CHAPTER 3

COSTS, INVESTMENTS AND R&D

OVERVIEW

In the fourth quarter of 2008, overall unit labour cost (ULC) and manufacturing unit business cost (UBC) rose by 12 per cent and 10 per cent respectively. For the whole of 2008, overall ULC and manufacturing UBC increased by 9.6 and 8.2 per cent respectively.

Investment commitments in the manufacturing and services sectors remained strong in 2008, with the bulk of the fixed assets investments and total business spending going into the chemicals cluster.

Singapore saw a continued expansion in its R&D capabilities, led by the private sector.

COSTS

Overall unit labour cost (ULC) for the whole economy rose by 12 per cent in the fourth quarter of 2008 (Exhibit 3.1). This was higher than the 10 per cent increase in the preceding quarter. Overall ULC for the whole year increased by 9.6 per cent, higher than the 5.2 per cent increase in 2007.

The manufacturing ULC rose by 15 per cent, lower than the 19 per cent increase registered in the previous quarter. Manufacturing ULC for the whole year grew by 11 per cent, higher than the increase of 3.9 per cent in the preceding year.

Manufacturing unit business cost (UBC) rose by 10 per cent in the fourth quarter of 2008, compared to the 11 per cent increase in the previous quarter. The increase was driven mainly by an increase in the manufacturing ULC and services cost, such as utilities (Exhibit 3.2). Manufacturing UBC for the whole year grew by 8.2 per cent, higher than the rise of 2.5 per cent in 2007.

Exhibit 3.1: Changes in ULC

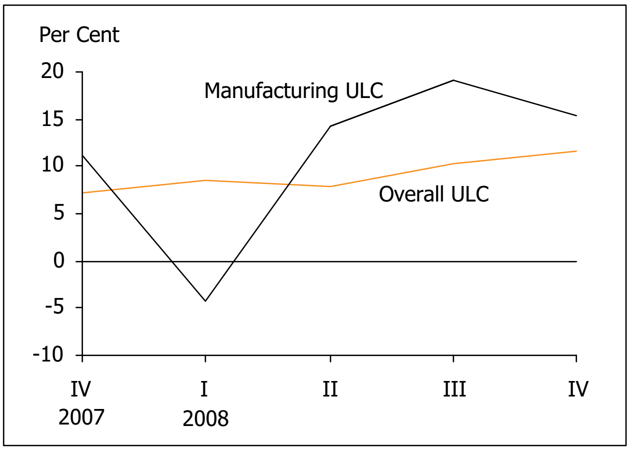
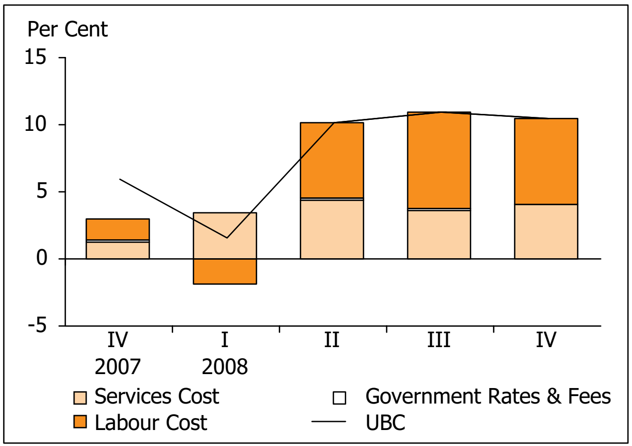


Exhibit 3.2: Percentage Contribution to Changes in UBC for Manufacturing



Singapore's relative unit labour cost (RULC) for manufacturing, a measure of Singapore's competitiveness against 16 other economies, continued to increase in 2008 (Exhibit 3.3). However, the RULC remained below the 2001 level. The increase in RULC in 2008 was mainly due to an increase in Singapore's ULC as well as the appreciation of the Singapore Dollar.

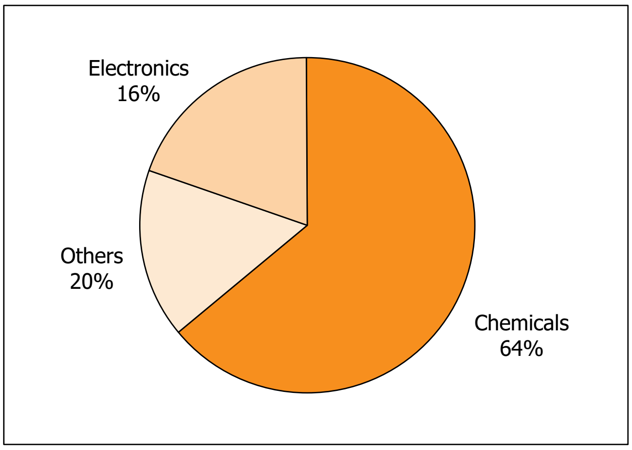
Exhibit 3.3: Singapore's Relative Unit Labour Cost in Manufacturing Against Selected 16 Economies

INVESTMENT COMMITMENTS

Investment commitments in the manufacturing and services sectors remained strong in 2008, building on the momentum that first started in 2006. In the final quarter of 2008, $2.2 billion in fixed assets investment (FAI) and $1.4 billion in total business spending (TBS) were committed. For the full year, $18 billion of FAI was committed, up from $17.2 billion in 2007. As for TBS, $7.8 billion was committed in 2008, up from $7.3 billion in 2007.

