2006 Asian Freight & Supply Chain Awards (AFSCA).

For an impressive 18th year, the Republic was awarded Best Seaport in Asia. In addition, Singapore came in tops for the 17th time as the best Global Container Terminal Operating Company, the Best Air Cargo Carrier for the 13th time, and the Best Airport in Asia, among other awards.

Hundreds of top executives in the transport industry gathered to celebrate the 20th anniversary of the AFSCA, widely regarded as the most authoritative and prestigious awards for the industry in Asia.

Organised by AFSCA and Cargonews Asia, the region's leading freight and logistics publication, the annual awards acknowledges and rewards Asia's transport and logistics providers for the year's outstanding work.

### 2006 ASIAN FREIGHT & SUPPLY CHAIN AWARDS

Best Seaport - Asia  
**Port of Singapore, Singapore**

Best Global Container Terminal Operating Company  
**PSA International**

Best Airport - Asia  
**Singapore Changi Airport Singapore**

Best Air Cargo Terminal Operator - Asia  
**Singapore Airport Terminal Services Ltd (SATS) Singapore**

Best Air Cargo Carrier - Asia  
**Singapore Airlines Cargo**

Best Emerging Container Terminal Asia (under 1 million TEUs per year)  
**Jurong Port Pte Ltd, Singapore**



# Schmidt Electronics Gives Electronics Industry Innovative Edge

TAPPING ON SINGAPORE'S INFRASTRUCTURE, SES LOOKS TO WIDEN THE SPHERE OF ITS OPERATIONS IN THE REGION.

An established leading integrated technology and service provider within the Asia-Pacific region with more than 40 years of experience, Schmidt Electronics Group Limited (Schmidt Electronics) has been blazing a trail in the industry since its inception. Covering a wide spectrum of manufactured technology and services – from printed circuit boards to wireless communications – Schmidt Electronics has been catering to a large base of clientele keen on leveraging their expertise and technical know-how.


Closer to home, Schmidt Electronic (SEA) Pte Ltd (SES) has also been making its presence known in Southeast Asia. The main responsibilities of its Singapore base include general management, sales and marketing and technical support.

However, in recent times, SES set a new milestone when it became the first foreign firm in Asia (barring Japan) to set up an X-Ray Inspection Competence Centre. MacroScience Technology, a 100 per cent owned company of the Schmidt Electronics group, decided to base the regional activities here under SES, leading to the development of the Singapore-based Competence Centre.

## INNOVATIVE TECHNOLOGY

With this Centre, the emphasis is mainly on R&D, production management and product marketing. Key to SES's competitiveness is its collaboration with local manufacturers to accelerate the production and assembly of these high-tech X-Ray systems. This leads to a faster factory-to-market rate and allows the company to develop better working relationships with its local customers, increasing SES's revenue in turn. Some of the products SES is bringing into the industry include the MSX-1000 and MSX-2000 models of X-Ray machines.

The emphasis on R&D is equally strong as the company has a dedicated team of 11 software engineers based locally. They are currently looking to develop the next generation of X-Ray 3D Inline Inspection System, together with the company's research team in Munich, Germany.

Lending its expertise and experience to Singapore's electronics and R&D sector, SES looks to leverage its Singapore base to complement its businesses, tapping on the island-state's excellent infrastructure and supply base for its complex products and services' requirements. 



# Four New Members Join EDB Board

NEW APPOINTMENTS ARE KEY TO ORGANISATION'S GROWTH AND PROGRESS

The Singapore Economic Development Board (EDB) welcomes the appointment of four new Board members – it's a move strategic to EDB's push forward through more valuable guidance and advice on its policies.

Appointed by the Ministry of Trade and Industry (MTI), the new members complete EDB's 12-member board. Selected from diverse industry sectors, each brings extensive knowledge and expertise to the table. Serving a two-year term that started on 1 February 2007, the new Board members are:



**Jonathan Asherson, Regional Director, Rolls-Royce Singapore**

The company's regional director since 1999, Asherson was formerly the regional executive of Rolls-Royce Malaysia. He started his career with Siemens, Germany in 1981 with subsequent postings at Siemens, USA and China.



**Dr Patrick A. J. Gyselinck, Vice President, Global Supply Chain, Asia, Schering-Plough Ltd**

Before his current appointment three years ago, Dr Gyselinck, who holds a doctorate in pharmaceutical technology from Belgium's University Gent, served as the Managing Director of Schering-Plough Ltd.



**Shunsuke Ohtsu, Chief Executive for Asia, Hitachi Ltd and Chairman, Hitachi Asia Ltd.**

Juggling dual roles since August 2006, Ohtsu began his career with Hitachi Europe Ltd. before rising to the position of General Manager, International Business Planning &

Development Group, Hitachi Ltd. in 2000. Ohtsu also holds an advanced management programme degree from Harvard Business School.




**Professor Gregory Paul Whittred, President, University of New South Wales (UNSW) Asia**

An UNSW alumnus himself, Professor Whittred, who obtained his doctorate in accounting and finance in 1986, is also a Fellow of both the Institute of Chartered Accountants

and Certified Practising Accountant Australia. Before assuming his present responsibilities, Professor Whittred was the Dean of the Faculty of Commerce and Economics, UNSW.

Following the new appointments, MTI and EDB also extend their sincere appreciation to the Board members who have stepped down from the Board for their significant contribution and leadership to EDB and Singapore.

