CPB Memorandum

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Department(s)	:	III
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Author(s)	:	Harold Creusen
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In focus: the chemical and plastics industry in the Netherlands 2002-2004 [1]

Dutch manufacturing in general experienced a severe setback in 2002. However, both the chemical and plastics industry had less trouble in keeping up sales volume growth. But cash flow dropped due to fierce price competition and high labour costs. The prospects of 2003 are more insecure than usual because of international political tensions. Still, the sales volume of chemical products may grow this year by 2¾%, the sales volume of plastic and rubber products may increase by 1½%. The start up of new and large scale plants lead to strong capacity expansions in the Dutch chemical industry. The cash flow of the chemical and plastics industry will probably bottom out. Next year, sales and cash flow may pick up as the recovery of foreign demand becomes stronger. Employment reductions and wage restraints may help to strengthen the Dutch competitive position.

[1] The forecasts in this Focus are valid until CPB publishes new industrial forecasts.

Account

Why an "Industry in focus"?

This "Industry in focus" is related to the "Centraal Economisch Plan" (CEP), which yearly presents an economic forecast for the Dutch economy for the current year and the year to come. The CEP itself does not include an outlook for specific industries. Therefore these are published separately as an Industry-in-focus (in electronic form). This focus puts the projections of the chemical industry and the plastics and rubber industry together.

Definition of the chemical and plastics industry

The statistical definition of the chemical and plastics industry in this "Industry in Focus" is in line with the CBS Standaard BedrijfsIndeling (SBI) 1993 (see table below, for further information link www.cbs.nl, search 'Standaarden', next 'SBI-indeling'). The chemical industry is split up in basic chemicals and the final chemicals industry.

Industry	SBI-code
Chemical industry	24
of which Basic chemicals	241, 247
Final chemicals	242, 243, 244, 245, 246
Plastics and rubber industry	25

The main line of reasoning

The reasoning of the chemical industry's outlook is roughly as follows.

1. To the industry, its international and Dutch environment are given. The elaborated argumentation for changes in this environment is published in the CEP (link: www.cpb.nl/nl/cepmev/cep) and the April issue of CPB Report (link: www.cpb.nl/eng/cpbreport).
2. The response of the chemical industry to the changes in its environments is assumed to be the same as in the past. Additional information from e.g. newspapers is processed as autonomous changes. Starting point of the forecast are the amounts of the items on the industry's statement of income in the previous year. The model is recursive for each industry. Mutual relations between industries follow the process chain, and this chain determines the sequence of computation of the industries' prospects.

The precise argumentation is published in Dutch as a CPB Memorandum (April 2003): 'De industrie in 2003-2004: De economie achter het scenario' (link: www.cpb.nl/nl/cepmev/cep).

Gauging the value of the projections

This "Industry in focus" sounds more definite than is justified by the uncertainties in future projections. The reason is that this clarifies the text. The figures do not pretend to prove with certainty what future brings. They give rather an indication of how we think about future developments on the basis of our current knowledge and explicit reasoning. This means that the projections can be brought under discussion, and this exactly indicates their value. One who finds the arguments plausible, can anticipate with policy on the basis of the projections.

Outlook on the industry's environment

International developments

The chemical and plastics industry has to cope with two obstacles in the international economic environment. The first obstacle concerns the uncertainty related to the Iraq-war. This year world trade volume might recover from its setback in 2001 and 2002, but the Iraq-war makes a revival rather questionable. The projection assumes that the Iraq-war will be solved quickly, so that world trade will grow by 5¼% this year and about 7¾% next year. But lack of confidence due to international political tensions may hamper economic growth.

Oil prices may be even more vulnerable to the developments in the Middle East than world trade volume. Still, it is expected that the yearly average of oil prices will increase modestly to $26.00 in 2003, and decline to $23.50 in 2004. In the first half of 2003 oil prises may rise temporarily. But in the second half of 2003, the expected diminishing of international tensions and a full restart of oil production in Venezuela may downsize oil prices. However, if the Iraq-war lasts longer than expected, yearly oil prices may soar and drag the international prices of basic chemicals to peak levels. Past experiences reveal that steep increases of oil prises may not necessarily go together with lower cash flows in the basic chemicals industry (see box below).

