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Abstract

Growth of industrial output for domestic consumption during 1930-75 was significant, but not continuous; growth (1932-41) was followed by decline (1942-46), recovery (1947-57), stagnation (1958-65) and acceleration (1966-75). Protective trade policies triggered growth in the 1930s, when industry policy favoured a balanced development of capital-intensive large and medium-sized ventures and labour-intensive small firms and firms in light industries. The gist of this policy continued during the late-1940s and 1950s, but industry policies increasingly favoured large, capital-intensive state-owned enterprises. By 1960, policies no longer targeted small ventures and labour-intensive industrialisation. After 1966, economic stabilisation and deregulation rekindled the momentum of industrialisation. Although policy interest in the development of small industrial ventures revived in 1975, large-scale labour-intensive industrialisation did start until the mid-1980s.

Key words: Manufacturing industry, Indonesia, industry policy, technological change

JEL-codes: L50, L60, N65

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1. Introduction

By 1930, Indonesia was ready for a change in the character of its economic growth. Firstly, population density in the core island of Java had risen to the extent that further absorption of labour in agriculture, the economy's mainstay, had become difficult with current technologies. Diversifying the economy by increasing non-agricultural employment opportunities was part of the solution. Secondly, the 1929 global economic crisis affected Indonesia badly. Moderate economic growth during 1900-29 had largely been based on the expansion of commodity exports, but drastic falls in the terms of trade and export earnings increased unemployment in export-oriented pursuits. The colonial government opted to encourage import-replacing manufacturing production. It employed trade and industry policies to propel a government-instigated industrialisation drive.²

Literature on Indonesia's long-term economic development often credits the 1970s as the first phase of sustained industrialisation. The measured growth of industrial output in both the national accounts and the annual industrial surveys, together with qualitative evidence, suggest that Indonesia did not experience industrialisation – in terms of growth and diversification of employment and output away from light industries – to any significant degree until the early-1970s, and that labour-intensive industrialisation did not start until the 1980s (*e.g.* Hill 1990: 86-88; Hill 1996: 23-26, 152-57). A common explanation for the delay is that macro-economic instability during the 1950s and the early-1960s prevented industrial growth, while the economy during the colonial era focused on producing primary commodities.

The impression of marginal industrial development before the 1970s is based on incomplete estimates of industrial output and employment. It contrasts with studies outlining evidence that the momentum of industrialisation of the 1930s was re-captured and sustained during the 1950s and after (*e.g.* Dick 2002: 273-304). Employment data suggest an almost doubling of employment in manufacturing industry from 2.2 million in 1930 to 4.0 million in 1976, and around 90% of manufacturing employment was in small-scale and cottage operations.³ However, statistical reporting of manufacturing output focused on large and medium sized ventures. It is therefore likely that available statistics underestimated the development of industrial employment and industrial growth until statistical reporting improved in the mid-1970s.

Resolving the uncertainty about the nature and timing of Indonesia's industrialisation experience is pertinent in the light of new conceptualisations of industrialisation processes and their consequences for economic development. Discussion long focused on the growth of large-scale, capital-intensive and/or heavy upstream industries, rather than small-scale and/or labour-intensive light industries.⁴ Backward and forward linkages were perceived to be much more significant in the former

² In this paper, the terms 'industry' and 'industrialisation' refer to manufacturing industry only, excluding construction and mining.

³ See Appendix 1 for estimates of industrial employment and for different definitions of 'large', 'medium', 'small' and cottage industries. Using post-1975 definitions, many of Indonesia's medium-sized ventures during 1930-75 would be regarded as small-scale. Because of the problem of defining the scale of production consistently, the paper will use the term small-scale production loosely.

⁴ Small-scale industries tend to be labour-intensive, but labour-intensive industries are not necessarily small-scale. For example, the development of weaving in Indonesia during the 1930s took place in both small-scale and large-

that the latter. Consequently, industrialisation policies in countries keen to spur economic diversification and modernisation often focused on large-scale firms. The needs of such firms were easier to identify and target than those of the myriad of small-scale ventures. Small-scale industries were often perceived to be a consequence of shortages of capital for investment and therefore as merely a transitory phase towards the development of large-scale industries.

Recent interpretations of industrial development in Japan and other East Asian countries noted that a large part of industrial expansion and increasing labour productivity was sustained by small-scale, labour-intensive ventures on the basis of improvements in the quality of labour (Sugihara 2007). If so, and noting that Indonesia's governments already fostered small-scale industrial ventures since the 1930s, why didn't Indonesia succeed in spurring economic development through labour-intensive industrialisation at an earlier stage?

This paper focuses on the period 1930-1975, as policies to foster industrial development started from 1930, while policies to encourage the development of small-scale enterprises were introduced on a significant scale after 1975. The next section of this paper explains that the quantitative evidence on industrial development in Indonesia during 1930-75 is wanting. It discusses available data on employment and quantifies industrial output. Section 3 sketches the main changes in Indonesia's business environment that impacted on decisions to invest or withhold investments during 1930-75. Section 4 outlines the industry policies that the Indonesian government pursued since the 1930s.

2. Trends in industrial employment and output

Despite inconsistencies in the estimation methods and the definitions underlying the data, Table 1 reveals that industrial employment increased during the 1930s, remained constant during the 1950s and 1960s, and increased to 4 million in 1976. While the share of industry in total employment decreased, the share of large and medium scale enterprises increased, in part due to a change in the definition of the size of companies. In all, these numbers suggest dynamic changes in industrial development, in terms of total employment and in terms of changes from small-scale to large- and medium scale operations.

Table 1: Employment in Manufacturing Industry in Indonesia, 1930-1976

	Large & medium	Small	Cottage	Total	% Share in total employment	Type of data source	
	(x 1,000)						
1930	100	1,400	709	2,209	13%	Population census, estimates	
1940	307	2,600	750	3,657	15%	Industrial survey, estimates	
1951/52	350	1,650	1,000	3,000	10%	Rough estimates	
1958	447	—	2,084	—	2,531	8%	Industrial and labour force surveys
1963/64	1,000	—	2,102	—	3,102	11%	Industrial census
1972	1,229	—	1,744	—	2,973	7%	Industrial survey, registration data
1974/75	662	343	3,900	4,905	11%	Industrial census	
1976	808	—	3,161	—	3,968	8%	Industrial and labour force surveys

Note: Definitions of firm size changed in 1963/64 and 1974/75, see Appendix 1. Total employment estimated in all cases, except 1930.

Source: Table A.1.

scale ventures (see below). This paper will focus on policies fostering the development of small-scale, labour-intensive ventures.

The annual average growth rates of total manufacturing employment between the most plausible benchmarks were 5.2% during 1930-40, -0.7% during 1940-63/4, 4.3% during 1963/4-1974/5 and 1.9% during 1963/4-1976 (depending on which data are comparable). Growth during 1930-40 and 1963/4-1974/5 was significantly higher than population growth of respectively 1.4% and 2.1% per year. Despite changes in definition (see Appendix 1), it is clear that by far the majority of employment was long in small and cottage industries. Hence, the growth of manufacturing employment was long largely generated by new opportunities in this sub-sector.

The 1974/75 industrial census offers the first estimates of manufacturing employment that can be disaggregated. Table 2 shows that 71% of salaried employment was in light industries (ISIC 31-33), spread over large and medium (59%) and small and cottage industries (41%). The table also shows that 78% of total employment was unsalaried, and that 79% was in cottage industry with less than 5 employees. The industrial census included anyone that devoted any time at all to industrial activity, and includes a large number of workers primarily engaged in non-manufacturing. This is the main reason why it arrived at a very high share of unsalaried people engaged in cottage industry. Other sources yielded lower estimates, such as 3.6 million in the 1976 inter-census population survey and 4.0 million in the 1976 labour force survey (McCawley and Tait 1979b: 133).

Table 2: Employment in Manufacturing Industry in Indonesia, 1974/75

ISIC	Total (x 1,000)	Shares		
		L&M	S	C
31 Food, beverages, tobacco	459.9	58%	24%	18%
32 Textiles, apparel, footwear	231.5	74%	20%	6%
33 Wood, wood products	86.2	26%	39%	35%
34 Paper, printing, publishing	30.6	71%	23%	5%
35 Chemicals, chemical products	99.4	84%	11%	5%
36 Non-metallic mineral products	91.0	27%	41%	32%
37 Base metals	2.1	94%	0%	0%
38 Metal products, machinery	83.9	66%	21%	12%
39 Other manufactures	17.6	48%	24%	27%
Total salaried	1,102.2	59%	24%	16%
Unsalariated	3,802.3	0%	2%	98%
Total	4,904.5	14%	7%	79%

Source: BPS 1981: 202-203.

There is no certainty about time trends in total manufacturing output. The annual surveys of manufacturing firms during 1939-1941 and 1953-75 are incomplete, covering only large and medium-sized firms. In the absence of comprehensive output data, Indonesia's national accounts estimated industrial output for 1921-39 (Polak 1943, 1979: 47-49) and 1951-58 (Muljatno 1960: 175) on the basis of the total wage sum and payments for purchased inputs. Even after a change to an output approach since 1958, estimates of Gross Value Added (GVA) in manufacturing remained far from complete.

The annual industrial survey was incomplete due to the non-response among surveyed firms, the incomplete database used for this survey, and the fact that the survey did not cover manufacturing firms employing fewer than 10 workers. The 1963-64 industrial census allows for some correction through extrapolation, but the estimates of GVA remained incomplete. Output in small-scale and cottage industry was estimated on the basis of the periodical socio-economic household survey, but

remained a rough guess.⁵ Comparisons of GVA between the Input-Output (I-O) Tables and the national accounts in 1971 and 1975, show that the latter were 68%, respectively 36% too low. In effect, reasonably complete estimates of output and GVA in manufacturing industry did not become available until the late-1970s and subsequent improvements to the annual industrial survey.