They are Motonobu Takemoto, President, Toyota Motor Asia Pacific; Eduardo Rosini, Regional Vice President, Asia Pacific, Microsoft Operations; Teo Ming Kian, Permanent Secretary, Ministry of Finance; and Robert Alan Myers, Managing Director & Chief Executive Officer, Cardinal Health Singapore. 

# EDB Year 2006 In Review: Record S\$13.4b Expected To Flow Into Investor-Friendly Singapore

SURPASSING ITS EXPECTATIONS FOR 2006, WITH OUTSTANDING RESULTS IN MANUFACTURING AND SERVICES BUOYED BY 450 QUALITY INVESTMENTS ACROSS THE BOARD, SINGAPORE ECONOMIC DEVELOPMENT BOARD ACHIEVED ITS BEST PERFORMANCE TO DATE.

An exceptional year – that was the verdict passed down by the Singapore Economic Development Board (EDB) at its 2006 Year-In-Review press conference, held on 29 January 2007. The scorecard revealed exemplary results that exceeded forecasts in value added (VA) to country's GDP, fixed asset investment (FAI), total business spending (TBS) and job creation. In particular, VA per annum and TBS were the best in more than 10 years, while jobs created were the highest recorded in the last five years.

This stellar performance was no mean feat, as Lim Siong Guan, Chairman, EDB, pointed out. "The competitors are different, but competition in every sector is just as intense," says Lim, who was helming his first annual assessment since assuming his current position in October 2006. He highlighted that despite mounting competition from both developing and developed countries, Singapore still remained an attractive location for capital-, knowledge- and innovation-intensive investments.

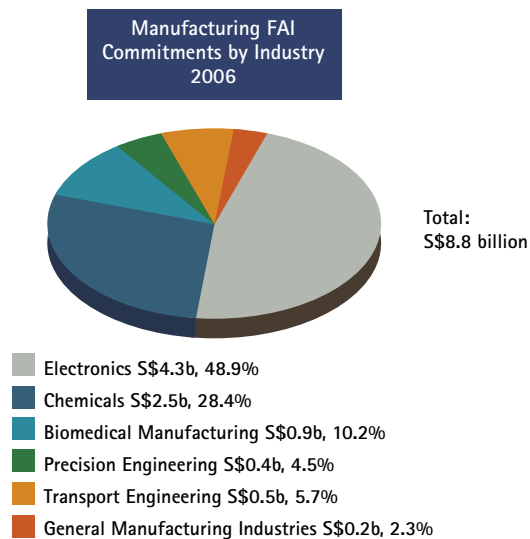
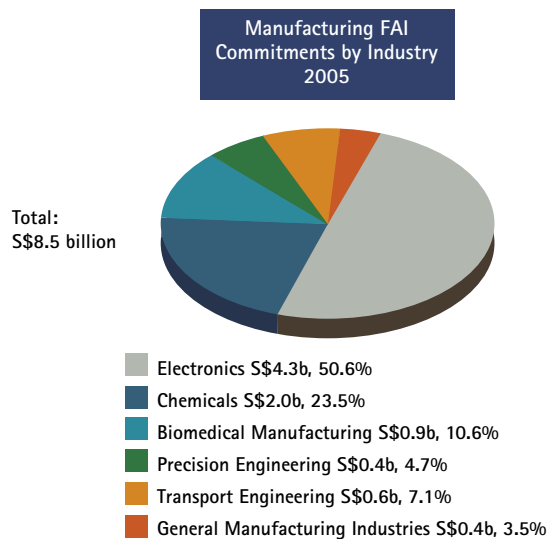
This makes the results posted in 2006 all the more appreciable as 450 projects were committed in the island-state during that period. When fully implemented, they are expected to generate some S\$13.4 billion (US\$8.7 billion) in total VA per annum, a 24 per cent jump over 2005's S\$10.8 billion (US\$7 billion). Approximately 26,800 new jobs will also be created as a result of these projects, furthering bolstering the country's economy.

## MANUFACTURING & SERVICES: MOVING UP THE LADDER

As investments poured in, manufacturing remains a cornerstone of Singapore's economy as it contributed at least two-thirds to GDP. Last year, manufacturing FAI raked in S\$8.8 billion (US\$5.7 billion), a four per cent increase over 2005. Meanwhile, TBS from services was S\$2.8 billion (US\$1.8 billion), a 12 per cent surge over the previous year.

EDB's blueprint for bringing the economy forward is obviously working, as indicated by its strong showing. For manufacturing, the agency stayed with its policy of attracting complex, high-end activities and this bore fruit as they garnered several large, world-scale manufacturing investments, each exceeding S\$1 billion (US\$700 million) in FAI. The chemicals sector received a shot in the arm with Shell Eastern Petroleum's cracker and MEG plant, its biggest investment in Singapore to date. It came as no surprise that the electronics sector – which drew in the lion's share of manufacturing FAI with S\$4.3 billion (US\$2.8 billion)





– also enjoyed the arrival of several high-value projects. These included two firsts: a S\$1.7 billion (US\$1.1 billion) 300mm silicon wafer substrate facility established by Samsung Electronics-Siltronic, and Intel and Micron’s S\$4.7 billion (US\$3.1 billion) NAND flash memory fabrication plant. Long-time investor Seagate Technology also announced its commitment to build its third media facility here at a cost of S\$1.3 billion (US\$846 million).