The second obstacle concerns the high euro-exchange rates. The dollar/euro rate will probably increase from 0.94 dollar per euro in 2002 to 1.08 dollar per euro in 2003 and 2004. The high dollar/euro exchange rate will offset the modest increase of oil prices (see next section). In contrast, high exchange rates will also undermine the competitive position of European chemical companies and provide their American and Asian competitors extra competitive advantage.

In summary, the growth of world trade volume might pick up forcefully, but uncertainties and high euro exchange rates slow down economic recovery within the Euro-zone. Europe can hardly catch up with the forceful economic growth of the US and Asia (see table below). In fact, the most important foreign customers of the Dutch chemical industry, Germany and Belgium, may gain a minimal GDP-growth in 2003.

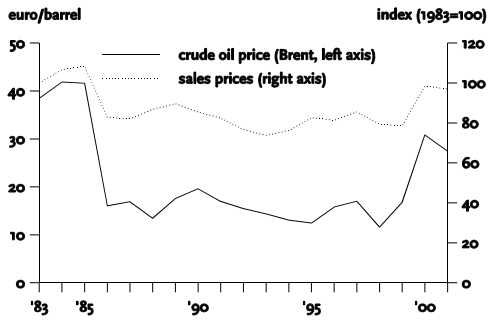
Table 1	Expected growth of Gross Domestic Product (GDP) in other countries				
	2000	2001	2002	2003	2004
	annual percentage change				
Germany	2.9	0.6	0.2	¾	2½
Belgium	3.7	0.8	0.7	1	2¾
European Union	3.5	1.5	1	1½	2¾
Asia (excl. Japan)	7	5	6.3	6	6½
Japan	2.8	0.4	0.3	¾	1¼
US	3.8	0.3	2.4	2¾	3¾

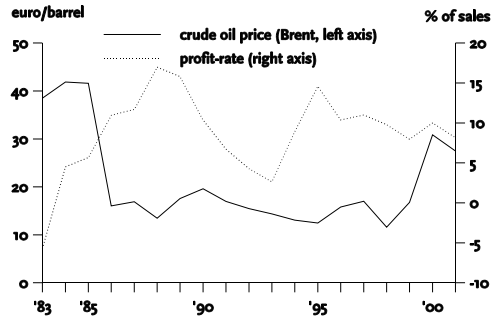
Cash flow in basic chemicals seems to be related to factors others than the oil prices

The prices of raw materials for the basic chemicals industries, such as naphtha, benzene and natural gas, are related to the oil prices. The Iraq-war raises much uncertainty about the future course of the oil prices. Then, what is the impact of sudden oil price changes on prices and profitability in basic chemicals? Experiences from the past may provide some clues.

In the past oil prices had a significant impact on the prices of basic chemicals (see figure on the left). The fierce oil price shocks of 1985-1986 and 2000 resulted in similar price changes of chemicals, but the impact is suppressed by other costs (such as labour and capital). Actually, in 2001 the costs of oil- and gas-products came only to 15% of total sales. During 1987-1999 oil prices remained stable, and thus resulted in stable sales prices of basic chemicals. Generally, higher oil prices also lead to lower profits since oil price changes are not immediately and completely passed on to sales prices. However, such effects are hardly visible (see figure on the right). Apparently, profits in the basic chemical industry seem to be more related to other factors, such as the international business cycle and the use of more efficient and large scale plants.

Relation between oil prices, sales prices and profitability in basic chemicals[1]





[1] The profit-rate is defined as the profits as a percentage of total sales.

International prices of chemicals

Despite the modest increase of oil prices in 2003, international prices of basic and final products will continuously decline. The high dollar/euro exchange rate will offset the increase of oil prices in dollars, and thereby result in a constant decline of oil prices in euros. The prices of raw materials, like naphtha and benzene, and petrochemicals will decrease successively.

The prices of petrochemicals and primary products will decrease at lower rates, because producing these products involves gradually more labour and capital costs. But, since both capital and labour costs of foreign competitors drop as well, foreign competitors may serve the international and Dutch market at continuously lowering prices.

Import prices of chemical and plastic products will fall as well, particularly in 2003. This price cut may be due to low capital and labour costs in other countries, but also due to the unfavourable euro/dollar exchange rate and delayed charges of previous price cuts of raw materials.