Figure 1 shows the results of an estimation of industrial output, using a commodity flow approach. The methodology uses key imported and domestically produced inputs for 29 industries to retroplate GVA in constant prices from the 1971 and 1975 I-O Tables. Both series were indexed with 1975 as the reference year. The methodology implicitly assumes that the input-output ratios of 1971, respectively 1975, apply to earlier years. This is a bold assumption, but it should be noted that investment in manufacturing industry only increased significantly since the mid-1970s, in the context of Indonesia's oil boom. Labour productivity in industry increased four-fold during 1975-2007, when manufacturing GVA increased by 9% per year on average.⁶ Hence, production technologies in manufacturing during 1930-75 may not have been very different from what they were in 1975, certainly in 1971. The indices are based on GVA estimates that cover 77% of total manufacturing GVA in 1971 and 73% in 1975. The different weights for both years yield slightly different results. For example, 1971 only contains off-farm milling of paddy by large rice mills (8% of estimated GVA), while 1975 also includes milling of paddy with small mechanical rice hullers, raising the share to 16%. The other key weighting differences are oil refining and vehicles repairs; both 16% of estimated GVA in 1971, but 8% in 1975.

In 1930, sugar refining contributed 43% to estimated GVA. The slump of sugar exports during the 1930s – from which Indonesia never recovered – has a major impact of output trend during the 1930s. Excluding sugar refining, Figure 1 shows that manufacturing GVA increased by 7% per year during 1932-41.⁷ The set-back during the Japanese occupation of 1942-45 was followed by rapid recovery with output growing at a considerable 14% per year during 1947-57. The years 1958-66 saw stagnation, while output growth accelerated to 11% per year during 1967-75.⁸

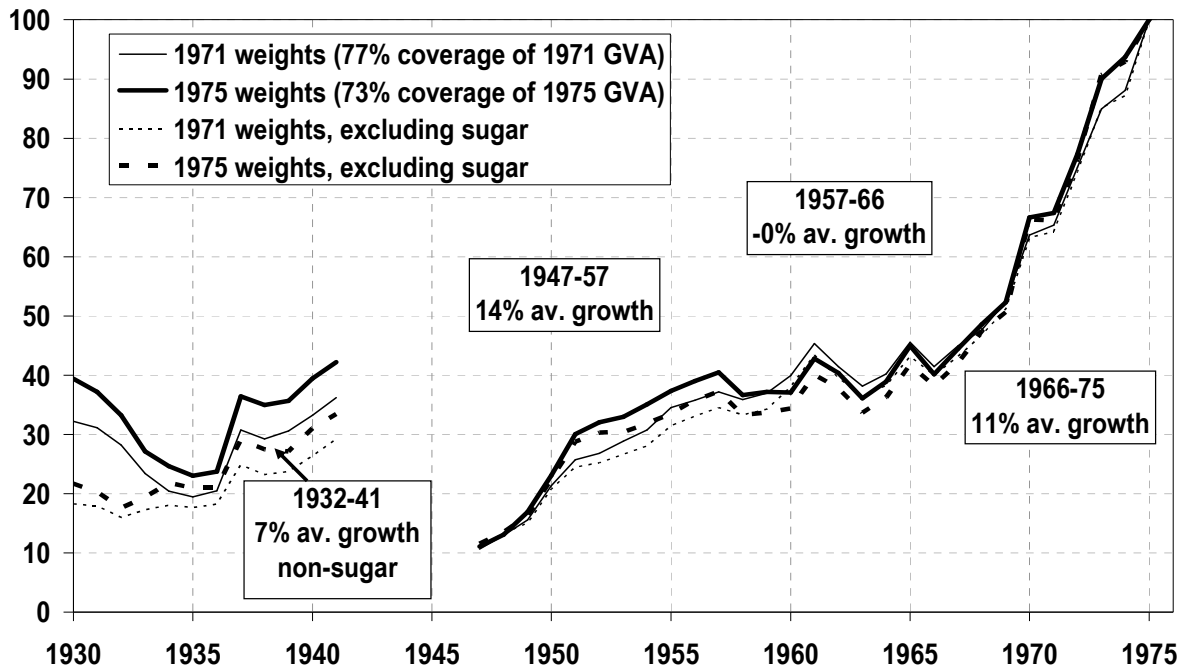
⁵ World Bank (1971, vol.2, pp.15-19 and 65-70) discusses the shortcomings of the industrial statistics for the 1960s.

⁶ Rough estimate, based on an extrapolation of manufacturing GVA in constant prices from the national accounts and employment estimates from the annual labour force survey.

⁷ Van Oorschot (1956: 94) and Gordon (1998: 18) estimated annual average growth of 7% and 9% for 1931-39, respectively, compared to our estimate of 4% for the same years. The difference is due to the fact that both used highly arbitrary estimates of wages and payments for materials, and, in absence of suitable deflators, retail and wholesale price indices for deflation.

⁸ Indonesia's national accounts contain data on GVA in manufacturing industry since 1958, albeit in different constant price series. They show the following average rates of change: 1958-66 -4%, 1966-73 8% and 1968-75 14% per year.

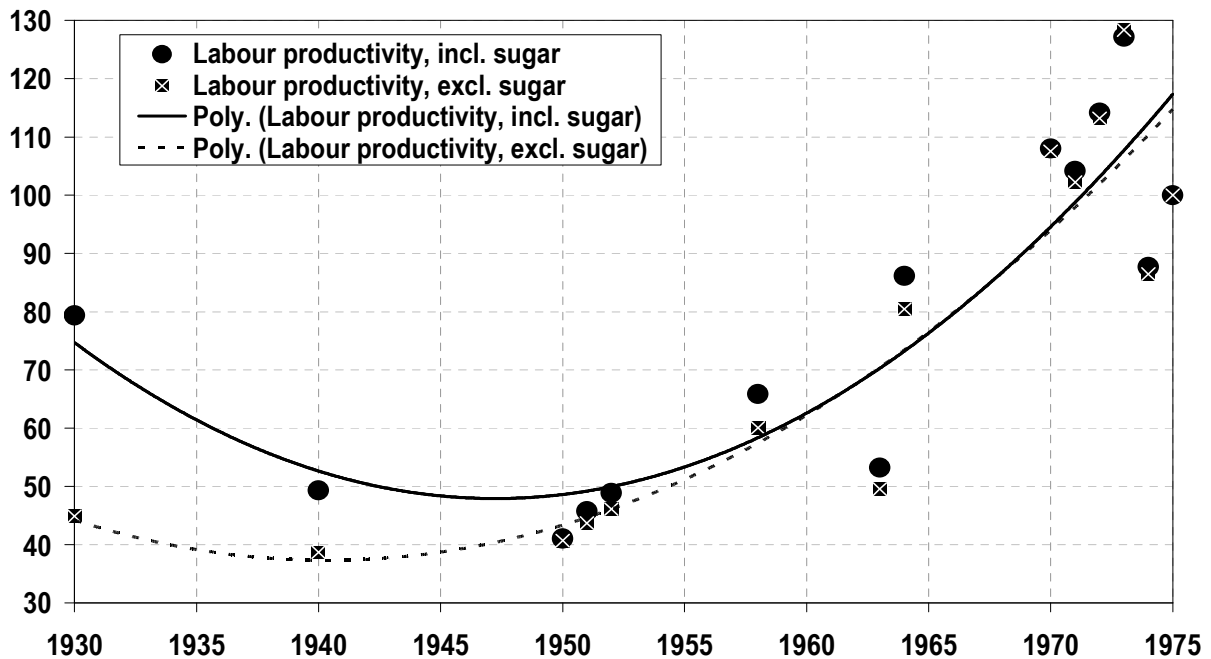
Figure 1: Gross Value Added in Manufacturing Industry in Indonesia, 1930-1975 (1975 = 100)



Note: Growth rates calculated on the basis of the 1975 weights series.

Source: Appendix 2.

Figure 2: Labour Productivity in Manufacturing Industry in Indonesia, 1930-1975 (1975 = 100)



Notes: Labour productivity estimated with estimated GVA in 1975 prices. Estimates of total employment in 1965, 1970, and 1972-73 not used, as they are too low.

Sources: Appendices 1 and 2; permanent sugar factory employment 1930-40 Segers (1987: 141-42), 1950-52, 1958, 1963-64, 1970 and 1972-74 *Upah pada Perkebunan2 di Indonesia* and *Statistik Upah Karyawan Perkebunan* (1953-74), 1971 and 1975 Table 3.

Figure 2 shows rough estimates of labour productivity for benchmark years. The fitted polynomial trend line shows that labour productivity decreased during the 1930s, recovered to 1940 levels by the early 1950s, and increased to the level of 1930 by 1970.⁹ The high level in 1930 was caused by the share of capital-intensive sugar refining in GVA. Excluding employment in sugar factories and GVA in sugar refining, labour productivity remained relatively constant during the 1930s and increased since the mid-1950s to at least double pre-war levels by 1971-75. Notwithstanding limitations in the underlying data, and assuming that technological change in small and cottage industries – where most employment was located – was only marginal, Figures 1 and 2 suggest that the path of industrial diversification and growth during the 1930s was labour-absorbing, changing after the mid-1950s to a more technology- and capital-intensive path with lower rates of labour absorption per unit of output.

Table 3: Structure of Manufacturing Industry in Indonesia, 1971 and 1975

	Employment (x 1000)		GVA (bln Rp)		Labour Productivity	
	1971	1975	1971	1975	1971	1975
1 Petroleum refining	14.9	15.1	63.9	92.3	4,288	6,107
2 Sugar	16.4	59.0	28.1	79.1	1,710	1,341
3 Chemical products	26.0	104.0	24.0	62.2	924	598
4 Beverages	9.3	16.3	6.9	21.6	740	1,327
5 Non-ferrous basic metals	10.2	27.2	6.5	17.2	638	632
6 Rubber products	6.6	18.0	4.2	17.4	637	964
7 Metal products	35.8	172.1	20.1	54.2	563	315
8 Basic iron and steel	3.0	8.5	1.4	4.5	462	522
9 Transport equipment, repairs	231.8	889.2	102.9	270.5	444	304
10 Paper, paper products, cardboard	50.5	55.5	21.9	58.4	435	1,053
11 Fertilisers, pesticides	2.0	4.3	0.9	24.6	426	5,713
12 Rice milling	115.0	493.3	32.5	188.3	283	382
13 Oils and fats	51.4	29.1	13.2	9.9	257	341
14 Machinery, electrical machinery	38.1	47.0	7.9	45.9	208	977
15 Cigarettes, tobacco products	145.6	47.2	27.9	127.1	192	2,689
16 Other food products	161.3	192.0	26.7	72.5	166	378
17 Non-metallic minerals	137.7	259.8	18.2	51.1	132	197
18 Flour, bakery products, noodles	39.0	71.6	4.5	41.3	115	577
19 Textile, apparel, leather	784.9	917.5	73.9	170.8	94	186
20 Spinning	84.2	102.6	7.7	26.4	91	257
21 Food processing, preserving	34.6	28.0	2.4	16.6	71	594
22 Cement	89.8	93.4	5.1	18.9	57	202
23 Bamboo, wood, rattan	424.1	732.2	9.9	41.6	23	57
24 Other products	80.1	178.8	5.6	14.9	70	84
Total	2,592.4	4,561.8	516.6	1,527.3	199	335
Share of sectors 14-24	78%	59%	37%	41%		

Note: GVA = Gross Value Added in market prices.