To ramp up the appeal quotient and relevance of Singapore’s manufacturing sector globally, EDB pushed the envelope in developing new growth areas. Its efforts paid off, with two groundbreaking projects that represent ambitious firsts for the Republic: Australian company Natural Fuel setting up its biodiesel plant and Singapore Copper Technologies’s plans to build an integrated copper refinery locally.

Over in services, TBS was at an all-time high, gaining ground mainly in the HQ & Professional Services segments, which contributed over S\$1.2 billion (US\$780 million), or 43 per cent to the services TBS pie. Not only are more companies basing their HQ activities here, they are also embarking on sophisticated, knowledge-intensive areas such as intellectual property management, design and innovation. The outstanding TBS showing

is linked with manufacturing’s solid performance, says Lim, as the latter not only creates downstream economic activities but also helps promote manufacturing support services.

## EMPHASIS IN R&D LEADS TO RISE IN PROJECTS

Maintaining Singapore’s attractiveness as a premier business destination, EDB also focussed on boosting R&D activities in the country. This sector is a crucial catalyst in developing the full potential of stalwart sectors, while nurturing new growth areas. Newer technologies and processes, in particular, help to enhance the country’s manufacturing capabilities. To this end, EDB looked to generate more opportunities for the R&D sector to flourish.

Its efforts resulted in not just 158 R&D projects worth S\$1.6 billion (US\$1 billion), representing a 30 per cent increase from 2005, but there were several groundbreaking firsts as well. One example was Vestas Wind Systems, which invested in its first R&D centre dedicated to wind technology here. “Singapore was not on the short-list,” says Ko Kheng Hwa, Managing Director, EDB. “Yet our officers succeeded in convincing the company to set up an R&D centre with 150 staff to develop next-generation wind energy.”





Indeed, EDB's strategy of aggressively promoting complex manufacturing and high-end R&D activities places the Republic in good stead in an increasingly competitive arena for investment dollars. Singapore will remain "an attractive place to plant new technologies," notes Lim.

This is not to say it isn't one currently. Several investments, involving highly skilled manpower and emerging technologies, were sealed in 2006 and they represent the first of its kind here. These include the establishment of a high volume flat panel TV production plant, a global water R&D laboratory, a commercial scale biologics manufacturing plant, a remotely-operated vehi-

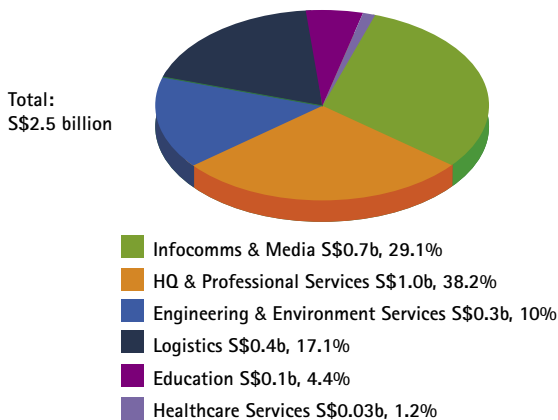
cle engineering and manufacturing plant, as well as an engine manufacturing plant. Further, EDB will capitalise on the impetus these new entrants bring to spur the expansion and promote horizontal integration within different clusters. For example, in the aerospace industry, maintenance, repair and overhaul (MRO) activities will gradually encompass engine manufacturing. EDB will continue to harness these pioneering projects to spearhead development in new industries such as alternative energy.

### INCOMING INVESTMENTS FROM NEW GEOGRAPHIES

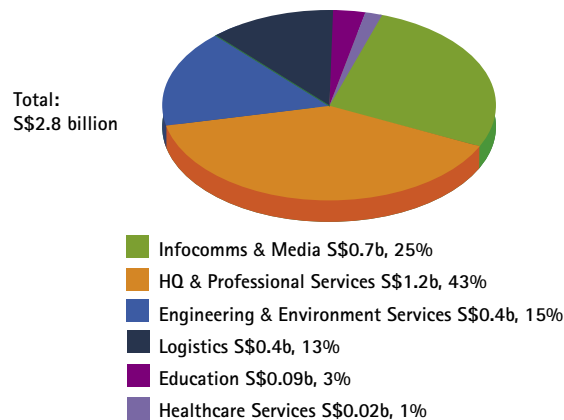
For the past five years, EDB has steadfastly and successfully engaged new geographies to invest in Singapore. And it is a trend that continues unabated. The number of Asia-Pacific (ASEAN, Australia, Greater China, India and Korea) and Middle East companies in Singapore has doubled to 13,000 and in 2006, 12 per cent of manufacturing FAI projects hailed from the Asia Pacific. Singapore also welcomed its inaugural investment from the Middle East – Kuwait's Proclad – which set up an oil equipment manufacturing facility. Other notable entries included Indonesia-based Pan Sino's coca processing plant, India's Bahar Industries' manufacturing and R&D centre, as well as Huijia's Chinese International School from China.

However, diversification does not mean Singapore's ties with long-term international business allies were neglected. In fact the US, Europe and Japan retained their commanding share of overall investments, strengthening relations along the way. And, while Singapore is on the constant lookout for business investments, EDB highlighted that around half of investments hail from existing investors each year. As such, maintaining good relations with Singapore-based MNCs, finding out their needs and identifying new opportunities are para-

Srvices TBS Commitments  
by Industry  
2005



Srvices TBS Commitments  
by Industry  
2006



mount considerations to ensure their competitiveness.


