



Chapter 9

MANUFACTURING

OVERVIEW

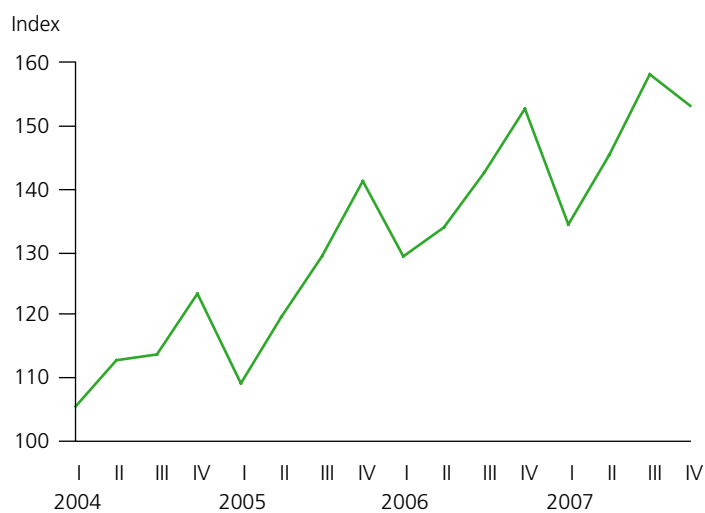
[Chart 9.1]

Growth in the manufacturing sector slowed to 0.2 per cent in the last quarter of 2007 compared with 11 per cent in the previous quarter. This was largely due to a contraction in the biomedical manufacturing cluster. The transport engineering, electronics, chemicals and precision engineering clusters, however, performed better in the fourth quarter while the general manufacturing industries cluster saw a more moderate performance.

For 2007 as a whole, the manufacturing sector grew by 5.8 per cent, down from 12 per cent in 2006. The transport engineering cluster continued to grow at a robust pace while the electronics, chemicals and general manufacturing industries clusters saw more modest growth. The biomedical manufacturing cluster, however, registered a marginal contraction.

INDEX OF INDUSTRIAL PRODUCTION TOTAL MANUFACTURING (2003 = 100)

[Chart 9.1]



PERFORMANCE OF CLUSTERS

[Tables 9.1, A9.1–A9.4 and Chart 9.2]

Another strong showing from the transport engineering cluster...

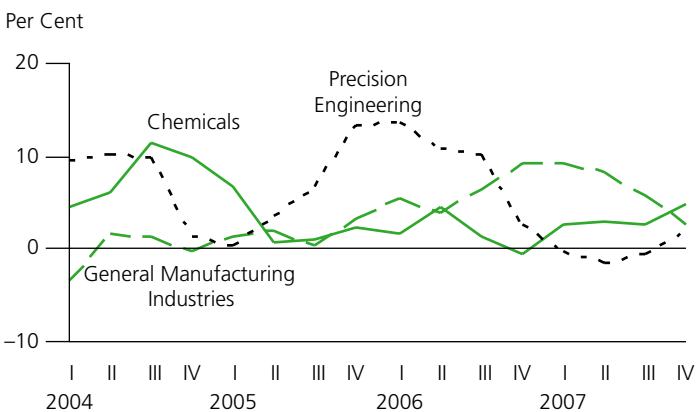
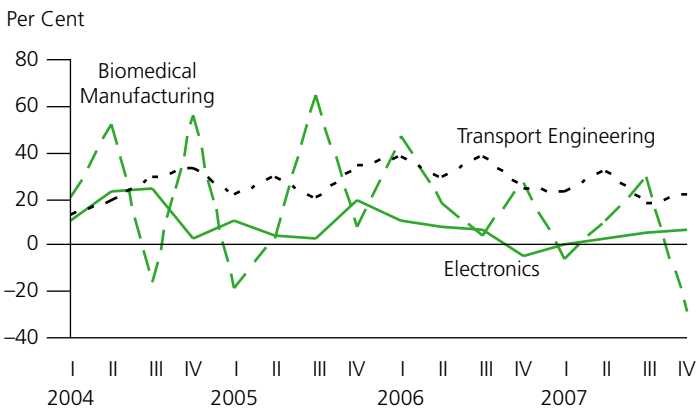
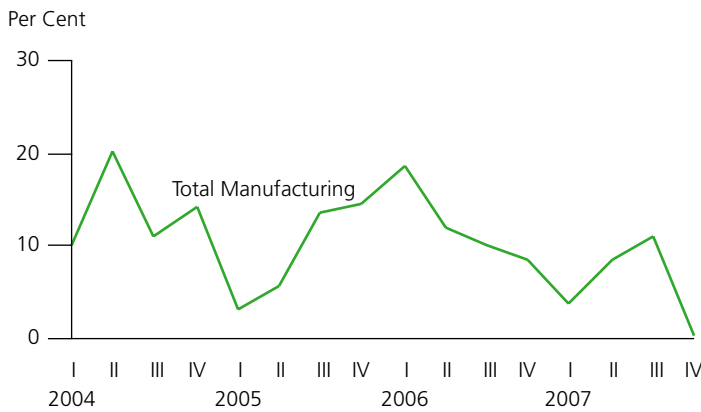
The transport engineering cluster continued to show strong growth of 24 per cent in 2007 compared to 32 per cent in 2006. Within the cluster, the output of the marine and offshore engineering segment grew substantially by 32 per cent as contracts for ship building, ship conversion, ship repairing and oil rig fabrication kept shipyards busy. The aerospace segment grew by 9.6 per cent due to a higher volume in repairs of commercial aircraft fuelled by the boom in low cost air travel. The land transport segment grew 19 per cent on the back of higher export orders.