Sources: Calculated from 66 x 66 tables in IDE (1977) and BPS (1980).

⁹ As noted above, employment in cottage industries was overestimated in the 1974-75 census. Employment estimates for 1971-73 of ca. 3.1 million indicate that labour productivity would be 50% higher if 1974 employment would be 3.4 million, rather than 4.9 million.

Labour productivity may be taken as an indication of the capital intensity of production. Table 3 ranks industrial sectors by labour productivity in 1971. Assuming that sectors 14-24 are labour-intensive, the share of these sectors in employment decreased in the early 1970s, while their share in GVA remained broadly the same. In other words, new industrial employment was by that time generated in more technology- and capital-intensive industries.

3. Changes in the business environment

3.1 Micro-economic changes and difficulties

When the economic crisis started to bite in the early 1930s, the government of colonial Indonesia faced difficult choices. Export earnings were falling as international demand for Indonesia's primary exports contracted and former trade partners used protection and preferential trade agreements that discriminated against Indonesia, as well as competitive devaluations. At the same time, the government of The Netherlands obliged colonial Indonesia to maintain gold parity of the currency. Unlike other countries, could therefore not redress falling export earnings with a competitive devaluation of its currency. Manufacturers experienced a rapid loss of competitiveness relative to products imported from countries with competitive devaluations. Particularly Japan's devaluation in 1931 caused a significant increase of Japanese imports of all kinds of light industry manufactures.

In September 1933 the government responded with the Crisis Import Ordinance (*Crisisinvoerordonnantie*), which established a system of import quota and licences that varied according to product, country of origin and importing firm. Quota were used for beer (1933), cement (1933), cooking pans (1934), ceramics (1935), rubber tyres (1935), textiles (fabrics 1934/35, towels 1935, blankets 1935, clothing 1936), sewing yarn (1935), light bulbs (1935), fertilisers (1935), wrapping paper (1935), and sulphuric acid (1937) (Wirodihardjo 1951: 87-130), while imports of a range of other products (including bicycles, ceramics and nails) were licensed (Van Oorschot 1956: 45). The aim was to reduce imports in an effort to decrease the trade deficit and shore up the domestic competitiveness of Indonesian producers in several industrial sectors, particularly *vis-à-vis* Japanese imports. The policy was primarily an effort to combat the effects of the crisis, but it soon became regarded as an opportunity to diversify Indonesia's economy away from dependence on primary commodities.

The effect of these trade policies was considerable. Domestic manufacturing output increased and diversified. To mitigate anticipated overproduction, the import restrictions were augmented in 1934 with the Industry Regulation Ordinance (*Bedrijfsreglementeringsordonnantie*). It introduced a licensing system to limit the growth of productive capacity of firms in industries where senior officials in the Department of Economic Affairs considered that competition was or threatened to become 'excessive', in order to prevent large firms from competing small firms out of the market (Van Eeghen 1937: 131; EW 1941: 1025-27; Van Oorschot 1956: 45-6).

Both items of legislation gave the colonial government unprecedented power to steer industrial development in Indonesia. Although initially intended to last until 1938, the system was continued in the absence of significant export recovery. There were numerous problems with the implementation of the rules, including disagreements about the classification of imported products, the relevant product unit, and the allocation of import permits to importing firms and countries of origin. Other problems involved estimating the size of the domestic market, licensed domestic production, and the carry-over

of imported product stocks from previous years in order to establish the appropriate quota, anticipating the consequences of import restrictions on price stability in domestic markets, and anticipating the carry-over of stocks, *etc.* (Wirodihardjo 1951: 55-85).

This regulatory system has been regarded as a tool to safeguard markets in Indonesia for firms in the Netherlands. The trade barriers indeed encouraged some Dutch firms to establish subsidiaries in Indonesia. However, the more significant consequence of this industrial policy was a drastic increase in manufacturing production in Indonesia for local markets and the further development of the domestic distribution network (Wirodihardjo 1951: 131-37).

The guilder devaluation in September 1936 reinforced this policy stance, and modest economic recovery started in 1937. It received a further impetus with the start of World War II in Europe in 1939. As the war disrupted supply lines from Europe, the government stepped up efforts to increase the domestic production capacity. When Indonesia became cut off from The Netherlands in 1940, the colonial government assumed an unprecedented degree of control over the economy (Barber 1939; Van Zyll 1940). In part to prepare for the consequences of war, in part because tutelage from The Netherlands was effectively lifted, the government stepped up efforts to bolster the economy. For example, in 1940 it assumed control over foreign payments with the Foreign Exchange Ordinance (*Deviezenordonnantie*), which made foreign exchange allocations for imports subject to permits of the Foreign Exchange Institute (*Deviezeninstituut*) at the central bank.

The Japanese occupation during 1942-45 disrupted the industrialisation process (EW 1946). Hostilities and the dismantling of industrial ventures, as well as the subsequent 1945-49 war of independence damaged production facilities. When the colonial government returned after August 1945, it sought to resume control over the economy and continue where it had left matters in March 1942. The extensive shortages of almost anything, and the need to orchestrate the reconstruction effort from the ravages of the occupation and war were urgent reasons to resume control over the economy, in particular foreign trade and foreign payments. Where possible, plans for economic recovery were grafted onto pre-war plans for economic diversification and growth.

Indonesia's full independence from The Netherlands in 1950 did not immediately have major consequences for economic policy. Controls over foreign trade and payments continued. A system of multiple exchange rates implicitly taxed export earnings and discriminated against luxury imports. The commodity export boom of 1950-51 caused by the Korea War reduced the urgency to control foreign trade and payments. But when commodity prices and export revenues fell in 1951-52, the balance-of-payments deficit mounted. The stock of foreign currency and gold depleted rapidly, and the import and payment restrictions were intensified. For example, foreign remittances were heavily taxed and in 1953 import surcharges of up to 400% placed further restrictions on imports. New classifications of imports and import duties were released (De Neuman 1956: 691-92).¹⁰

These measures limited imports, but they also discouraged foreign direct investment (FDI). They increased the competitiveness of Indonesia-based producers in the domestic market, particularly firms with low dependence on imported capital goods and raw materials. The system to license productive capacity was continued. By 1956, productive capacity in the following industries was licensed: textiles (spinning, weaving, knitting, textile printing), printing, cigarettes, ice, cooking pans, rice milling, rubber re-milling, rubber smoking, and storage and warehousing (Kraal 1957: 286-93).

¹⁰ De Neuman (1956) contains a long lament about the fact that the increasingly complicated and arbitrary systems of control over payments and import, as well as arbitrary control over formal credit increased business risk.

During the 1950s, other factors exerted a negative impact on the business environment, reducing incentives for industrial investment and expansion. A succession of coalition governments during the 1950s caused an accumulation of twists and turns in policies affecting the economy, enhancing risk perceived by private enterprise (Kraal 1957: 263; Glassburner 1960). But even after President Sukarno ended parliamentary democracy in 1959 and assumed executive powers, economic policy changes continued to reduce predictability in Indonesia's business environment and therefore increased risk to private firms.

Large-scale firms in particular had to absorb the consequences of new labour legislation that reduced working hours, increased labour costs in the formal sector, tightened dismissal rules, and allowed union activity and strikes (De Wit *et al.* 1961: 38-50). Strikes increased, as unions became better organised and more militant. Labour unrest frequently targeted foreign-owned firms and strikes were recurrent until the nationalisation of most foreign firms after 1957.

Nationalisations were a consequence of increasing hostility towards foreign firms, particularly Dutch-owned ventures, which came to a head in December 1957 when Indonesia failed to receive UN support for its position in its conflict with The Netherlands about West Irian. Workers occupied Dutch firms, until the armed forces took physical control. Dutch firms were formally nationalised in 1958. Many were put under the management of appointees with the right political contacts, or of former officers of Indonesia's armed forces, who were able to subdue the strikes. Other Western firms felt the threat, until they too were nationalised during 1963-65.

The nationalisation of foreign firms was part of a re-definition of the role of government in the economy. Despite its increasing involvement in the economy since the early 1930s, the government was not regarded as a substitute for markets. Hence, economic planning, culminating in the Five Year Development Plan 1956-60, was largely indicative (BPN 1956). But in 1959 President Sukarno set the country on a socialist 'Guided Economy' (*Ekonomi Terpimpin*) path of development with a more prominent role for State-Owned Enterprises (SOEs) and prescriptive economic planning in the form of the Eight-Year Development Plan 1961-68 (Castles 1965; Pauker 1961). New SOEs were established in a range of economic sectors, including key services such as finance, shipping, trade and distribution.

A reason to establish SOEs operated by indigenous Indonesians was that earlier efforts to spur an '*Indonesianisasi*' of the economy had been unsuccessful. In April 1950, the new government of independent Indonesia expanded a program initiated in the late 1940s by the Dutch colonial government that allocated import quota of pre-war Dutch and Japanese firms to Indonesian importers, who met several conditions regarding *e.g.* access to capital and managerial skill (Glassburner 1962: 76-77). The Fortress (*Benteng*) program was based on this precedent (Amstutz 1958). Under this program, the Department for Development and Organisation (*Jawatan Perkembangan Organisasi*) in the Ministry of Economic Affairs allocated import licenses for specific products to registered Indonesian importers. New businessmen qualified for registration after they had taken out designated loans from the government-owned *Bank Negara Indonesia* (BNI, 1946) to meet the criteria of access to capital to be registered for the program.