## FAVOURABLE PROSPECTS FOR 2007 & BEYOND

Ko also took time out during the press conference to commend the agency's team of officers. Attracting investors, he said, is a tough process, especially as Singapore does not have a big domestic market. "As a result, EDB has to sell the intangibles," he explains. "However, despite mounting world competition, the tenacity, imagination, agility and commitment of our officers reflect their quality and approach." He cited Shell Eastern Petroleum's cracker project, which took more than five years to materialise, having been placed on the backburner several times. He also praised the "quick, solid response" of his team, who are willing to work round the clock to divert lucrative projects into Singapore.

Having a solid frontline team, and with Singapore a leader in many aspects of the global economy, EDB is optimistic for more good times. It describes 2007's world-wide and local economic outlook as "buoyant", and forecasted that investments will contribute between S\$11 – S\$11.5 billion (US\$7.2 – US\$7.5 billion) to the economy.

The agency is also targeting to hit S\$9 billion (US\$5.9 billion) in manufacturing FAI and up to S\$2.9 billion (US\$1.9 billion) in services TBS.

To achieve these figures, EDB intends to sharpen Singapore's value proposition abroad via the "4-Ts" – Think, Try, Test and Trust. Companies will be encouraged to "think" of the city-state as a potential investment location for a broad spectrum of activities, from manufacturing to services. Based on Singapore's world-class pro-business environment, they will feel compelled to give the country a "try" for their investments to bear fruit. Next, they will look to Singapore to "test" innovative products and solutions for the world market. And finally, they will place their "trust" in the Republic to consistently deliver quality, productivity and respect for intellectual property.

"[This will be] EDB's formula as it looks ahead to ensure continued flow of investment into Singapore," says Lim. He added that Singapore's open employment market will continue to welcome both local and foreign talent, with more new jobs and long-term career options available as investors bring new opportunities into the country. 





# Alteon Training Brings Expertise To Singapore With S\$60m Training Centre

PROVIDING FLIGHT CREW WITH THE NECESSARY SKILLS, THE NEW FACILITY AIMS TO BUILD UP A CORE NUCLEUS OF SKILLED PROFESSIONALS FOR SINGAPORE'S AEROSPACE INDUSTRY.

Singapore's aerospace industry added another feather to its cap when it witnessed the opening of Alteon Training L.L.C.'s latest, and one of its largest, Training Centres on the island-state's shores. The wholly-owned subsidiary of The Boeing Company opened its new facility with Lim Hng Kiang, Minister of State for Trade and Industry, witnessing the commemoration.

The state-of-the-art training facility is sited in Changi, conveniently located near the vicinity of Changi National Airport, and was built at the cost of S\$60 million (US\$39.1 million). It houses seven full flight simulator bays, with four simulators in operation for the Boeing 777-200/300, 737-300/400/500, Airbus 320 and Fokker 100 aircrafts. The simulator for Boeing 737-800 is scheduled for installation by the middle of this year while the training simulator for Boeing 787, Boeing's "most successful launch commercial plane", remains on course to arrive by the first quarter of 2008.

## NEW MILESTONE

All of these mark an exciting new milestone for the prestigious flight crew training facility, which has been making waves worldwide. "We are very excited to celebrate the



newest addition to our global network of training centres," remarks Sherry Carbary, President, Alteon Training. "The Singapore centre greatly expands our capability to meet the increasing demands for aviation training in the region."

Indeed, with six classrooms and two computer-based training rooms, the new training centre has the capacity to train up to 6,000 pilots per year, in addition to trained maintenance and cabin crew, to supplement the flourishing aerospace industry here in Singapore as well as the region. The high-tech facility allow trainees the use of workstations equipped with self-guided computer-based training to monitor and chart the pace of their learning experience at the training centre.

"This training centre is one of our most technologically advanced and well equipped training centres in the world," says Doug Miller, Vice President, Boeing International Corporation. "The establishment of this centre further underlines Boeing's desire to deepen our relationship with the local aerospace industry and with Singapore as a whole."

Alteon Training L.L.C. was formed in April 2003 after Boeing gained full control over Alteon's predecessor, FlightSafety Boeing Training International in 2002. Having undergone a successful re-branding exercise, Alteon has since become the world's first full service provider of airline training. Currently, Alteon operates over 80 full-flight simulators at over 23 training locations worldwide.

## VALUE-ADDED SERVICE


The company's presence in the local aerospace industry has added more value to the range of expertise and services currently provided. The aerospace industry is regarded as one of the fastest growing in-



dustries in Singapore and in just the first three quarters of 2006, the sector saw an excellent growth rate of over 15 per cent. It is also home to more than a quarter of the world's Maintenance, Repair and Overhaul (MRO) activities, with companies like SIA Engineering Company blazing a trail in this arena.

"Given the tremendous growth potential of the industry, there is now a growing demand for specialised aerospace-related training," says Lim. "The training of pilots, cabin crew, maintenance personnel and aviation business executives will be imperative in sustaining the growth in the aerospace sector."

Acknowledging the significance of Alteon's new regional training centre to the industry, Lim adds, "Alteon's choice of Singapore as its regional training centre fits very well with our vision to be the region's Aerospace Training Campus. It has certainly carved an important milestone in aerospace training."

With Alteon Training's crucial contribution to the local and regional aerospace industry, the sky is the limit for the company's future growth and success. 