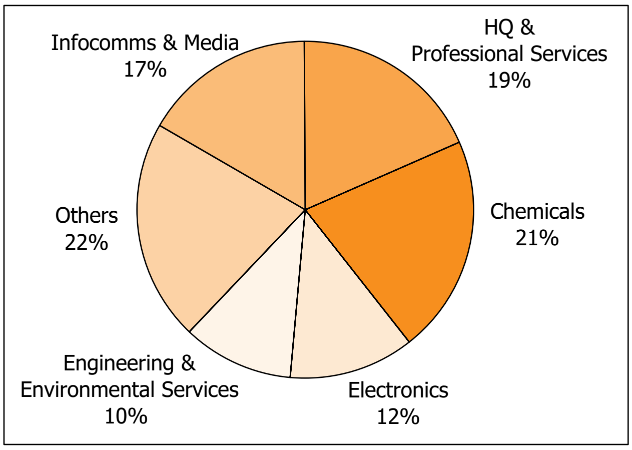
The largest industry contributor to FAI in 2008 was the chemicals cluster, which attracted $11.6 billion in commitments, mainly in petrochemicals (Exhibit 3.4). This was followed by the electronics cluster, with $2.9 billion in commitments. In terms of sources, US investors accounted for $11.3 billion, or 63 per cent, of total FAI. The next largest sources were Europe (16 per cent), Singapore (10 per cent) and Japan (6.9 per cent).

Exhibit 3.4: Fixed Asset Investments by Industry Clusters in 2008



TBS also saw the chemicals cluster emerge as the largest industry contributor, with $1.6 billion in commitments in 2008 (Exhibit 3.5). This was followed by headquarters & professional services ($1.5 billion) and infocomms & media ($1.3 billion). As for sources, US investors accounted for $3.7 billion, or 48 per cent, of total TBS. The next largest sources were Europe (17 per cent) and Singapore (17 per cent).

Exhibit 3.5: Total Business Spending by Industry Clusters in 2008



When fully operational, these investment commitments are expected to generate $14.7 billion of value added and create approximately 21,700 jobs. About three-quarters of these jobs are expected to require skilled workers.

RESEARCH & DEVELOPMENT (R&D)[1]

Gross domestic expenditure on R&D (GERD) increased by 27 per cent from $5.0 billion in 2006 to $6.3 billion in 2007 (Exhibit 3.6).

Expenditure on R&D in the private sector grew at a faster rate than the public sector in 2007. Private sector expenditure on R&D increased by 29 per cent from $3.3 billion in 2006 to $4.2 billion in 2007, accounting for 67 per cent of GERD. The manufacturing sector accounted for 71 per cent of private sector expenditure on R&D in 2007.

Public sector expenditure on R&D increased by 23 per cent from $1.7 billion in 2006 to $2.1 billion in 2007. The government sector accounted for 37 per cent ($771 million) of public sector expenditure on R&D in 2007, followed by the public research institutes with a 35 per cent share ($730 million), and the higher education sector with a 29 per cent share ($603 million).

As a percentage of GDP, GERD increased from 2.3 per cent in 2006 to 2.5 per cent in 2007, and private sector expenditure on R&D increased from 1.5 per cent in 2006 to 1.7 per cent in 2007.

Singapore's R&D intensity (GERD as a percentage of GDP) is above the OECD average (2.3 per cent in 2006). It is approaching that of the US (2.7 per cent in 2007) but trails Japan (3.4 per cent in 2006).

Relative to the small advanced countries, Singapore's R&D intensity is ahead of Ireland (1.4 per cent in 2008), Belgium (1.9 per cent in 2007) and Denmark (2.5 per cent in 2007), but is below world leaders like Sweden (3.6 per cent in 2007), Finland (3.4 per cent in 2008) and Switzerland (2.9 per cent in 2004).