The explicit aim of the *Benteng* program was to create 'protected' (*benteng*) importers, reduce the role of Dutch-owned general trading firms in import trade, and increase the participation of ethnic Indonesians in business. The criteria for registration were lowered in 1953 and the number of would-be businessmen increased rapidly, nominally handling 70% of import trade. But by 1955 it became clear that 90% of these firms had sold their licenses to other firms, presumably ethnic Chinese (De Neuman 1956: 693; Glassburner 1962: 80). By 1956 it was obvious that the policy had failed. Many of the BNI-

financed Indonesian enterprises were faltering, and BNI credit appeared to have been misused. The registration requirements were tightened, resulting in a drastic decrease of registrants and an effective abandoning of the program. Consequently, medium and large scale business, particularly in manufacturing and distribution, remained dominated by ethnic Chinese and Dutch-owned enterprises.

Nationalisation of Dutch enterprises in 1957-58 bolstered the role of ethnic Chinese firms, which filled voids left by Dutch firms, particularly in trade and distribution. Consequently, the government tightened the system of import controls and took control of the distribution system. While the distribution of controlled imports had previously largely been handled by private firms¹¹, imports of essential products would henceforth be handled by state-owned trading firms. They would allocate imports to industry associations, which distributed them to members. The allocations were closely supervised by relevant government ministries, which also expected output in accordance with allocated inputs (IS 1959a). By 1961, the allocation of key imported and domestically produced goods had become a bureaucratised process. Although registered small-scale producers were included in these allocations, many opted to sell their allocated inputs to large firms that were struggling to produce to capacity, as was the case in the *batik* and weaving industries (Kertanegara 1958: 374; Keppy 2001: 175-208).

The policy was successful in sidelining ethnic Chinese entrepreneurs in distribution, particularly after about 70,000 of them were banned from rural areas in 1959 (IS 1959c; Van der Kroef 1960: 58). About 100,000 ethnic Chinese subsequently opted to repatriate to China. These developments severely disrupted the distribution of inputs to and the purchase of produce from small and medium-sized manufacturing firms outside main urban centres. Cooperatives were expected to take over the role of these rural Chinese, but despite their rapidly growing numbers on paper they were not able to do so.

3.2 Macro-economic difficulties and shortages of key inputs

Mounting macro-economic difficulties capped these micro-level problems, particularly the spiralling dual deficit. The government plugged a growing public deficit by increasing its borrowing from the central bank, fuelling inflation in the process. The balance-of-payments deficit mounted in the early 1960s. Economic growth slowed, inflation eroded wages and underemployment increased during the late-1950s and early-1960s.

The change of government in 1966, and the change of Presidency from Sukarno to Soeharto in 1967 brought change in the country's economic fortune. The new government implemented a program of economic stabilisation and abandoned the 'Guided Economy' principles, followed by the gradual lifting of the various restrictions on private enterprise, and a change to an indicative process of economic planning, starting with a new First Five-Year Plan in 1969. This process was bolstered by the rapid expansion of oil production for export after 1966, and the rise of oil prices since 1973. This export windfall resolved the dual deficit problem and helped to establish the macro-economic foundations for an acceleration of economic growth after 1966 through a diversification of the economy away from primary sectors.

¹¹ Exceptions included the import and distribution of all white cambric cloth to batik producers, which was since 1955 in the hands of the Association of Batik Cooperatives (*Gabungan Kooperasi Batik Indonesia*) (Kertanegara 1958: 373).

All these changes took place in a context of significant shortages of key manufacturing inputs: skilled labour, investment capital, entrepreneurship, capital goods, raw materials and semi-manufactures, and electricity.

Indonesia had abundant unskilled and uneducated labour, but skilled and educated workers were required for the development of manufacturing ventures. Immigrant Dutch nationals long filled this void, until most of them left the country during the early 1950s. Skilled labour was in short supply (Kraal 1957: 279). The education system improved, but there was a delay until it started to supply educated workers in significant numbers. Even so, it would take time for graduates to acquire relevant experience, and average educational attainment increased only slowly.

The exact rate of investment was unclear, but the national accounts put Gross Fixed Capital Formation at between 5 and 10% of GDP during 1951-70, rising quickly to 20% in 1975.¹² Hence, after depreciation of 3 to 6.5%, the net rate of capital formation may have been a low 2 to 3.5% of GDP. FDI inflows dried up quickly in the early 1950s. Most FDI consisted of re-invested earnings that firms could not transfer overseas without having to pay a high implicit rate of taxation. In addition, government policy towards FDI was ambivalent and investors considered risks to be high in the unsettled political and economic climate. Except for the oil industry, FDI inflows only increased significantly after the adoption of a more accommodating new Foreign Investment Law in 1967.

The banking sector and the stock market were embryonic at best and not in a position to muster private savings for investment on a significant scale (Charlesworth 1959). By the early-1960s, all major private banks had been nationalised. They were ordered to finance the operations of the burgeoning number of SOEs (Bank Indonesia 1968: 65). Consequently, private firms that were willing to invest in new productive capacity depended largely on re-invested earnings for investment, while small-scale ventures depended largely on personal savings and curb markets for establishment and expansion. This limited the possible rate of expansion of private enterprise, particularly in manufacturing.

Indigenous entrepreneurship was in short supply. Western firms, particularly Dutch firms, had been retreating from Indonesia before 1958. For example, in 1955 the sale of *General Motors'* interest in the *General Motors Java* car assembly plant created state-owned *Gaya Motor*. Some Dutch-owned firms expanded on the basis of re-invested earnings, as opportunities to repatriate earnings were limited. Ethnic Chinese entrepreneurs increasingly filled voids that were a consequence of the reluctance of Western firms to invest in Indonesia. They also benefited from the 1950-55 *Benteng* program as unofficial partners of would-be Indonesian entrepreneurs or as buyers of their import licenses. The problem with this development was that ethnic Chinese firms were generally small, with restricted access to finance. Hence, in more capital- or technology-intensive industries, they could not replace foreign firms. In addition, they faced increasing restrictions on their operations.

The supply of capital goods and key inputs was impeded. The distribution of domestically produced inputs suffered from an increasing breakdown of the transport network of inter-island shipping, overland railways and road transport (Van der Kroef 1960: 59-60). The supply of imported inputs was hampered by import restrictions, *i.e.* the licensing of imports and foreign exchange, and the complicated system of increasingly overvalued multiple exchange rates that intended to discriminate against luxury imports. Prices of capital goods and inputs fluctuated considerably (Kraal 1957: 281-82).

Of crucial importance to the development of mechanised manufacturing industry was the shortage of electricity generating capacity in areas where it was required (McCawley 1973: 23-7).

¹² Compared to 8% in 1938 (CBS 1948).

Electricity production increased, but only the completion of the hydro-electricity plant connected to the huge Jatiluhur dam in West Java in 1967 brought significant relief. It contributed to a tripling of electricity production during 1950-70, and a further doubling during 1970-75.

4. Government support for industrialisation

During 1930-75, successive governments designed and implemented policies to foster industrialisation. Industry policy had initially been intended as a temporary measure to create employment in the short term. But it expanded during the 1930s with the aim of creating employment in the long term, particularly in Java, and it was resumed and diversified after World War II. At the same time, as section 2 has shown, employment and output in manufacturing industry increased, despite the adverse developments in the wider business environment noted in section 3. Were industry policies a crucial factor in these developments?

4.1 Pre-war support for large-scale ventures

Fostering industrialisation had been an object of government policy before the 1930s, but the effort was minor and haphazard (Segers 1987: 16-27). It seems to have been taken for granted that enhancing large-scale industrialisation beyond the processing of primary produce was not an option. The country's comparative advantage was in primary exports, and significant changes in its terms-of-trade and real exchange rate dampened private sector interest in investing in manufacturing ventures, whether for export or to service the growing domestic market. Industrialisation did occur, but largely in sectors that enjoyed some natural protection, or in industries that processed primary commodities or serviced commodity production.

It is necessary to distinguish between the development of large-scale ventures and small-scale ventures, without being very specific about the exact size difference between the two. Before 1930, large scale ventures were mainly found in agro-processing, particularly the ubiquitous sugar factories in Java. Engineering firms, such as *Machinefabriek Braat* (Surabaya), were often dependent on contracts from agro-processing plants. Some other large-scale industries existed, such as the *Padang Portland Cement Mij.* (1912), the *British-American Tobacco* company (1916), the *Papierfabriek Padalarang* rice paper mill (1923), and the *General Motors Java* car assembly plant (Tanjung Priok, 1927). The armed forces maintained the sizeable Navy shipyards in Surabaya and an Armoury Plant in Bandung. But, on the whole, such large ventures were exceptions, not the rule. In addition, there was a plethora of small and cottage industries that produced a wide range of consumer items for local markets. Several of these were concentrated in specific areas, sometimes as a consequence of a long artisan tradition and often because raw materials were produced locally.

Soon after the onset of the 1929 crisis, it became clear that to reduce imports and create new income opportunities, the government had to encourage investment in a range of industries producing for the domestic market. Hence, trade policies encouraged the establishment of a wide variety of large ventures (Shepherd 1941: 73-79; EW 1940: 742-47). Many were the result of investment by consortia of private firms, often including one or more of the big six Dutch-owned general trading companies in Indonesia and/or parent firms in The Netherlands or USA. Prominent new import-replacing ventures were the *Nederlandsch Indische Bierbrouwerijen* (later *Heineken*) brewery (Surabaya, 1931), *Preanger Bontweverij* weaving plant (Garut, 1932), *Archipel* brewery (Jakarta, 1933), *Goodyear Tyre and Rubber*

Company (Bogor, 1934), Unilever's soap, margarine and cooking oil plants such as *Lever Zeepfabrieken* (1934) and *Van den Berg's Fabrieken* (Jakarta, 1935), *National Carbon Co. (Java)* batteries plant (1935), *N.I. Schoenhandelmij Bata* shoe factory (Jakarta, 1937), *Java Textiel Maatschappij* weaving/spinning plant (Tegal, 1936), and the *Papierfabriek Letjes* paper mill (Leces, 1939) (Segers 1987: 30-35). These were the tip of an iceberg; by 1940 there were about 5,473 large and medium sized manufacturing establishments using mechanical power (Segers 1987: 61).