**Indeed, with six classrooms and two computer-based training rooms, the new training centre has the capacity to train up to 6,000 pilots per year, in addition to trained maintenance and cabin crew, to supplement the flourishing aerospace industry here in Singapore as well as the region.**

# Retronix Provides Value-Added Services To Electronics Industry

IN PROVIDING THE INDUSTRY WITH A SERVICE NO ONE WAS OFFERING, THE COMPANY HAS SINCE ESTABLISHED ITSELF AS AN INNOVATIVE AND FAST-GROWING INTERNATIONAL NAME TO WATCH FOR.

**T**he electronics manufacturing industry churns out numerous products each year to meet the growing needs of an increasingly tech-savvy and dependent society. From computers to mobile phones to high-end equipment such as X-Ray machines, we are constantly looking out for the next new advanced gadget or device that would take us to the next level of speed and convenience.

## CORNERING A NICHE

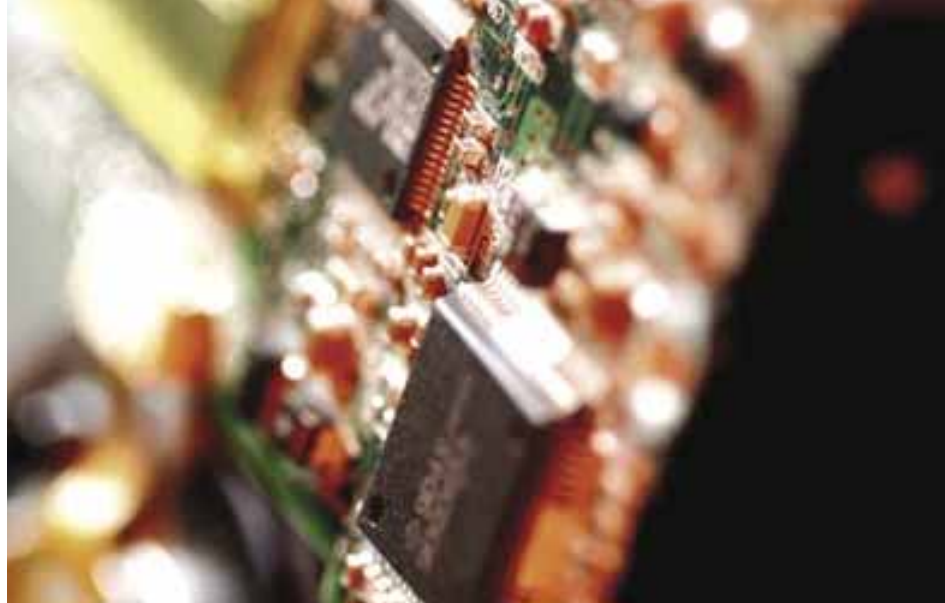
However, some companies opt to carve a niche in this dynamic industry by providing service support to the bigger original equipment manufacturers (OEMs) and electronic manufacturing services (EMS) companies. While staying in the background, they continue to provide critical and integral product services that help these OEMs save a substantial amount of money in resource wastage.

Retronix Limited, who was the first to introduce asset (component) recovery to the electronics industry, is one such company. The organisation, originally founded in Glasgow, Scotland in 1992, has since developed its business to include providing de-bugging, repair and de-manufacturing services to the larger OEMs in the electronic industries. The company is also ranked among the Top 20 fastest growing companies in Scotland.

In fact, by providing this unique set of services, the company has done so well it has managed to corner off a significant portion of the industry's product servicing and recovery needs, despite competition from other companies who have since jumped on the bandwagon. Retronix now has branches set up in countries ranging from United Kingdom to Singapore to China, and some of their key product and service features include laser re-balling and providing functional tests for components to ensure their workability.


## SERVICING THE REGION

The company opened its Singapore branch in mid-2006 with a capital investment of S\$1.2 million (US\$750,000). This was mainly to tap on the increase in local demand for their services and to provide service support to its major Singapore-based clients. The branch currently has 50 employees, with most technicians performing de-bugging and de-manufacturing duties. Retronix has underlined its intent to enhance the skill set of local technicians by bringing in experienced debug trainers to improve their job knowledge. It also looks to Singapore as a base to improve its marketing thrust for the region and act as a launch pad for new, innovative technology, further reducing costs for major manufacturers. Even as the company looks for opportunities to expand its operations in the island-state, the service it currently provides remains vital to the industry.



Its team of well-drilled de-bugging technicians helps manufacturers to reduce their outlay on production. This is done by analysing the reasons behind printed circuit boards (PCBs) that had failed the quality test. The technicians would then find out the faults inherent in these PCBs and rectify them by repairing the specific portion before sending it for another round of tests to ensure its workability. This reduces OEMs' costs as the faulty PCBs would have been thrown out otherwise.

Not only do they perform de-bugging services, Retronix also helps companies cut down significant wastage by de-manufacturing. This refers to the process of salvaging the only valuable component left in failed PCBs with unpinpointed faultiness – the chip sets. Retronix's technicians would recycle these chips, testing their functions to ensure that everything is working before re-releasing these chip sets into the market, thereby helping original manufacturers to save a significant portion of production costs.

With the electronics industry drawing in S\$4.3 billion (US\$2.8 billion) worth of fixed asset investments in 2006, Retronix looks to leverage Singapore's flourishing electronic manufacturing landscape for more growth and business opportunities in the coming years. 