Table 2 International prices

	2000	2001	2002	2003	2004
Oil price ($/barrel)	28.40	24.60	25.00	26.00	23.50
Euro exchange rate ($/euro)	0.92	0.90	0.94	1.08	1.08
Oil price (euro/barrel)	30.80	27.40	26.50	24.00	21.75
	price index (in euro, 1999=100)				
Raw materials					
Naphtha	184	163	158	143	130
Benzene	161	138	133	121	109
Petrochemicals					
Ethylene	184	143	140	133	125
Propylene	183	159	154	143	133
Styrene	196	153	150	143	136
Primary plastics					
Poly-ethylene	129	120	118	113	119
Poly-propylene	125	125	122	118	114
Poly-styrene	122	117	115	112	109
PVC	134	114	113	109	106
	annual percentage changes				
Import price of chemical final products	3.8	1.9	0.5	–3	– 1
Import price of plastic products	2.3	1.7	–0.1	–3¼	– ¾

Dutch environment

The economic prospects for the Dutch national economy don't look very good as well. Real gross domestic product (GDP) may only grow by ¾% this year and 1¾% next year. The sales and output growth of purchasing industries hardly recover from their setback in the last two years. For instance, the sales of the Dutch construction industry, which is one of the main customers of the plastics industry, will only grow by 1½% this year and ¾% next year.

Prices of non-material inputs (labour and capital services) continue to diverge. Labour becomes more and more expensive. Like previous years, in 2003 wages will increase further by 4%, but now due to higher pension premiums. Next year the wage level will rise more modestly by about 2½%. Against that, lower prices of investments and interest rates reduce depreciation rates and consequently the unit cost of capital. But for the chemical and plastics industry the lower cost of capital will be insufficient to compensate the higher unit labour costs, particularly in 2003.

Dutch chemical industry in 2002-2004

Table 3 Key figures for the chemical industry in the Netherlands [a]

	2000	2001	2002	2003	2004
	in billion euros				
Nominal value					
Sales	35.1	35.0	34.7	34.8	35.6
Cash flow	5.1	4.6	3.8	3.7	3.9
Investments	2.1	1.4	2.2	2.3	2.3
	annual percentage changes				
In volume					
Sales	7.2	0.2	2.8	2¾	4¼
Prices					
Sales	17.5	–0.6	–3.6	–2½	–1¾
Unit operating costs	17.4	1.1	–1.3	–2¼	–2¼

[a] For an explanation of the used terms, see in the back of this 'Focus'.

Sales and cash flow in 2002

Many branches in Dutch manufacturing had a severe setback in 2002, but the chemical industry had less trouble in keeping up economic growth. The sales volume rose by 2.8%, more than any other manufacturing industry. Still, cash flow dropped due to fierce price competition and high labour costs.

Despite the modest growth in general world trade volume, export volume of chemicals grew by nearly 4%. In basic chemicals, massive capacity expansions (ethylene-cracker of Dow at Terneuzen, BDO[2]-plant of Lyondell-Bayer at Rotterdam Botlek) induced more exports to foreign customers[3]. In fine chemicals, exports of personal care products and paints to other European countries flourished. Sales of pharmaceuticals and pharmaceutical ingredients stagnated, mainly due to delays in development and approval of (registered) medicines in the US.

Price margins and cash flow dropped substantially in basic chemicals but stabilized in final products. Prices of goods and services purchased by the basic chemical industry declined particularly due to delayed charges of previous oil price cuts (2001). But sales prices dropped even more because of fierce price competition reinforced by capacity expansions. Diminished

[2] Butanediol, which is a raw material for brake fluids and resins for coatings.

[3] Surprisingly particularly to Belgium which had only a real GDP growth of 0.7%

price margins, but also higher wages and rising depreciation costs related to capacity expansions pressed profitability substantially.

The sales prices of final chemical products increased slightly, while input prices declined faintly. Higher sales volume and a tiny increase of price margins were just sufficient to compensate higher wages. Therefore cash flow in final chemicals increased modestly.

Sales and cash flow in 2003 and 2004

Despite the doubtful and modest international economic recovery, the chemical industry may end up in a reasonable growth of sales volume of about 2¾% this year and 4¼% next year. In fact, the exports in basic chemicals will be pushed up by continuing capacity expansions, e.g. by the Lyondell-Bayer plant at Rotterdam Botlek producing primary plastics (propene-oxide and styrene). The exports in final chemical products may grow less exuberantly, particularly due to a strongly weakened international competitive position of Dutch companies.