1940 and 1941 saw a flurry of government encouragement of new ventures, particularly in heavy industry. A series of new projects was announced, including 8 large scale plants for the production of aluminium, iron and steel, fertiliser, caustic soda, glass, wood pulp, plywood and cotton spinning mills, with on average 20% government participation (Van Zyll 1940: 259; EW 1941: 392-96; Davis 1941). Some of these and several other projects were started, such as the *Philips Fabricage & Handel Mij* assembly plant for electrical equipment. However, few could be completed before the Japanese invasion started early in 1942.

4.2 Pre-war support for small-scale ventures

Support for small-scale industry had its origins during World War I, when disruptions in international shipping caused shortages of a range of imported products in Indonesia. The colonial government hedged plans for industrialisation, of which only embryonic support for small-scale industries eventuated. It took the form of modest technological institutes for applied research and vocational training, including leather (1918, Yogyakarta), textiles (1922, Bandung), *batik* (1922, Yogyakarta), and ceramics (1926, Bandung) (Sitsen 1943a: 36; Rhyne 1954: 76-78; Stepanek 1955: 32-35). Apart from improving production technologies for clusters of small-scale ventures, these institutes offered training for local producers, were actively engaged in disseminating improved production technologies to small producers in their vicinity, and engaged travelling vocational teachers.

Rising unemployment in the early-1930s and incessant population growth in densely populated Java were the main factors underlying the need to create new employment opportunities. It was also obvious that the development of large and medium sized ventures was insufficient for that purpose, as the majority of employment was in small and cottage industries. By 1935, it became clear that trade protection had not only fostered the development of large and medium sized ventures, but also of small firms, despite their limited access to capital and technology.

It also became clear that ethnic Chinese middlemen were playing an important role in that process as suppliers of raw materials and purchasers of final produce from small producers, particularly in the textile industry. But while in the early 1930s the influence of Chinese middlemen was considered a threat to small producers who would be in need of protection, from 1935, the government reconsidered the role of small industries in the industrialisation process. Rather than view them as potential victims in need of protection, government policy began to consider the strengths of existing small industries and the ways these could be furthered and combined with the strengths of large firms (EW 1935: 1064; De Neuman 1954: 252). The experience of Japan, where 60% of industrial output was generated by small-scale ventures, was explicitly mentioned in support of the argument that government policy should focus on small-scale enterprises (Sitsen 1937: 165).

A growing number of industrial consultants (*nijverheidsconsulenten*) was appointed. In addition, six Consultation Agencies for Small-Scale Industry (*Consultatiebureaus der Kleinindustrie*) were established, mainly in Java. They employed a large staff of technical and economic instructors, and

travelling vocational teachers (Van Eeghen 1937: 132-33; EW 1940: 748; EW 1941: 21-22). Together, consultants and the staff of the Consultation Agencies disseminated the new technologies developed by the technological institutes, assisted in the purchase of raw materials, and conducted research into the socio-economic aspects of small firms and their industries. They monitored the development of productive capacity in several industries that had a mix of small, medium and large scale enterprises, convinced that a balance in the development of these types of enterprises had to be achieved.¹³ They assisted promising firms to gain access to credit as working capital or for the purchase of raw materials or capital goods from the Small Industry Fund (*Fonds Kleine Nijverheid*), established in 1936 in the Department of Economic Affairs.¹⁴ Together, the consultants and the Consultation Agencies constituted the Industry Extension Service (*Nijverheidsdienst*) in the Department.

The consultants also encouraged producers to establish cooperative ventures in regional clusters of small-scale industries. Eight of these ventures were established as industry centres (*nijverheids-centrales*) by 1936, each servicing 15 to 20 village clusters of small producers in areas with an established cottage industry. The centres orchestrated the purchase of raw materials, and organised the finishing and sale of final products, thus cutting out the middlemen.¹⁵ Such ventures were pioneered in weaving, ceramics and ironworking during the late-1930s on a limited scale and under supervision of the industrial consultants (Sitsen 1937: 143-45; Sitsen 1943a: 16-18; Rhyne 1954: 268-69).

An unpublished 1936 report by Peter H.W. Sitsen, the Director of the Industry Division of the Department of Economic Affairs since 1935, established the rationale behind these developments (Rhyne 1954: 52-67). It was formalised in 1937, when the government endorsed a set of 'guidelines' to foster small-scale industry (EW 1937: 551). The policy did not seek to establish an industrialisation plan, but allowed circumstances to determine the measures that the consultants would pursue (Rothe 1938: 5). The policy also stated that the industrialisation effort would be labour-absorbing and focused on Java, where wages were lower. It would not lead to an increase of the production costs of the country's primary export industries. And it would not disadvantage consumers by minimising any increase of the cost of goods in order to maintain the competitiveness of the country's import trade sector (EW 1937: 551-52; Hulshoff Pol 1948: 851). Despite government support for the development of small industries, the private sector was expected to be the engine of industrial change. Lastly, the aim was to orchestrate a process of industrialisation that would balance the role of small and large industries.

In other words, industrialisation would not put upward pressure on wages, and would not increase prices. Import-replacing industrialisation would not be brought about through a high rate of trade protection, but by fostering private firms in industries that were or could be internationally competitive and would for that reason not harm the interests of the country's primary exporters. Hence, the aim was to foster labour-intensive private firms that would be able to compete against particularly Japanese imports with a moderate degree of trade protection through the quota system, while the licensing of productive capacity would foster balanced growth.

During 1937-41 small industries expanded quickly, despite (1) products being of non-standardised design and quality; (2) industries being capital-deficient and labour-intensive; (3)

¹³ See e.g. Van Warmelo (1938: 5), who was industrial consultant for the textile industry.

¹⁴ The amount of credit extended by the Fund was limited; f105,000 in 1938, f99,000 in 1939, f 171,800 in 1940 (EW 1940: 748; EW 1941: 1562). This was significantly less than credit extended to manufacturing firms by the General People's Credit Bank (*Algemeene Volkscredietbank*), effectively the only source of formal credit for small ventures.

¹⁵ This happened only on a modest scale from 1937. Each of these industrial centres also had only a modest turnover (EW 1941: 1017-32).

sustained competition of imported consumer goods and light capital goods; (4) the simple technologies they used and the only embryonic technical assistance offered by government agencies (White 1953: 254). There is no evidence that this expansion was a direct consequence of the increasing activity of the Industrial Extension Service. Although the work of the Service may have helped, the development of small-scale industry was most likely a consequence of the increased opportunities to sell consumer goods in domestic markets. Small firms produced goods for local needs and tastes that large and medium sized firms did not produce. Despite low quality, low prices made their goods competitive in the lower ranges of markets. The most prominent examples of small industry development were weaving and *batik*, but production of leather goods and footwear, ceramics (pottery, bricks and roof tiles), household utensil and farm implements, umbrellas, rattan and bamboo plaiting and wickerwork, woodwork and carpentry (furniture), and cigarettes also expanded.¹⁶

4.3 Industrialisation planning before 1950

The principle of balancing the development of small and large industries underpinned the Industrial Development Plan (*Industriepplan*), prepared by Sitsen and R.M. Pandji Soerachman Tjokroadisoerio, Head of the Industry Extension Service. The plan, presented in March 1941, made the principle of a balanced, mutually supportive development of small- and medium scale and large scale operations explicit (De Neuman 1955: 18-19). This dual development was regarded as a way of economising on scarce factors of production to skills and managerial capabilities (De Neuman 1954: 253).

This principle was repeated in the new guidelines for industrial development of 1946 (Van Warmelo and Elias 1947; Hulshoff Pol 1948: 850-51). Two key differences with the 1937 guidelines were, firstly, that capital-intensive industrialisation was envisaged in more labour-scarce areas outside Java where the availability of natural resources would support such industries. Secondly, in the light of business cycles caused by dependence on primary exports, the need to create employment opportunities in Java was now considered to be as important and urgent as preventing increasing wages from harming the competitiveness of primary exports. It was argued that population growth would mitigate any upward pressure on wages as a consequence of the industrialisation effort.

The new guidelines explicitly favoured nurturing labour-intensive industries, particularly small-scale handicraft-based ventures, in the face of shortages of investment capital. The 'technological-economical structure' would determine the development opportunities of small, medium or large-scale, or of labour or capital-intensive enterprises. Where economic opportunities were equal, preference would be given to small-scale industry. The guidelines also stated that trade protection and industry policies, including the regulation of productive capacity, could be used during the start-up phase of an industry. A major change compared with 1937 was that the government agreed to assist in supplying capital for large, medium and small-scale industries through 'suitable financial agencies' where private financial interests would not be sufficient, and would take a share in new large ventures where private interest would be insufficient. The latter may have been a consequence of the capital-intensive projects with government investment in 1940. While the 1937 policy explicitly rejected industrial planning, the 1946 guidelines foreshadowed indicative five-year planning within a 25-year framework.

¹⁶ EW (1940: 740-42; 1941: 1018-21; 1949: 1235-36) sketches the development of small-scale *batik*, weaving, bamboo hat making, mat weaving, cigarettes, umbrella, and furniture production during the 1930s and 1940s, while Aten (1952/53) details the development of small-scale production of textiles, umbrellas and blacksmith items in West Java. Stepanek (1955: 105-10) lists 110 of these clusters that existed in 1952.

The new guidelines foreshadowed a 5-year development plan, which took the form of the Special Industrial Development Plan 1950 (*Bijzonder Industrieel Welvaartsplan 1950*, DEZ 1949: 9-11) of November 1949, prepared by D. Groenveld (De Neuman 1955: 30-31). This plan established the foundations for later industry policy, as several aspects were implemented during the 1950s. The plan contained three key aspects. (1) Expansion of the number of technological institutes. They developed new products for which locally-produced raw materials could be used, ways to improve the quality of these raw materials, as well as new production and management technologies that suited the circumstances, such as the supply of raw materials and the technical capabilities of small and medium-sized firms. They also offered training courses. (2) Research by foreign experts into the feasibility for FDI in specific large-scale industrial ventures for upstream production of basic goods, several of these had already been proposed in 1940. This included caustic soda, nitrogenous fertiliser, aluminium, building materials, paper, plywood, gunny bags, cement, glass bottles, spinning and weaving, tanneries, and fish canning.