**The organisation, originally founded in Glasgow, Scotland in 1992, has since developed its business to include providing de-bugging, repair and de-manufacturing services to the larger OEMs in the electronic industries.**



(L-R): Professor Kam Chan Hin, Chair, NTU School of Electrical and Electronic Engineering and Henry Liu, Chairman, aRFIC.

# Advanced RFIC Partners NTU To Strengthen Semiconductor Industry

**S\$9 MILLION INVESTED TO ADVANCE HIGH-END INTEGRATED CIRCUIT TECHNOLOGY**

Singapore's semiconductor industry has grown by leaps and bounds over the years as the country stepped up efforts to transform itself into a knowledge- and innovation-driven hub. One of the important factors behind this accomplishment is the country's highly skilled and tech-savvy talent pool.

Advanced RFIC Pte Ltd (aRfic), an industry leader in the field of Radio Frequency Integrated Circuit (RFIC) technology, recognises this importance of a strongly innovative and skilled labour pool, and this is evident as its recent collaboration with Nanyang Technological University (NTU) looks to strengthen this key resource.

A highly specialised field involving patented engineering design and development, RFIC technology is essential in size reduction and power efficiency for most of today's modern electronic applications. Without it, mobile phones for instance, would still be bulky and cumbersome instead of the sleek, feature-packed models they are now.

According to Henry Liu, Chairman, aRfic, the joint partnership has several key objectives: harvest greater expertise in the high technology sector that is RFIC; develop further research on deep submicron nanometer devices; create design software that helps predict device performance; and strengthen the company's R&D capabilities.

## SHAPING THE FUTURE

The partnership will see the Singapore-based aRfic invest S\$9 million (US\$5.9 million) to further advance R&D in RFIC technology. It will also create postgraduate scholarships for NTU students with a total of S\$1.4 million (US\$937,440) set aside for 30 scholar-



**“The semiconductor industry remains an important economic driver for Singapore and it is crucial we develop the talent to meet this growth,”**

– Professor Kam Chan Hin, Chair, NTU’s School of Electrical and Electronic Engineering

ships. Each two-year scholarship is worth S\$48,000 (US\$31,250).


In addition, a new state-of-the-art laboratory dedicated to RFIC technology research will be set up at NTU’s School of Electrical and Electronic Engineering. In fact, NTU could well be the only university in Asia to house a world-class 300mm probe system that makes modeling, measurement and characterisation of nano-RF devices as well as integrated circuits and systems possible.

Students selected for the scholarship will work on four key projects in the new laboratory over two years. To ensure that the projects are market-focused and meet industry needs and trends, the students will work closely with industry players.

## MOVING FORWARD

By preparing future generations, the aRfic-NTU initiative looks set to push the local semiconductor industry to the next level.

Needless to say, the potential of the RFIC sector is endless. And Singapore is keen on developing it further to move the local semiconductor industry up the value chain. “The semiconductor industry remains an important economic driver for Singapore and it is crucial we develop the talent to meet this growth,” explains Professor Kam Chan Hin, Chair, NTU’s School of Electrical and Electronic Engineering.

Not only does NTU have established strengths in integrated circuit design and development and strong ties with the industry, its research group in IC design ranks among the top few worldwide. “Through research efforts, NTU has been helping to provide the critical R&D support in Singapore’s push up the semiconductor value chain,” adds Professor Kam. “With this collaboration, NTU can further provide the necessary postgraduate training to prepare our students for the higher-end market of the industry.” 

Henry Liu, Chairman, aRFIC and Professor Kam Chan Hin, Chair, NTU’s School of Electrical and Electronic Engineering (centre) with their respective staff members.

# Wacker's New Technical Centre Synergises Regional Operations



WITH THE NEW FACILITY, WACKER IS POISED TO BRING ITS REGIONAL ACTIVITIES TO THE NEXT LEVEL.

**W**acker Chemie AG, founded in 1914 by Dr. Alexander Wacker, has long been associated with excellence in the quality of products and services provided. The Wacker Group has since grown into an international chemicals company with some 14,400 employees, 22 production sites and over 100 sales offices worldwide. Wacker is a leader in numerous industrial sectors, offering a comprehensive range of state-of-the-art products, and these are highly sought after in various high-growth end-user sectors such as photovoltaics, electronics and pharmaceuticals.

Wacker's development has continued with the launch of its new technical centre in Singapore. The new facility, opened in January 2007, serves as a regional Centre of Excellence for construction polymers, silicone emulsions, silicone resins and antifoam agents. Its other functions include the development of applications in the construction, textiles, pulp- and paper-processing sectors, and in the process industry. With all these capabilities in place, Wacker hopes to strengthen its Asian presence in due course.

## STRONG REGIONAL SHOWING

It is also precisely due to Southeast Asia's strong growth rate that prompted Wacker Chemicals (South Asia) Pte. Ltd (Wacker South Asia) to consolidate its presence and operational efficiency here by investing in this technical centre. "We are generating double-digit sales growth in Asia, which accounts for almost one third of Group sales today," says Dr. Rudolf Staudigl, Executive Board Member for Asia, Wacker Chemie AG. "The Singapore technical centre is another important milestone in our growth strategy for Southeast Asia."

Singapore was chosen for its strategic location, which enables investors to tap into the fast-growing Asian market. This allows Wacker to reinforce its position as a leader in high-quality chemical raw materials. The new technical centre, located in the Singapore Science Park, also offers customer support in the development of new products and product applications with the aid of its new 400 sq m laboratory. This is in conjunction with the move of their sales office to the same site, giving optimum and multi-faceted service and product support for their customers.