The price margins and profits will stabilize in 2003, but recover slightly in 2004. High exchange rates reduce input prices but also competitor's prices, particularly outside the Eurozone. This puts much pressure on sales prices and price margins of Dutch companies. The weak improvement of price margins and higher wages in 2003 induce a modest recovery of cash flow in 2003 and 2004.

Figure 1 **Sales prices and Unit operating costs in the chemical industry**

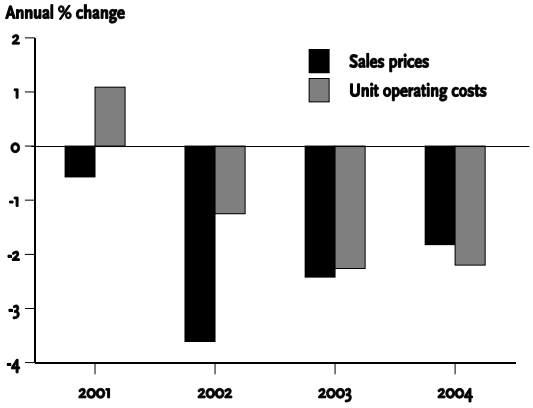
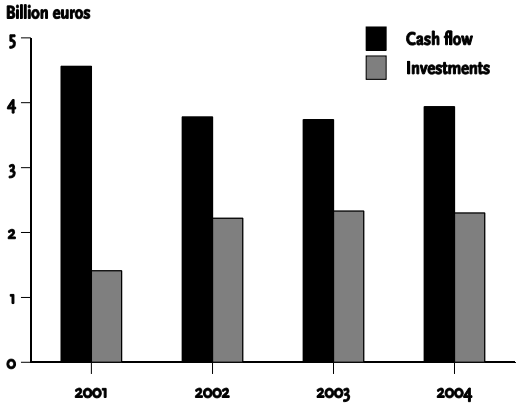


Figure 2 **Cashflow and Investments in the chemical industry**



Investments and employment in 2003 and 2004

Investments remain rather high in 2003 and 2004. Large scale projects determine the high level of investments in 2003. These projects mainly concern new production-plants for petrochemicals and primary products (see above), but also plants for artificial fibres[4]. Smaller projects may be postponed to 2004 when economic recovery picks up.

Steep cuts in employed staff in this and next year will push up labour productivity growth and reduce labour costs. The employment increase of a few hundred people by the plant start ups can by no means compensate the substantial employment cuts and reconstructions of the major companies. The persistently high wage increase of 2003 limits the unit labour cost reduction to 1¾% . But next year when wage restraints may be enforced, unit labour costs may decline by 4%. This may help to recoup the Dutch competitive position, particularly in the final chemicals industry.

[4] More particularly, Teijin-Twaron invested 113 mln euros in their plants in Delfzijl and Emmen in order to expand the production capacity of the Twaron-fibre (artificial fibre) (see Petrochem, 2002, *Petroprojecten* on www.petrochem.nl).

Dutch plastics and rubber industry in 2002-2004

Table 4 Key figures for the plastics and rubber industry in the Netherlands [a]

	2000	2001	2002	2003	2004
	in billion euros				
Nominal value					
Sales	5.8	5.7	5.9	5.8	6.0
Cash flow	0.6	0.6	0.6	0.5	0.6
Investments					
	annual percentage changes				
In volume					
Sales	3.7	–2.7	2.9	1½	3¾
Prices					
Sales	4.1	2.2	–0.7	–2	0
Unit operating costs	7.6	3.3	0.3	–1¼	–1¼

[a] For an explanation of the used terms, see in the back of this 'Focus'.

Sales and cash flow in 2002

Like the chemical industry, the plastics and rubber industry performed relatively well in 2002, with a strong production growth and modest decline of cash flow. The sales volume of plastic and rubber products grew by about 3%. The volume of exports increased substantially, even despite the low world trade volume and the modest growth of foreign countries. Domestic demand, however, dropped sharply due to lower demand of building materials (e.g. plastic pipes and frames), but also due to depressed demand of packing materials.

Last year the cash flow diminished slightly. Prices of purchased goods decreased faintly, but sales prices dropped little further and diminished price margins. However, the sharp growth of sales volume could nearly compensate the negative impact of lower price margins and higher wages on profitability.