But 62% of the plan's budget was for (3) the fostering of cottage and small-scale industries through the establishment of 69 industry centres during 1950-54, which would assist clusters of small producers in the acquisition of new production technology, the purchase of raw materials, the processing of produce to improve and standardise product quality, and the marketing of final products. These centres had been pioneered in the late-1930s, but now the intention was to expand them geographically and across a wider range of industries in which labour-intensive, small-scale production of mainly consumer goods appeared promising: weaving, ceramics, ironworking, copper working, wood processing, tanning and leatherworking, and rubber processing. These were generally sectors that would be able to compete with imported consumer items, processing locally sourced raw materials and creating new employment opportunities.

In 1948, manufacturing firms started to recover from the devastation during the Japanese occupation and the first phase of the war of independence until December 1947. The colonial government supported this process through its regional Bureaus for Industrial Recovery (*Bureau voor Industrieel Herstel*), renamed Bureaus for Industrial Promotion (*Bureau voor Nijverheidsbevordering*) in 1949, which offered advice and mediation for foreign exchange applications, supply of raw materials, technical and management matters. They often assumed similar tasks as the industry centres before the war, even though they were not suited for that purpose (Davis 1949: 1233). The Small Industry Fund was re-established in 1948, together with the government-owned Recovery bank (*Herstelbank*), which offered credit to firms for recovery purposes (Van Oorschot 1949: 117). However, the dire foreign exchange shortages limited imports of spare parts and raw materials, and therefore the pace of recovery.

4.4 Industrialisation planning, 1950-1975

Administrative changes followed Indonesia's independence, which delayed the start of the Industrial Development Plan in 1950. The structure of the Industrial Section at the Ministry of Economic Affairs did not change. The scientific research section, the development and training institutes, the Industry Extension Service, the regional Bureaus for Industrial Promotion and the Consultation Agencies (*Badan2 Konsultasi*) were all continued within the Department of Trade and Industry of the Ministry of Economic Affairs as the Industrial Extension Service (*Jawatan Kerajinan*). Although the numbers of employees increased significantly in the early 1950s (Stepanek 1955: 60-61), the departure of many Dutch nationals from the public service caused a growing shortage of experienced employees, which

was a crucial element of the highly diversified industrial development effort of the Service. In addition, as had been the intention in 1949, the plans for industrial development were to be integrated in a five-year overall development plan. But it took until 1953 before this overall planning process started at the new State Planning Bureau (*Biro Perancang Negara*, BPN).

During his brief 7-month spell as Minister of Trade and Industry in 1951-52, Sumitro Djojohadikusumo sought to expedite the rate of industrialisation as a matter of urgency. He was convinced that a forced pace of industrialisation, if necessary with government investment, was the key to Indonesia's economic development. It would help to overcome the economy's vulnerability to cyclical fluctuations in international trade and the structural decline in the terms-of-trade of primary commodities (Djojohadikusumo 1952: 211-16; Djojohadikusumo 1953: 174-78).¹⁷ He ordered a revision of the Industrial Development Plan in October 1950. The result was the Economic Urgency Plan (*Rencana Urgensi Perekonomian*), announced in March 1951. The main difference with the 1950 Industrial Development Plan was that now support for large-scale firms occupied 53% of the plan's budget (MEA 1951: 6).

The new plan echoed several of the 1946 guidelines and offered the parameters for further planning of industrialisation during the 1950s and 1960s, which took two forms. Firstly, it aimed to establish seven and prepare several other major large-scale projects. These were to be established with government involvement for two purposes: to replace imported products with local production and save foreign exchange, and 'as the basis for and the stimulant of other industrial enterprises' (MEA 1952: 24). Pre-war industry policy had sought to protect and support small-scale industry in an industrialisation process that would in large part be driven by private-sector investment in large-scale ventures. Now, the key upstream industries would be established as SOEs with trade protection. FDI would only be accepted in 'non-essential' industries, but even for them foreign participation was qualified (IR 1951: 184-86).

As far as these large-scale projects were realised in later years, they have been well-documented. A few plants were established during the Urgency Plan and started production soon after, such as a cotton spinning plant in Cilacap, a desiccated coconut meal factory in Minahasa (Sulawesi), a caustic soda plant near Surabaya and several newspaper printeries (Stepanek 1955: 51). Others experienced delays, often caused by poor management and bureaucratic bungling (Djojohadikusumo 1954: 9-10). These and other projects took much longer to start and reach completion, including the Gresik cement plant, the Palembang urea plant, the Surabaya bottle factory, the Cilegon steel works, or the Asahan aluminium works in North Sumatra. Many did not come on stream until the 1960s. Production in these firms may have slowed during the mid-1960s due to insufficient maintenance, shortages of foreign exchange for imports or parts and raw materials, and shortages of skilled employees, but on the whole they added to industrial output.

Almost all were government-owned ventures; often financed and controlled by the state-owned *Bank Industri Negara* (BIN). BIN was the 1952 reincarnation of the 1948 *Herstelbank*, which in 1960 became *Bank Pembangunan Indonesia* (Bapindo). BIN had been established for the purpose of financing Indonesia's industrialisation. On the basis of government-provided capital and assets raised

¹⁷ Saroso Wirodihardjo – like Sumitro, an economics graduate of the Rotterdam School of Economics – also supported active trade and industry policies for this reason, as well as the dismantling of import quota that benefited industries in The Netherlands (Wirodihardjo 1951: 199-206, 221-28). As Head of the Department of Trade of the Ministry of Economic Affairs, he was engaged in designing and implementing trade policies to foster industrialisation, diversify the economy and mitigate the impact of global trade cycles on Indonesia's economy (Wirodihardjo 1956).

through bond issues, BIN played a major role in this process. It lent for projects with government guarantees of repayment and for projects on its own account, and it took majority shares in projects, generally in ventures which did not attract private investment. By 1956, the distribution of its assets over these three categories was 29%, 29% and 42%, the latter involving 32 firms, of which 23 in manufacturing (BIN 1956: 14-17). Some firms were taken over from private interests, such as the *Gaya Motor* car assembly plant, which the government purchased from *General Motors*. The development of SOEs was only the tip of an iceberg of medium and large enterprises. From 5,473 in 1940 (Segers 1987: 61), the number of medium and large firms had increased to 9,877 in 1954 (BPN 1955: 454-55) and continued to grow to 24,332 in 1964 (BPS 1967: 1).

The second aspect of industrialisation planning in the 1950s comprised efforts to foster small- and medium-sized, privately-owned ventures by encouraging the development of clusters of such ventures in selected industries and selected regions. Like the late 1930s, the aim of this approach was to introduce existing or would-be individual small producers to improved, but still simple technologies, and to introduce collectives of such producers to more advanced imported technologies for processing purposes in order to improve and standardise the quality of produce. The approach also involved the establishment of cooperatives for the purchase of raw materials and for the sale of final produce in order to cut out middlemen. This approach was supported by efforts to offer credit on favourable terms to small-scale producers and encourage the mechanisation of production. All these efforts were primarily focused on Java. This second part of the Economic Urgency Plan was in effect a revision of Industrial Development Plan, and will be discussed in the next section.

A third key aspect of the plan was to provide credit for working capital and investment in machinery to medium-sized enterprises during 1951-52. Credit lines would come from several sources, including the Department of Industry, state-owned banks and particularly the government agencies like BIN and successor of the Small Industry Fund, the People's Credit Fund (*Yayasan Kredit Rakyat*) in the Ministry of Economic Affairs. Medium-sized enterprises in 9 labour-intensive rural industries like textiles and rubber processing, were to be given priority, as well as enterprises processing domestic inputs to replace imported inputs.

The loans program for medium-sized firms was not drafted until 1952 and started in 1953. Given limited funding, it focused on credit to firms for the purchase of only machinery and equipment. The program was supported with US foreign aid for the purchase of the machinery, while credit was administered for the People's Credit Fund by state-owned banks BIN and *Bank Rakyat Indonesia*. The program was intended to benefit 82 industrial ventures, selected from 247 applicants. Of the beneficiaries, 72 were in Java, and most produced consumer goods (Djojohadikusumo 1954: 20-22; Stepanek 1955: 46-50; Rao 1956: 166-68). A progress report in 1956 showed only partial success; only 22 of the 82 ventures had received new machines, of which only 10 were using them, while only 6 were satisfied and able to run the machinery continuously (Mulia 1958: 200).

A general problem with the whole plan was that mechanisation of these enterprises was perceived as a technical issue, which took insufficient account of related socio-economic issues, including the level of education and technical skills of workers, the place of mechanised production in the supply chain, and the economical use of machinery relative to manual production techniques (Zain and Mulia 1956: 165-71; Mulia 1958: 200-05). Mechanisation efforts were not very successful, except where the existing level of entrepreneurial ability was high. A big problem was the shortage of skilled engineers and technicians, and trained mechanics who could sustain the mechanisation effort (Dunkle 1959: 30).

Most of the industrial development projects proposed in the 5-year development plan for 1956-60, prepared by BPN, were continuations of the Economic Urgency Plan: the technological institutes; the industry centres; credit for mechanisation; 18 large-scale enterprises, including aluminium, caustic soda, cement, paper, bottles, and fertiliser (BPN 1956: 112-17). These large-scale enterprises became the focal point of the industrialisation drive. They were now unequivocally announced as SOEs, as the policy stance in favour of SOEs had gained increasing support. An advisory Commission for Industrialisation (*Panitia Industrialisasi*) had formally proposed in August 1951 that the government take the lead in establishing these ventures, as Indonesian-owned private enterprise was still regarded to be too weak for this purpose and FDI in key industries was deemed undesirable (De Neuman 1955: 34).¹⁸ The 5-year plan established priorities for investment by regional governments and private sector in a range of industrial sectors, but did not propose concrete measures to facilitate such investment (BPN 1956: 118-25). The plan also did not offer any indication how exactly the large-scale ventures would become ‘the basis for a stimulant of other industrial enterprises’, as the Economic Urgency Plan had envisaged. In other words, there was no longer a concerted effort to seek a balanced and integrated process of industrial development.¹⁹

Several of the large scale projects were subsequently realised, often with foreign aid. For example, the cement plant in Gresik was established in 1957. Other projects took much longer, such as the aluminium plant in North Sumatra. They therefore re-appeared in the Eight-Year Development Plan 1961-68 (Siahaan 1996: 536-38). However, given the multitude of economic problems, few new projects were actually started. Planning and construction of projects that were finalised in the 1960s had generally started in the 1950s. Hence, several of these projects re-appeared in the new Five-Year Development Plan for 1969/70-1973/74 (Siahaan 2000: 9-11).