"Singapore has an excellent infrastructure with skilled personnel and high-class universities, valuable assets for developing business and R&D," says Staudigl. "Furthermore, it



is also very safe and all these make Singapore a good place to live and to do business in."

## EXTENSIVE BUSINESS WEB

Wacker's extensive operations can be generally categorised as such: Wacker Silicons, Wacker Polymers, Wacker Fine Chemicals, Wacker Polysilicon, and Siltronic. Wacker Silicons, a world-leading silicones manufacturer, creates over 3,000 highly specialised and innovative products ranging from silicone fluids, emulsions, resins, elastomers and sealants to silanes and pyrogenic silicas. These products are valued in sectors such as construction, chemicals, cosmetics, textiles, automotive, paper and electronics.


Wacker Polymers, too, is the leading producer of state-of-the-art binders and polymer additives, materials used mainly in construction, automaking, paper and adhesives, as well as in the production of printing inks and surface coatings.

Wacker Fine Chemicals, on the other hand, deals with biologics and other biotechnology products, such as cyclodextrins and cysteine; while Wacker Polysilicon is widely used in the semiconductor and photovoltaics industries. Last but not least, Siltronic produces Hyperpure silicon wafers and monocrystals for semiconductor devices.

## STRATEGIC GROWTH

Wacker has been a vital supplier of chemical products to the Southeast Asia region for many years. This is true as Wacker South Asia was first established in 1984 to coordinate the region's sales activities. A familiar face in the local business landscape, they first began operating in Singapore in 1999 with its production facility for 200mm silicon semiconductor wafers. It has, however, not rested on its laurels, as the company remains constantly on the lookout for further business development opportunities.

"A key element in our strategy for regional growth is substantial investments in local production capacities. Here in Singapore, for instance, we are building a new factory for the production of cutting-edge 300mm semiconductor wafers together with Samsung Electronics," Staudigl reveals. "Operations are scheduled to start by 2008 and the overall investment totals to S\$1.5 billion (US\$1 billion). This will enable us to serve the high demand for 300 millimetre wafers, especially in the Asian markets." The joint venture is expected to produce 300,000 wafers per month and have 800 employees by 2010.

With the local and regional economy displaying strong signs of continued growth, The Wacker Group looks poised to increase its regional presence and activities in the near future. 

**"A key element in our strategy for regional growth is substantial investments in local production capacities. Here in Singapore, for instance, we are building a new factory for the production of cutting-edge 300mm semiconductor wafers together with Samsung Electronics,"**  
– Dr. Rudolf Staudigl,  
Executive Board  
Member for Asia,  
Wacker Chemie AG



# Biomedical Sciences 2006: Manufacturing Output Hits All-Time High Of S\$23b

NEW MANUFACTURING AND R&D COMMITMENTS CONTRIBUTED TO EXCEPTIONALLY STRONG GROWTH IN SINGAPORE'S BIOMEDICAL SCIENCES (BMS) INDUSTRY.

**W**hen the Biomedical Sciences initiative was launched in Singapore back in June 2000, it was by no means an accidental development. Climbing out of economic recession and looking to stay competitive, the government decided to bank on higher value added, knowledge intensive activities to revitalise its economy. This led to the biomedical sciences (BMS) industry being pinpointed to be developed into a key economic driver, in addition to electronics, engineering and chemicals.

What a difference some six years make. Today, BMS is one of the fastest growing and most sophisticated sectors in the country, with such activities as product discovery and development, clinical research, high-tech manufacturing, regional business functions as well as health care delivery.

## MANUFACTURING & SERVICES: TWIN GROWTH ENGINES OF BMS INDUSTRY

Indeed, 2006 proved to be an exceptional year for the BMS industry. Manufacturing output climbed to S\$23 billion (US\$15 billion) last year, an unprecedented 30.2 per cent increase over 2005.

Thanks to major international players like GlaxoSmithKline, Pfizer, Merck, Sharp and Dohme, Schering-Plough and others, pharmaceuticals manufacturing recorded a strong performance, accounting for 91 per cent of total output, while Medical Technology continues to contribute significantly, maintaining output levels at over S\$2 billion (US\$1.3 billion).

Taken together, the level of BMS manufacturing fixed asset investment (FAI) commitments increased to S\$901 million (US\$586.6 million), up from the previous year's S\$859.5 million (US\$559.5 million). This impressive showing constituted 10.2 per cent of EDB's total FAI commitments of S\$8.8 billion (US\$5.7 billion) for 2006.

While manufacturing shone, so did investments in R&D and Business Services, which grew by over a third to attain a record high of S\$217.3 million (US\$141.5 million) in total business spending (TBS). This was 7.6 per cent of EDB's total TBS commitments. In terms of value added (VA) per annum, BMS projects committed in 2006 stand to contribute S\$2.26 billion (US\$1.5 billion) when fully realised, or 16.8 per cent of EDB's total expected VA per annum in 2006 commitments.