Yet another strong year for the marine and offshore engineering segment...

CHANGES IN INDEX OF INDUSTRIAL PRODUCTION

[Chart 9.2]



MANUFACTURING

[TABLE 9.1]

INDEX OF INDUSTRIAL PRODUCTION (2003 = 100)	2007 Value Added (% Share)	2006		2007				2007
		4th Qtr	Annual	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Annual
		Percentage Change Over Same Period Of Previous Year						
Electronics	29.7	-4.1	4.5	0.8	2.5	5.8	6.4	4.0
Chemicals	11.8	-0.6	1.7	2.5	3.0	2.6	5.0	3.3
Biomedicals Manufacturing	24.4	26.8	22.4	-5.4	10.6	29.0	-28.0	-0.6
Precision Engineering	13.0	2.7	9.1	-0.1	-1.6	-0.5	2.1	0.0
Transport Engineering	11.9	24.7	32.1	23.6	31.4	18.1	22.0	23.5
General Manufacturing Industries	9.2	9.3	6.3	9.4	8.3	5.7	2.5	6.3
Total Manufacturing	100.0	8.4	11.9	3.9	8.6	11.0	0.2	5.8

Note: The Industries are classified according to the SSIC 2000.

Source: Economic Development Board

The electronics cluster grew by 4.0 per cent, a mild slowdown from 4.5 per cent in the previous year. The semiconductors segment grew 16 per cent with output geared to meet demand for NAND flash and DRAMs, while the production of electronic modules and components rose 7.0 per cent from 2006 levels. On the other hand, contractions were seen in the computer peripherals (-20 per cent), infocomms and consumer electronics (-7.7 per cent), and data storage segments (-1.6 per cent). The decline in the data storage segment moderated as the higher output of disk media compensated for the fall in production of disk drives.

The chemicals cluster grew by 3.3 per cent compared with 1.7 per cent in 2006. The production of petrochemicals and specialty chemicals rose by 5.4 per cent and 6.5 per cent respectively. However, these expansions were moderated by a 0.2 per cent dip in output of refined petroleum products, due to some refinery plant maintenance shutdowns during the year.

The precision engineering cluster saw flat output growth in 2007. The 6.5 per cent growth in the machinery and systems segment was offset by a 4.3 per cent contraction in the precision modules and components segment. Production of precision components, springs, metal stampings, dies and moulds fell while output of machinery – such as hoists, lifting machinery, refrigerating machinery, industrial process control equipment, switchgear and switchboards – increased.

The biomedical manufacturing cluster shrank 0.6 per cent. Although the medical technology segment grew 15 per cent, the cluster was dragged down by a 2.5 per cent contraction in the pharmaceuticals segment. Plant maintenance shutdowns and changes in product mix resulted in a significant contraction in the production of active pharmaceutical ingredients in the last quarter of 2007.

The general manufacturing industries grew by 6.3 per cent, similar to that in 2006. Performance of the food, beverages and tobacco segment was a strong 11 per cent, while the printing segment grew 2.4 per cent over the year.

INVESTMENT COMMITMENTS

[Tables 9.2, A9.5–9.6 and Chart 9.3]

Investor confidence in our manufacturing sector remained strong...