During this new five-year plan, foreign aid and FDI in Indonesia increased very significantly and manufacturing industry received a considerable part of this inflow of funds. Foreign aid relieved the government’s budget deficit. Together with inflows of oil export revenues, the government was able to invest considerably in new and existing SOEs. Continued high rates of effective projection for manufacturing industry meant that foreign manufacturing firms were attracted to Indonesia to establish subsidiary production plants with local partners, as this was often the only way to sell in Indonesia’s rapidly expanding domestic markets. But these developments mainly benefited large-scale industry. SMEs benefited only by implication; for example, because foreign exchange controls and restrictions on imports of raw materials and semi-manufactures were lifted.

Frequent re-organisations of government departments and personnel were unhelpful (Kraal 1957: 304; Siahaan 2000: 34-39). In addition, the public agencies involved in administering the programs were not always well-prepared and sometimes mismanaged their role. Djohadikusumo

¹⁸ This view was included in the 1956 draft Foreign Investment Law, which restricted FDI opportunities (De Neuman 1956: 690; Kraal 1957: 298-300). The law passed parliament in 1958.

¹⁹ It thus appears that the advice of White Engineering (1953: 250-52) to the Indonesian government to establish ‘a program of close coordination of the small-scale industry research and development work with the research and development work for large-scale industry and communications’ was not put into effect. The consultancy firm – or rather Brown University economist Hugh B. Killough – had been engaged by Sumitro in 1952 to prepare groundwork for planning purposes, awaiting the establishment of BPN. It did not offer concrete proposals, but argued with reference to historical precedent in support of the development of small-scale industry. It noted the labour-absorbing capacity of small industry, considered it an integral part of ‘the country’s productive apparatus’ and favoured coordination with large-scale industrial development. It referred to the development of small industries during 1937-41, and underlined the industry centre approach in the Economic Urgency Plan.

(1954: 718) noted the ‘desperate conditions of public administration’. Mulia (1958: 204) noted the lack of coordination between directives from the Ministry in Jakarta and the Ministry’s field workers.

4.5 Support for small-scale ventures, 1950-1975

The core of the second part of the Economic Urgency Plan was the establishment of 23 central units, now called ‘core enterprise’ (*induk perusahaan*), during 1951-52. Their role was to provide a variety of services to assist clusters of cottage industry producers (MEA 1952: 2-3; White 1953: 258-62; Stepanek 1955: 13; Rao 1956: 163-66):²⁰

- Buying, processing and distribution of raw materials;
- Selling processed raw materials to cottage producers on credit and on a non-profit basis;
- Technical guidance and advice on improved production methods and processes;
- Mechanised finishing of products to achieve a final product of a consistent higher quality;
- Marketing arrangements for final products.

The new plan had a few other aspects, such as the extension of credit to cottage and small-scale firms.

The Economic Urgency Plan also contained the research and training aspect of section 1 of the Industrial Development Plan. The rehabilitation of training and research at the technological institutes had become urgent, since there was a back-log in replacing equipment damaged during the 1940s, and because many Dutch technicians left during 1950. Provided the institutes could be rehabilitated, the expectation was that training would not only benefit entrepreneurs in targeted areas, but also in neighbouring areas as improved ways of production would spread.

The *induk* program was put in place with technical assistance and aid from the United Nations and the United States (Stepanek 1955: 19-24). Initially 23, later 18 *induk* were expected to be established during 1951-52 in industries like woodworking, ceramics, textiles, metal working, leatherworking, umbrella production and iron and bronze smelting. The first progress report was upbeat (MEA 1952). But by the end of 1954 only 8 were in operation (Djojohadikusumo 1954: 11-14). The ceramics *induk* in Plered (West Java) was successful (Wolf 1954: 6-7; Rao 1956: 164).²¹ But other *induk* were plagued by a variety of difficulties, including difficulties attracting good managers, delays in the delivery of machinery, lack of skilled operatives, poor management caused by inexperience, ineffective sales organisation resulting in substandard products, but also cumbersome government administration causing delays, shortages of technical experts to offer advice, and land procurement and construction difficulties (Djojohadikusumo 1954: 11-18; BPN 1955: 383; Stepanek 1955: 39-40). Three *induk* were completed during 1954 and others were nearing completion by 1955.

The sober evaluations of the *induk* and mechanisation programs in the Economic Urgency Plan contrast with assessments of two UN-supported consultants for industrial development. Stepanek (1955) offered a detailed description of his involvement in implementing the Economic Urgency Plan during 1952-55. Following the completion of the plan, he designed follow-up projects to help alleviate

²⁰ Note that an *induk* itself was not a cooperative, because the assets of an *induk* were owned by the government and its director was appointed by the Minister of Economic Affairs, until a local cluster of producers would purchase the assets from the government. An *induk* could, however, offer its services to village-based cooperatives.

²¹ The ceramics *induk* in Plered was able to supply produce at a price 40% lower than comparable Japanese imports (Wolf 1954: 7).

the urgent shortage of foreign exchange.²² Altogether, 22 of the original *induk* continued, at least until 1968. After 1956, they were joined by 31 pilot enterprises (*perusahaan pelopor*) which served a similar purpose (Siahaan 2000: 179). Rao (1956: 166-67) was also notably optimistic about what had been achieved, noting for example that the mechanisation project assisted almost 200 firms in 17 consumer goods industries. The mechanisation project was institutionalised with the establishment of the *Kantor Urusan Mekanisasi dan Pembiayaan Industri (Biro Mekanisasi* from 1959) (Siahaan 2000: 180).

Despite such achievements, the impact of the mechanisation program may have been marginal. If the program benefited 200 firms, it would have reached less than 0.1% of the number of small-scale firms it sought to assist.²³ The number of *induk* and pilot enterprises that were established – successful or not – was close to half the number of identified small industry clusters (Stepanek 1955: 105-10). Compared to the total of 30,000 villages throughout Indonesia, the overall impact would have been marginal. Hence, both initiatives may have been successful at a local level, but there is no evidence of wider technological diffusion. As far as small industries developed, this may have occurred independent of the *induk* and mechanisation programs. In particular, many small and medium enterprises (SMEs) owned by ethnic Chinese emerged, generally in industries producing light consumer goods and/or industries hitherto dominated by larger Dutch-owned ventures that experienced disruptions due to strikes.²⁴

The *induk* program did not end with the UN-support for it in 1955 (Stepanek 1955). Government support for existing and new *induk*, as well as other forms of government support continued into the 1960s. Few details of these efforts are available, but it appears that the Industry Extension Service and the Section for Small Industry (*Bagian Sektor Industri Kecil*) of the Department of Industry continued the same model as established during the 1950s into the 1960s (Soebroto 1964: 64-68, 109-120). In addition, US foreign aid for SME development continued during 1956-59 (IS 1959b). It was used for the rehabilitation and modernisation of the industrial development and training institutes for SMEs and cottage industries (section 1 of the 1950 Industrial Development Plan), establishment of 12 further *induk* with mechanised production facilities in addition to the 8 *induk* of the Economic Urgency Program, a credit program to facilitate the mechanisation of SMEs, training abroad of managers and key technicians, and consulting services of US engineers (*e.g.* Dunkle 1959). There is no indication that the credit programs for small-scale industries continued. Panglaykim *et al.* (1963: 82-87) suggest that small firms depended largely on the informal ‘unorganised’ credit market.

The *induk* approach to fostering industrial development may have lost its momentum in the late-1950s. Although the program seems to have expanded, in hindsight, the *induk* program was hampered by a range of problems, which prevented a more significant impact. Given the limited scale at which the projects were established during 1951-55, the program could only have had a limited direct impact. The program was expected to offer participants opportunities to acquire relevant skills, apply these and then pass them on. Improvements in skills, production technology and productivity would lead to higher incomes and would encourage others to copy and further disperse the lessons of the project. Hence, if the projects would have any impact on the development of the country’s industrial sector, it must have been largely indirect and difficult to measure.

²² In a letter to the author (16 December 2005), Stepanek noted that he revisited two of the *induk* in the early 1990s and that both were still flourishing.

²³ Assuming, with reference to Appendix 1, employment in small-scale ventures to have been 1.5 million and that an average venture engaged 10 employees.

²⁴ With reference to changes in size definitions (see Appendix 1), the term SME is used loosely.

The limited results of these efforts to spur small-scale industries may be related to the fact that they continued to experience competition from cheaper imported manufactures produced by more efficient overseas producers, as had been the case in the 1930s, despite the restrictions on imports. For example, imports of cotton cloth remained high until 1958-59. Domestic production increased steeply since, but on the basis of power looms operated by large-scale, though labour-intensive ventures, rather than SMEs. Likewise, the *batik* industry found it difficult to compete with imported and domestically produced printed cotton goods. In addition, there is no evidence that the development of large-scale enterprises created opportunities for cooperation between large firms and SMEs, possibly as subcontractors, as had been a pronounced feature in business development in Japan.

By the mid-1960s, the number of large manufacturing SOEs had increased significantly, and many more were on the drawing board (DPD 1965). Although the planned expansion had to be delayed, it seems likely that the expansion of SOEs since the late-1950s absorbed most of the attention and resources of the Department of Industry, possibly to the detriment of policy attention to other industrial sectors. This is obvious from the expanding structure of the Department of Industry during the 1960s. By 1970 it still had a Directorate General for Light Industry and Handicrafts (*Direktorat Djenderal Perindustrian Ringan dan Kerajinan Rakjat*). However, the number of other sections in the Department had grown with the number of industries in which new SOEs had been established.²⁵ The Department of Industry was most likely largely occupied by the monitoring of SOEs, and where possible preparing them for sale to private investors.