Sales, employment and cash flow in 2003 and 2004

This year the sales volume will increase modestly by 1½%, but next year more firmly by 3½%. Export growth may face a temporary setback due to low demand from Dutch neighbours, especially of the German and Belgian car industries. But next year, the growth of export volume will pick up by 4¼%. Domestic demand starts to recover this year. In 2003 the demand of building materials will recoup temporarily because of the modest production growth in the construction industry. But in 2004 demand of other products from other manufacturing industries, such as packing materials, will pick up more forcefully.

The personnel reductions that started previous year will continue in 2003 and 2004. But again, persistent high wage increases this year will push up unit labour costs by ¾%. However, next year forceful productivity growth and modest wage increases may reduce unit labour costs by 2¼%.

Finally, the cash flow of the plastics and rubber industry will bottom out. The currently high exchange rate reduces input prices but also competitor's prices. Strong international competition puts much pressure on sales prices and price margins. Declining price margins combined with high wage increases induce a further decline of profitability in 2003. But in 2004 price margins and cash flow will pick up as increased demand relaxes the pressure on competition and sales prices.

Figure 3 **Sales prices and Unit operating costs in the plastics and rubber industry**

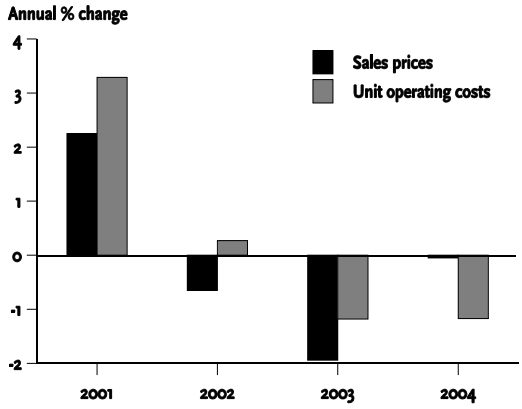
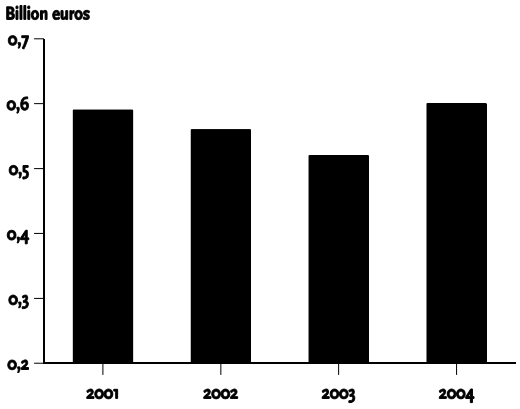


Figure 4 **Cashflow in the plastics and rubber industry**



Key figures

Table 5 Key figures of the environment [a]

	2000	2001	2002	2003	2004
	annual percentage changes				
International environment					
In volume					
Relevant world trade [b]	10.4	1.6	1.95	5¼	7¾
International prices and rates					
Oil price ($/barrel)	28.40	24.60	25.00	26.00	23.50
Euro exchange rate ($/euro)	0.92	0.90	0.94	1.08	1.08
Dutch environment					
In volume					
Gross domestic product	3.3	1.3	0.3	¾	1¾
Production construction sector	4.1	2.5	–0.3	1½	¾
Consumption of durables	6.8	–2.3	0.3	–¾	4
Prices					
Wage rate companies in the Netherlands	4.9	5.1	5.0	4	2½

[a] For an explanation of the used terms, see in the back of this 'Focus'.

[b] "Relevant" world trade: foreign demand for *all* Dutch manufacturing products at *all* geographical markets which are important to Dutch manufacturing *as a whole*.

Table 6 Key figures for the Dutch chemical industry [a]

	2000	2001	2002	2003	2004
	in billion euros				
Nominal value					
Sales	35.1	35.0	34.7	34.8	35.6
Purchased goods and services	26.5	26.7	27.0	27.1	27.7
Wages	3.6	3.8	3.9	4.0	4.0
Cash flow	5.1	4.6	3.8	3.7	3.9
Investments	2.1	1.4	2.2	2.3	2.3
	annual percentage changes				
In volume					
Sales	7.2	0.2	2.8	2¾	4¼
of which in foreign markets	12.4	3.3	3.8	2½	3¾
in the Dutch market	8.4	–0.3	0.0	4	5
Value added	7.0	4.2	3.0	2	2¾
Prices					
Sales	17.5	–0.6	–3.6	–2½	–1¾
Unit operating costs	17.4	1.1	–1.3	–2¼	–2¼
Purchased goods and services	20.7	1.8	–1.6	–2½	–2¼
Unit labour costs	-2.5	5.6	1.1	–1¾	–4
Number of employees (level, thousand FTE)	72.4	72.9	72.2	69.8	68.1
Labour share in income (%)	51.0	57.2	67.0	68¾	67¼

[a] For an explanation of the used terms, see in the back of this 'Focus'.