Investments in manufacturing were exceptionally strong in 2007. In the final quarter, some \$8.7 billion of fixed assets investment were committed. For the full year, the sector attracted \$16.1 billion of investment commitments, up from \$8.8 billion in 2006. When fully operational, these commitments would generate \$6.0 billion of value added and create almost 16,900 jobs, of which 59 per cent are skilled.

EU investors (mainly from Netherlands, Switzerland, Germany, UK and France) committed almost \$8.4 billion, or 52 per cent of total investments. This was followed by US investors, which accounted for 19 per cent. The next largest sources came from local and Japanese investors, which committed 11 per cent and 6.3 per cent respectively.

About 91 per cent of the commitments went to projects in the chemicals, electronics, and biomedical manufacturing clusters, which attracted \$8.6 billion, \$5.1 billion and \$0.9 billion respectively. For the transport engineering and precision engineering clusters, investment commitments amounted to \$0.5 billion and \$0.4 billion respectively.

EU investors committed a large share of total investments...

MANUFACTURING INVESTMENT COMMITMENTS BY CLUSTER, 2007

[TABLE 9.2]

Cluster	Fixed Assets Investment (\$ Billion)	Fixed Assets Investment (%)	Value Added (\$ Billion)	Value Added (%)	Employment (No)	Employment (%)	Skilled & Above (%)
Electronics	5.14	31.9	1.68	28.0	6,198	36.7	64
Chemicals	8.63	53.7	1.00	16.6	1,039	6.2	74
Biomedical Manufacturing	0.93	5.8	1.50	24.9	913	5.4	81
Precision Engineering	0.41	2.6	0.62	10.3	2,999	17.8	75
Transport Engineering	0.50	3.1	0.73	12.1	4,839	28.7	36
General Manufacturing Industries	0.47	2.9	0.49	8.1	889	5.3	56
TOTAL	16.08	100.0	6.02	100.0	16,877	100.0	59

Note: Figures may not add up due to rounding.

Source: Economic Development Board

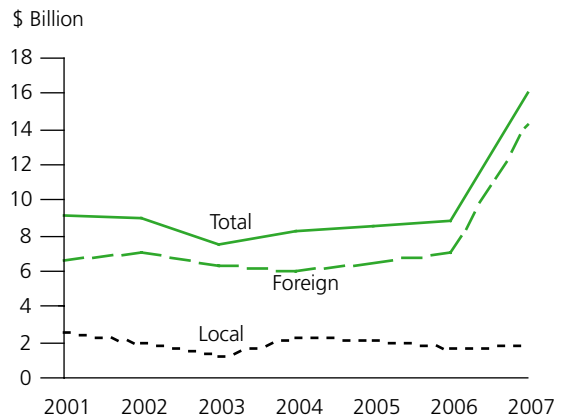
KEY INDICATORS IN THE MANUFACTURING SECTOR

[Chart 9.3]

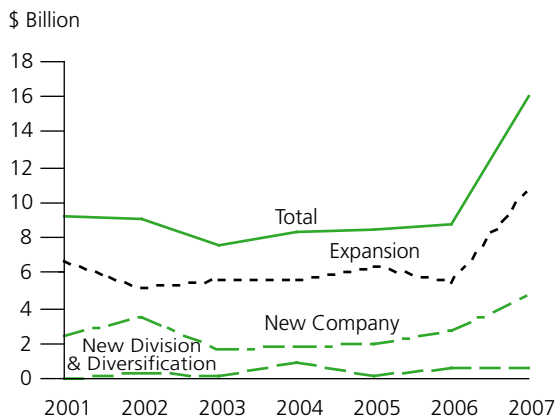
VALUE ADDED PER WORKER OF MANUFACTURING



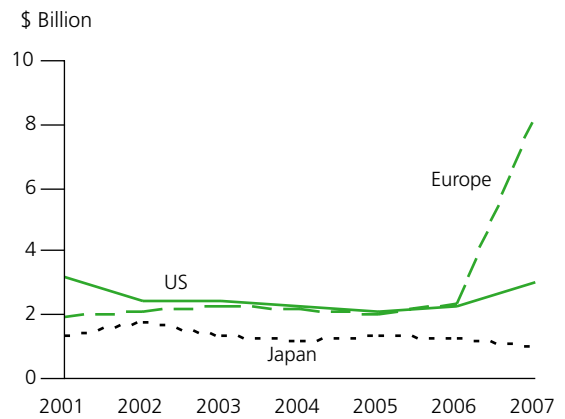
INVESTMENT COMMITMENTS IN MANUFACTURING



NEW COMPANY, EXPANSION AND NEW DIVISION & DIVERSIFICATION INVESTMENTS



INVESTMENT COMMITMENTS BY REGION/COUNTRY



RESEARCH & DEVELOPMENT (R&D)

Continued expansion in Singapore's R&D capabilities...