Exhibit 3.6: R&D Expenditure

	2006	2007
Gross Expenditure on R&D (GERD) ($ Million)	5,010	**6,339**
Private Sector Expenditure on R&D ($ Million)	3,293	**4,235**
Public Sector Expenditure on R&D ($ Million)	1,717	**2,104**
Private Sector's Share of GERD (%)	65.7	**66.8**
GERD as % of GDP	2.3	**2.5**
Private Sector Expenditure on R&D as % per cent of GDP	1.5	**1.7**

[1] Figures provided in this section are based on the 2007 National R&D Survey released by the Agency for Science, Technology and Research in December 2008.

R&D Manpower

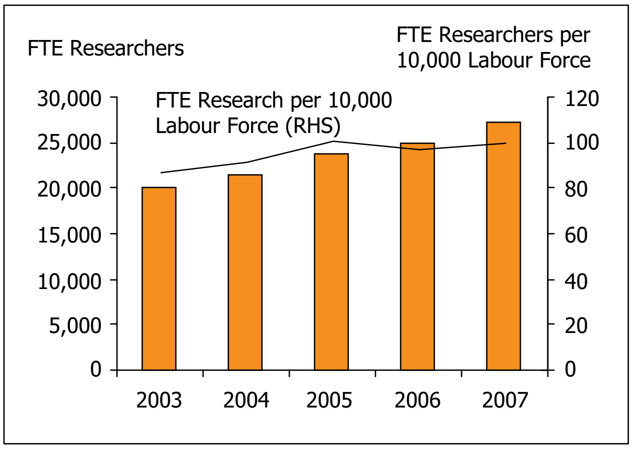
The full-time equivalent (FTE) number of researchers in Singapore increased 9.1 per cent from 25,033 in 2006 to 27,301 in 2007. In comparison, the labour force grew by 6.0 per cent from 2.6 million in 2006 to 2.8 million in 2007. The FTE number of researchers per 10,000 labour force thus increased from 97 in 2006 to 99 in 2007 (Exhibit 3.7).

In the private sector, the FTE number of researchers increased by 8.8 per cent from 14,894 in 2006 to 16,210 in 2007. In terms of educational profiles, 7.2 per cent (1,159) were PhD-holders, 22 per cent (3,492) were Master degree-holders, 55 per cent (8,988) were Bachelor degree-holders and 16 per cent (2,571) did not hold university degrees.

In the public sector, the FTE number of researchers, excluding full-time postgraduate research students, increased by 9.7 per cent from 6,378 in 2006 to 6,997 in 2007. The number of full-time postgraduate research students increased by 8.9 per cent from 3,761 in 2006 to 4,094 in 2007.

In 2007, 42 per cent (2,904) of the researchers, excluding full-time postgraduate research students, in the public sector were PhD-holders. 24 per cent (1,687) of them were Master degree-holders, 33 per cent (2,292) Bachelor degree-holders and 1.6 per cent (115) without degree qualifications. Among the full-time postgraduate research students, 27 per cent (1,091) were enrolled in Master degree programmes and 73 per cent (3,003) in PhD programmes.

Exhibit 3.7: Researchers

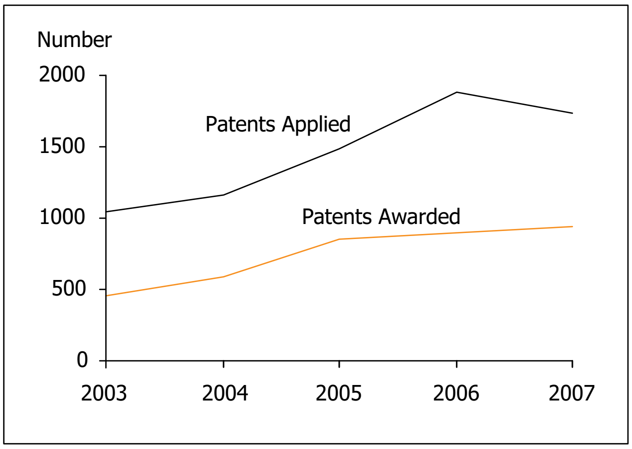


Patenting[2] Activity OF R&D Performers

The patenting activity of R&D performers in Singapore declined in 2007. The number of patent applications decreased by 7.8 per cent from 1,886 in 2006 to 1,739 in 2007 (Exhibit 3.8). The decline in patent applications was accounted for by the private sector, where patent applications fell by 9.4 per cent from 1,561 in 2006 to 1,415 in 2007.

The number of patent applications in the public sector remained stable. The number of patent awards increased by 5.6 per cent from 891 in 2006 to 941 in 2007. The private sector accounted for 81 per cent of the patent applications and 84 per cent of the patent awards of the R&D performers in 2007.

Exhibit 3.8: Patenting Indicators



[2] A one-off revision was made for patents applied and patents awarded numbers for the period of 2000-2006 due to errors in reporting by respondent organisations in the earlier years.