Table 7 Key figures for chemical branches

	2000	2001	2002	2003	2004
	annual percentage changes				
Sales volume					
Basic chemicals	9.5	-0.9	2.9	3¾	4½
Final chemicals	3.5	2.5	2.8	1	3½
Number of employees (*1000)					
Basic chemicals	32.0	31.9	31.6	30.7	29.9
Final chemicals	40.4	41.0	40.7	39.2	38.3
Sales prices					
Basic chemicals	25.5	–1.6	–5.6	–2¾	–2¾
Final chemicals	3.9	1.6	0.1	–2	–¼
Unit operating costs					
Basic chemicals	23.8	0.1	–2.1	–2¾	–2¾
Final chemicals	6.3	2.9	0.3	–1½	–1
Purchased goods and services					
Basic chemicals	28.2	1.2	–2.3	–2¾	–3
Final chemicals	6.6	3.0	0.0	–1¾	–¾
Unit labour costs					
Basic chemicals	–6.1	6.0	1.0	–2¼	–4½
Final chemicals	2.8	4.0	1.2	–½	–3¼

Table 8 Key figures for the Dutch plastics and rubber industry [a]

	2000	2001	2002	2003	2004
	in billion euros				
Nominal value					
Sales	5.8	5.7	5.9	5.8	6.0
Purchased goods and services	3.9	3.8	4.0	4.0	4.1
Wages	1.2	1.3	1.3	1.4	1.4
Cash flow	0.6	0.6	0.6	0.5	0.6
	annual percentage changes				
In volume					
Sales	3.7	–2.7	2.9	1½	3¾
of which in foreign markets	7.6	–0.3	6.3	1¾	4¼
in the Dutch market	2.2	–0.2	-2.8	1¼	2¾
Value added	2.6	–3.0	2.1	1¼	2¼
Prices					
Sales	4.1	2.2	–0.7	–2	0
Unit operating costs	7.6	3.3	0.3	–1¼	–1¼
Purchased goods and services	8.6	2.2	–0.1	–2	–1½
Unit labour costs	2.8	6.2	0.3	¾	–2½
Number of employees (level, thousand FTE)	32.1	32.1	31.6	30.9	30.5
Labour share in income (%)	78.8	82.7	86.4	90	86½

[a] For an explanation of the used terms, see in the back of this 'Focus'.

Explanation for used terms

Macro-economic variables

Gross domestic production (GDP)	Gross domestic product at market prices (= domestic production at factor cost + indirect taxes – subsidies + depreciation)
Relevant world trade	Weighted average of volume changes of imports of agricultural goods, food and non-energy manufacturing products of customers countries, with Dutch export shares as weights
Wage rate	Wages, salaries and national security costs per employee in the Dutch market sector

Industry specific variables

Cash flow	Depreciation and income other than wages and net subsidies
Investments	Gross investments in fixed assets, tangible (a.o. company premises and machinery) and intangible (software packages and databases)
Labour share in income	Wages (including earnings self-employed) as share in the sum of wages and trading profit. Trading profit equals profits before taxation and before interest payments and including the earnings of self-employed
Purchased goods and services	Use of intermediates, raw materials and services in production
Sales	The industry's gross production at market prices
Unit labour costs	Compensation of employees per unit of real value added in manufacturing
Unit operating costs	Total costs of labour and purchased goods and services per unit of real value added in manufacturing
Price margin	Difference of sales prices and prices of purchased goods and services
Value added	The value which labour and fixed capital add to the purchased goods and services. Accounting principle: gross domestic production at market prices less the costs of purchased goods and services
Upstream industry	An industry that produces semi-manufactured products for other companies in downstream industries, and particularly uses raw materials like oil, naphtha etc.
Downstream industry	An industry that particularly produces finished products for consumers, and uses mostly semi–manufactured products of upstream industries