R&D EXPENDITURE

[TABLE 9.3]

Gross domestic expenditure on R&D (GERD) increased 9.3 per cent from \$4.6 billion in 2005 to \$5.0 billion in 2006. Private sector expenditure on R&D rose by 8.6 per cent from \$3.0 billion in 2005 to \$3.3 billion in 2006, accounting for 66 per cent of GERD. The manufacturing sector accounted for 67 per cent of private sector expenditure on R&D in 2006.

Increasing at a faster rate than private sector expenditure on R&D, public sector expenditure on R&D gained 11 per cent from \$1.6 billion expenditure in R&D in 2005 to \$1.7 billion in 2006. Of the total, the public research institutes accounted for 36 per cent (\$623 million); the higher education sector, 34 per cent (\$576 million); and the government sector, 30 per cent (\$518 million).

As a percentage of GDP, GERD was maintained at 2.3 per cent in 2006. Likewise, private sector expenditure on R&D as a percentage of GDP remained unchanged at 1.5 per cent from 2005 to 2006.

Singapore's R&D intensity (GERD as a percentage of GDP) is similar to the OECD average (2.3 per cent in 2005), but is below that of the US (2.6 per cent in 2006), Germany (2.5 per cent in 2006) and Japan (3.3 per cent in 2005). Relative to the small advanced countries, Singapore's R&D intensity is ahead of that of Ireland (1.3 per cent in 2006) and Belgium (1.9 per cent in 2006) and is approaching that of Denmark (2.4 per cent in 2006). But it trails the world leaders: Sweden (3.8 per cent in 2006), Finland (3.4 per cent in 2007) and Switzerland (2.9 per cent in 2004). Among the Newly Industrialized Economies, Singapore's R&D intensity is approaching that of Taiwan (2.5 per cent in 2005) but is behind that of South Korea (3.0 per cent in 2005).

R&D EXPENDITURE

[TABLE 9.3]

	Gross Expenditure on R&D (GERD) (\$ Million)	Private Sector Expenditure on R&D (\$ Million)	Public Sector Expenditure on R&D (\$ Million)	Private Sector's Share of GERD (%)	GERD as % of GDP (%)	Private Sector Expenditure on R&D as % of GDP (%)
2001	3,233	2,045	1,188	63.3	2.1	1.3
2002	3,405	2,091	1,313	61.4	2.2	1.3
2003	3,424	2,081	1,343	60.8	2.1	1.3
2004	4,062	2,590	1,472	63.8	2.2	1.4
2005	4,582	3,031	1,551	66.2	2.3	1.5
2006	5,010	3,293	1,717	65.7	2.3	1.5

Source: Agency for Science, Technology and Research

R&D MANPOWER

[Chart 9.4]

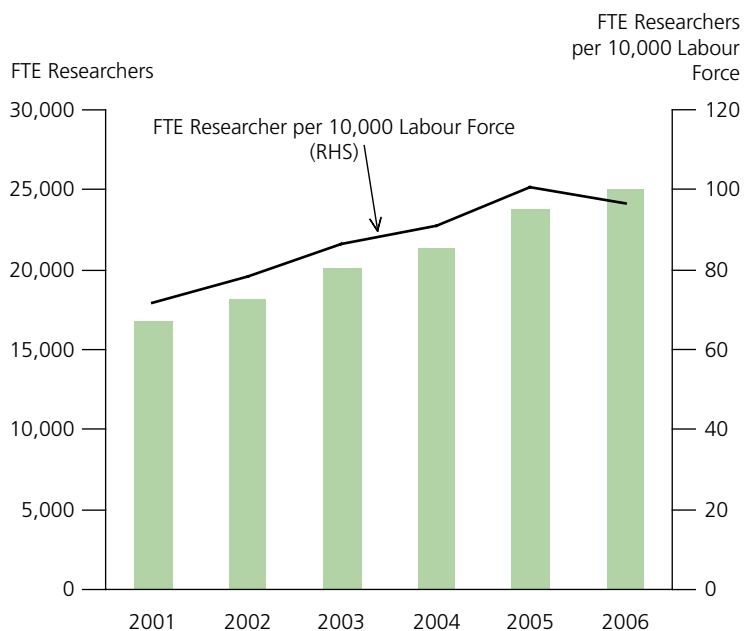
The full-time equivalent (FTE) number of researchers in Singapore rose by 5.2 per cent to 25,033 in 2006. As the labour force grew at a faster rate of 9.6 per cent in 2006, the FTE number of researchers per 10,000 labour force experienced a decline from 100 in 2005 to 96 in 2006.