In the manufacturing arena, biologics – the development of new classes of drugs using genetics and cell culture – is growing rapidly. Genentech, one of the world's most successful biotechnology companies, will begin operations in a biologics plant jointly set up by Lonza and Bio\*One Capital. Bio\*One Capital is the BMS investment arm of the Singapore Economic Development Board (EDB), managing over S\$1.2 billion (US\$780 million) in funds for the industry, while the Lonza Group is one of the world's leading life sciences contract manufacturing company producing biological therapeutics. In 2006, Bio\*One also invested S\$114 million (US\$74.2 million) into 16 new and follow-on projects, with close to 95 per cent of invested funds channelled into companies with Singapore-based activities, fuelling the growth of Singapore's BMS landscape. Other significant developments include GSK Biologics breaking ground for its largest vaccine investment in Asia – a human vaccine manufacturing facility – the first of its kind in Singapore.

Pharmaceuticals manufacturing also received a shot in the arm with Abbott's S\$450 million (US\$292.9 million) greenfield nutritional plant and Merck's S\$100 million (US\$65.2 million) expansion of its existing production formulation facility.

Over in medical technology, Singapore's strengths in complex manufacturing and precision engineering were leveraged by companies involved in advanced manufacturing activities. Edwards Lifesciences will build a tissue heart-valve production plant; MDS Sciex opened its first Asia-Pacific plant to manufacture its new cellular analysis system; and Philips Medical Systems established its first learning centre in the region – one of three worldwide – to train the local workforce on the use of its advanced imaging equipment.

## HARNESSING R&D TO BUILD INVESTOR CONFIDENCE

Singapore continues to be the prime location in Asia for translational and clinical research as well as clinical trials management. Together with its solid intellectual property protection regime and its established regulatory infrastructure, the city-state has also made significant progress in pooling a critical mass of highly skilled BMS R&D manpower.

This is evident as there were a total of 4,054 research scientists and engineers here in 2005, with overall total expenditure on biomedical research reaching S\$888.9 million (US\$578.7 million). In 2006, research institutes under the Biomedical Research Council collectively published more than 335 papers in international scientific journals – a 200 per cent increase from 2001. Fifteen patents have also been awarded to the biomedical research units of the Agency for Science, Technology and Research (A\*STAR) to date. All of these point to a flourishing domestic BMS R&D scene.

The discovery and development of new drugs and medical devices was not neglected in the midst of all these developments. The Novartis Institute for Tropical Diseases (NITD) established a new Ma-

**The BMS industry is expected to maintain its growth trajectory and remains firmly on track to reach S\$25 billion (US\$16.3 billion) in manufacturing output and generate 15,000 jobs by 2015.**



laria research programme in partnership with the Wellcome Trust, Medicines for Malaria Venture and EDB. The world's largest tocotrienols (a drug which helps lower cholesterol levels) R&D centre was set up by Davos Life Science while US-based Codexis also has plans to open the first biocatalyst centre here.


Clinical trials on S\*BIO's SB939 are expected to begin both here and in North America by early 2007 and will be the first locally developed novel clinical candidate for targeted cancer therapy. ES Cell International achieved a world's first with its GMP-compliant human embryonic stem cell lines suitable for clinical applications. The company intends to begin human trials for diabetes and congestive heart failure next year.

## GAINING MOMENTUM

The BMS industry is expected to maintain its growth trajectory and remains firmly on track to reach S\$25 billion (US\$16.3 billion) in manufacturing output and generate 15,000 jobs by 2015. R&D remains a key sector as the Ministry of Trade & Industry unfurled its Science & Technology Plan 2010 in February 2006. Some S\$7.5 billion (US\$4.9 billion) will be committed over the next five years to sustain innovation-driven growth through economic-oriented R&D, which supports Singapore's key industry clusters. Already, S\$5.4 billion (US\$3.5 billion) has been allocated to A\*STAR to develop the public sector while EDB will receive S\$2.1 billion (US\$1.4 billion) in funds for the private sector.

Singapore will also step up efforts to build a dedicated plug and play environment for BMS R&D and manufacturing in order to meet companies' needs all in one location. For example, SGS opened its new Quality Control Testing laboratory and leading reagents company Invitrogen set up its first on-site supply centre in Asia at Biopolis.

Besides manufacturing and R&D, other areas such as the Healthcare Services sector will continue to be groomed. The Joint Commission International (JCI), which sets the gold standard accreditation for patient safety and care, opened its Asia-Pacific office in Singapore, a strong endorsement of Singapore's role in the international healthcare arena.

With quality infrastructure, manpower, research institutes, readily available funding and an established business community, coupled with exciting developments and long-term initiatives, the BMS landscape can look forward to an even more vibrant and dynamic future. 

The Economic Development Board (EDB) is Singapore's lead agency responsible for planning and executing strategies to sustain Singapore's position as a global hub for business and investment.

We work closely with local and foreign companies across a diverse range of activities in both manufacturing and services to help them move towards higher value-creating operations in an increasingly knowledge-based and innovation-driven environment. We also encourage companies to use Singapore as a headquarters and total business centre to manage their global or regional functions to service their global or Asia Pacific operations.

Singapore is today a "Global Entrepolis" – a compelling global hub for business and investment where entrepreneurs and enterprise converge, spark and realise innovations, forge partnerships, and create value in manufacturing and services industries. EDB acts as a catalyst and facilitator to ensure a thriving "enterprise ecosystem" in Singapore. We encourage innovation and entrepreneurship by helping to create an environment which is conducive for start-ups and companies of all sizes to interact with each other with good corporate governance practices and where intellectual property is protected.

For more information on how EDB can help in your business and investment, please visit [www.sedb.com](http://www.sedb.com).

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