In the private sector, the FTE number of researchers increased 4.6 per cent to 14,894 in 2006. In terms of educational profile, 6.4 per cent (957) were PhD holders, 21 per cent (3,178) were Master degree holders and 55 per cent (8,230) were Bachelor degree holders.

In the public sector, the FTE number of researchers, excluding full-time postgraduate research students, climbed 9.3 per cent to 6,378 in 2006. The number of full-time postgraduate research students increased 1.2 per cent to 3,761 in 2006. Excluding full-time postgraduate research students, 40 per cent (2,546) of public sector researchers were PhD holders, 26 per cent (1,672) were Master degree holders and 32 per cent (2,052) were Bachelor degree holders. Among the full-time postgraduate research students in 2006, 27 per cent (1,005) were enrolled on Master degree programmes and 73 per cent (2,756) on PhD programmes.

RESEARCHERS

[Chart 9.4]



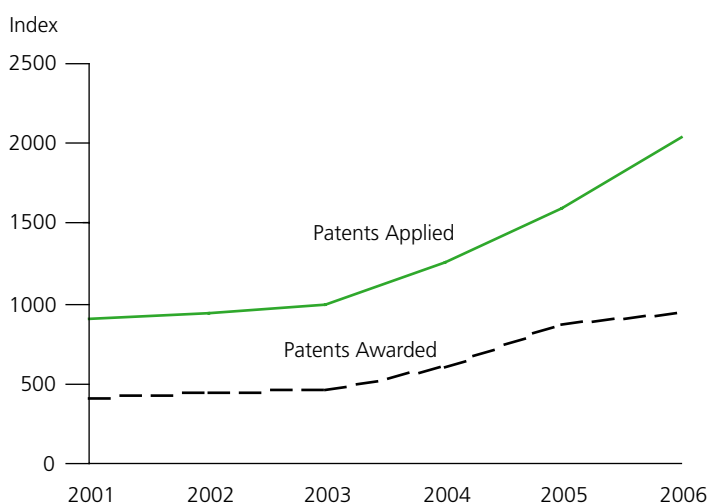
PATENTING ACTIVITY OF R&D PERFORMERS

[Chart 9.5]

The patenting activity of R&D performers in Singapore continued to gain ground in 2006. The number of patent applications increased 28 per cent to 2,036 in 2006, and the number of patent awards grew 6.4 per cent to 933 in 2006. The private sector accounted for 77 per cent of the patent applications and 83 per cent of the patent awards of the R&D performers in 2006.

PATENTING INDICATOR

[Chart 9.5]



LOCAL ENTERPRISE DEVELOPMENT

SMALL AND MEDIUM-SIZED ENTERPRISES (SMEs)

(1) Pro-Business Environment

Entrepreneurship Development

BlueSky Exchange & Evening and BlueSky Festival

The Action Community for Entrepreneurship (ACE) organises activities regularly to promote dialogue and networking amongst entrepreneurs. The BlueSky Exchange and Evening is a networking session for aspiring entrepreneurs and startups to establish contacts with financiers, professionals and the more established entrepreneurs. In 2007, some 460 entrepreneurs attended 5 such networking sessions. The BlueSky Festival is held annually to celebrate and showcase the spirit of entrepreneurship. The BlueSky Festival in July 2007 attracted some 800 participants.

Access to Finance

Loan Financing Schemes

The Local Enterprise Finance Scheme (LEFS) offers fixed interest rate loans to help enterprises upgrade and expand their operations while the Loan Insurance Scheme (LIS) helps enterprises venture overseas. Loans amounting to \$716 million were approved for some 3,600 SMEs under LEFS and LIS in 2007. These loans are expected to generate value-added of about \$1 billion.

The 3rd tranche of the Loan Insurance Scheme (LIS 3) was launched in August 2007 following the success of LIS 1 and LIS 2. A projected total of \$3 billion private sector loans will be catalysed over the next four years. With LIS 3, a wide repertoire of trade financing facilities such as inventory/stock financing, structured pre-delivery working capital and factoring will be offered to SMEs and internationalising companies at a lower premium rate.

Business Support Services

EnterpriseOne Business Information Services (EBIS)

The EnterpriseOne Business Information Services (EBIS) was launched in August 2007 to help enterprises become knowledgeable, innovative and information-savvy in order to compete effectively in the global marketplace. Three EBIS Centres have been set up. EBIS is part of the EnterpriseOne initiative which aims to help enterprises find the answers they need to start, sustain and grow their businesses. The other components of the EnterpriseOne initiative are the EnterpriseOne portal www.business.gov.sg supported by a Call Centre, and a network of Enterprise Development Centres at the Association of Small and Medium Enterprises (ASME), Singapore Manufacturers' Federation (SMa), Singapore Chinese Chamber of Commerce & Industry (SCCCI) and Singapore Malay Chamber of Commerce & Industry (SMCCI).

(2) Industry Development

Local Enterprise and Association Development (LEAD)

The Local Enterprise and Association Development (LEAD) programme was launched in May 2005. As of December 2007, the programme has supported a total of 15 industry proposals from 16 associations. In 2007 alone, five LEAD projects, one each from the Association of Singapore Marine Industries (ASMI), Singapore Contractors Association Limited (SCAL), Singapore Industrial Automation Association (SIAA), Singapore Logistics Association (SLA) and Sustainable Energy Association of Singapore (SEAS) were launched. These projects provide the blueprints for upgrading the industry and enterprises championed by these industry associations.

Customer-Centric Initiative (CCI)

The Customer-Centric Initiative (CCI) was launched in 2005 to transform Singapore's service quality by encouraging companies to be committed to service excellence and to take the lead in raising service standards in their industry. Since its launch, about 2,500 retail establishments (20 per cent of total retail establishments) and about 1,200 food and beverage establishments (27 per cent of total food and beverage establishments) have participated in CCI.

National Retail Scholarship Programme

The National Retail Scholarship Programme was launched in May 2007. A total of 100 scholarships per year for Diploma, Degree and Master programmes will be offered over the next five years. This marks the first time that the Government and industry are working together to award scholarships for retail tertiary courses to groom future leaders and to attract and retain talents for the retail industry.

Capability Development Programme (CDP)

Four sectoral Capability Development Programmes, namely, Food CDP, Marine CDP, Logistics CDP and Medical Technology CDP were launched in 2007. These sector-specific programmes aim to upgrade SME capabilities to enable them to move up the value chain and provide better support to large enterprises.

(3) Enterprise CapabilitiesLocal Enterprise Technical Assistance Scheme (LETAS)

The Local Enterprise Technical Assistance Scheme (LETAS) provides assistance to SMEs to defray the cost of engaging consultants to upgrade and modernise their business operations in the areas of IT and quality management systems. 895 first-time applicants benefited from LETAS in 2007.

BrandPact

Launched in April 2005, BrandPact aims to raise local enterprises' awareness and understanding of branding, to develop brand knowledgeable executives and to catalyse the adoption of branding as a strategy for business competitiveness. As of December 2007, promotion of BrandPact reached some 4,300 companies and a total of 145 BrandPact projects were initiated. While the majority of the projects are in the Retail and Food and Beverage sectors, the manufacturing sector is increasingly witnessing more B2B companies embarking on branding.

Technology Innovation Programme (TIP)

The Technology Innovation Programme (TIP) was established in August 2006 to enhance technology innovations in local enterprises. About 150 technology innovation projects have been initiated since its launch. New Centres of Innovations (COIs) for the Food, Marine and Offshore, Environmental and Precision Engineering industries have been set up to enhance the technology infrastructure support for SMEs.

Intellectual Property Management (IPM) Programme

The Intellectual Property Management (IPM) Programme was inaugurated in January 2007 to help SMEs identify, create, own, protect and exploit their intellectual properties (IPs) as a growth strategy. The programme covers IP strategy development, audit/review and branding projects.

(4) Markets and Business Opportunities

Helping Companies to Comply with Overseas Technical Regulations & Standards

Export Technical Assistance Centre (ETAC)

The Export Technical Assistance Centre (ETAC) was launched in October 2006 to provide SMEs with information and advisory services to understand and comply with standards and technical regulations in overseas markets. In 2007, ETAC provided one-to-one assistance to about 120 companies and reached out to some 600 companies through workshops and seminars on food, electrical and environmental technical regulations. To help our food exporters, a new database detailing the various food import regulations and standards of 32 countries was made available in 2007.

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