By the late-1960s, there was no longer any explicit consideration for the role of SMEs in Indonesia's industrialisation process (Soehoed 1967; Ranuwihardjo 1970). Still, the DG of Light Industry and Handicrafts in 1970 coordinated the *induk*, and was also scheduled to reinvigorate and expand the number and activities of the *induk* during the new First Five-Year Plan for 1969-74, including assisting them to produce for export through a 'Handicraft Sales Emporium' (DDPR 1970: 18-26). But other sources suggest that officials at this DG were still grappling with the issues surrounding small industries in ways that echoed the tentative efforts of their predecessors in the 1930s and 1950s.

The oil export windfall of the early 1970s lifted import and exchange constraints and enabled firms to invest in imported new technologies. The rapid industrialisation was to a large extent carried by large and medium enterprises, often using capital-intensive technology, and producing import-replacing light consumer goods in protected domestic markets (McCawley 1981: 78-82; Hill 1990: 87). FDI was relevant in several industries, but productive capacity continued to be licensed for a range of manufactures, effectively restricting FDI (Donges *et al.* 1973: 167-68).

While the licensing of productive capacity in the 1930s had been used to bolster the position of SMEs, there was evidence in the early 1970s that small firms were pushed out of business (World Bank 1979: 41). Still, any development of SMEs during the 1960s and early 1970s, possibly with output growth of 7 to 8% per year would have gone largely unnoticed (McCawley and Tait 1979a: 136). It would have taken place without government support, except for trade protection and any technological changes that may have reached SMEs from the technological institutes, because evidence of significant productive linkages between large enterprises and SMEs was limited (Thee 1985; Thee 1994: 111-12).

²⁵ Even after privatisation of several SOEs in the late-1960s, the 1974-75 Industrial Census revealed that SOEs generated no less than 25% of GVA (McCawley 1979: 74).

Policy interest in fostering SMEs received an impetus in the early 1970s. However the aims of this renewed interest were different from previous decades. Supporting SMEs had previously been placed in the context of seeking to accelerate the diversification of the Indonesian economy, mitigate the impact of business cycles and reduce imports. The new policy aim was placed in the context of relieving poverty through employment creation, improving labour conditions, and protecting SMEs from the rigours of market forces and the competition of larger, often ethnic Chinese operated firms.

Renewed interest took the form of the Guidance and Development of Small Industries program (*Bimbingan dan Pengembangan Industri Kecil*, BIPIK) of the Department of Industry. From 1975, BIPIK offered technical assistance to clusters of small indigenous firms. It fostered *induk*-like clusters of small-scale enterprises across the country, each consisting of 50 to 100 small firms (World Bank 1979: 41-51; Poot *et al.* 1990: 206-10; Thee 1994: 105-6; Siahaan 2000: 183-89). The clusters were supported by Technical Service Centres (*Unit Pelayanan Teknis*, UPT, staffed with Field Extension Officers (*Tenaga Penyuluh Lapangan*), who had been trained at 4 national centres. The centres provided technical services and training, supported by research outcomes from the technological institutes, and arranged the purchase of raw materials for the small firms (DJIK 1982: 15). BIPIK had some similarities with the *induk* program, but it was established on a much larger scale. For example, by 1979, there were about 1,000 UPTs, 410 extension officers, and 148 project staff members. Such commitment of resources far exceeded the industry centre program of the 1930s and the *induk* program of the 1950s.

BIPIK worked in conjunction the government's very sizeable nation-wide subsidised Small Investment Credit (*Kredit Investasi Kecil*) and Credit for Working Capital (*Kredit Modal Kerja Permanen*) programs for small indigenous enterprises, established in 1973 (Bolnick 1982: 66; Poot *et al.* 1990: 210-15). These programs also had echoes of the 1950s, but the key difference was again one of scale. For example, KIK/KMKP each serviced over 15,000 customer small industrial firms in 1974 (Bolnick 1982: 69 and 74). There is some evidence that BIPIK and KIK/KMKP had a positive impact on the development of SMEs (Poot *et al.* 1991: 215-22). However, the overall impact remains difficult to establish. SMEs may have developed despite government support, rather than because of it (Hill 2001: 250-54).

The stance of Indonesia's industry policies changed again in the early 1980s. Falling oil prices and the need to encourage other foreign exchange earning, labour-intensive export industries, caused the government to change industry and trade policies towards export-oriented industrialisation, based on Java's abundant labour supply and the prominence of primary commodities in the rest of the country.

5. Conclusion

During the 1930s, policies of necessity, *i.e.* the need to reduce imports in line with falling export earnings, led to the development and implementation of industry policy. The consequence was import-replacing industrial development, particularly in labour-surplus Java, where this could have harmed export industries before 1930. As the results of these policies unfolded, they were fine-tuned after 1936 to achieve a balance between small and large-scale enterprises, where possible. All this was private sector development; the role of government was to guide the process, not to be an active participant.

Necessity again forced the pace and direction of industrialisation when in 1940 the need for upstream industries was identified in order to accommodate the shortages caused by World War II. This led the government to create preconditions for a more interventionist industry policy. It also introduced

the principle of balanced, mutually supportive development of large and small-scale industries. The need for such policies was re-confirmed in the late-1940s, but in the face of drastic shortages the need for closely orchestrated industrial recovery was high.

The 1950 Industrial Development Plan established parameters for industrial policy during the 1950s. The centres concept to foster small-scale industrial development was a major part of the plan. It was successful on a small scale, but could not be expanded on a larger scale. Political turmoil, economic deterioration and government services running out of manpower, money and ideas intervened. While the trappings of the system to support small industries were continued, industry policy focused instead on large-scale projects that were easier to identify and implement. However, due in part to lack of private sector interest and in part for ideological reasons, such projects were established as SOEs. These projects were expected to become key upstream industries, supplying inputs to benefit private sector industrial development. As far as they did, they fostered the development of large scale ventures. Formally, SMEs were to be shielded through allocations of key inputs, but many chose to trade their entitlements to larger firms that were struggling to produce to capacity. Hence, SMEs languished.

Changes in economic policy and the rapid growth of primary exports after 1966 gave private enterprise a new impetus. SMEs benefited from the changing government attitude towards private enterprise, but industrial development was largely driven by large-scale ventures and depended very much on protected domestic markets where large firms were in a better position. Hence, by the mid-1970s a significant dichotomy in Indonesia's industrial structure had emerged, in which SMEs were regarded as in need of protection in their competition with larger ventures. Public policy regained interest in SMEs, starting with the 1974 BIPIK program, which in some ways echoed the 1950 Industrial Development Plan. However, a major goal of BIPIK was to serve social policy objectives. SMEs were not considered to have an integral role in the process of industrial development.

It is tempting to conclude that Indonesia missed an opportunity for labour-intensive industrialisation in the early 1950s, by not bringing the experience with SME development of the 1930s to fruition. However, the implicit counterfactual is that the import-replacing policies of the 1950s could have laid the foundations for a comparative advantage-driven export-oriented industrialisation drive at a later stage, possibly the 1960s. Apart from the fact that this downplays the political realities of the time, it ignores that Indonesia's underlying comparative advantage was in primary exports. The growth of oil export earnings increased during the 1960s, turned into a windfall boom during the 1970s, but led to an appreciation of the real exchange rate that would have thwarted aspirations of export-oriented industrialisation, whether labour-intensive or capital-intensive. Hence, in the 1970s, Indonesia found itself in the same bind as it had been before the 1930s. The opportunity for export-oriented industrialisation only re-emerged when oil prices fell in the early 1980s. This time, deregulation resolved the anti-export bias and encouraged private enterprise to grasp new manufacturing opportunities that were in line with the country's comparative advantage.

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Appendix 1: Estimates of employment in industry

There is not one single source that offers consistent estimates of industrial employment during for 1930-75. There are several possible sources:

1. Population censuses of 1930, 1961, 1971, but they used incomparable definitions of employment.
2. Firm registrations under the Factory Ordinance (*Fabriekenordonnantie*) of 1910. Firms had to register with the Labour Inspection Service (*Arbeidsinspectie*) in the 1930s, and with the Ministry of Labour in the 1950s if they had 10 or more employees, or less than 10 employees and operated power machinery.
3. Firm registrations at the Ministry of Economic Affairs in the 1930s and the Ministry of Industry in the 1950s, if they were active in controlled industries, for which the productive capacity was licensed. Later registration data covered all industries, although incomplete for small-scale firms.
4. Industrial Survey of the Central Office of Statistics and its successors among large and medium sized firms during 1939-41 and 1949-75. These data exclude agro-processing and mining-related operations like oil refining and tin smelting, and non-mechanised small and cottage enterprises. Employment in large- and medium sized industrial ventures changed marginally from 442,586 in 1954 to 439,791 in 1963. The response rate remained around 80-90%, but it appears that the survey mailing list, established in 1954, was badly out of date by 1963. The 1963-64 and 1974-75 industrial censuses found many more firms than included in the survey. This problem was acknowledged and resulted in an improved 'backcasting' estimate of output, but only from 1975 onward.
5. Industrial censuses: 1963-64 and 1974-75. Despite the fact that the first took place in difficult times, its principles and procedures were well-defined and precise. Foreign consultants at BPS were engaged in the process of preparing and supervising implementation. Hence, despite definitions that are incompatible with 1974-75, the 1963-64 census is an underutilised resource.

The definitions of size used in these sources varied. Before the 1930s, registration under the Factory Ordinance was the only criteria. Firms with less than 5 employees were often regarded as cottage industry. In 1937, the Industry Division of the Department of Economic Affairs introduced the first criteria, mainly to identify small-scale and cottage industries (Sitsen 1937a: 140; Sitsen 1943: 22-23):

- Cottage industry, which produced manufactures as a sideline activity, primarily for home consumption or sale in local markets.
- Small-scale industry, consisting of self-employed, full-time craftsmen, producers engaged under the putting-out (*bakul*) system, and unmechanised workshops, often processing semi-manufactures for middlemen.
- Factory industry, consisting of medium and large-scale enterprises that used mechanical power.

Obviously, this definition was relatively vague, and slightly different definitions were found in the literature. For example, Sitsen (1943c: 469) labelled firms employing less than 50 people 'small'. But it seems to have been generally understood that cottage industries consisted of production for household or local consumption, often part-time, while small-scale industry mainly used hand tools, employed less than 50 workers, and were engaged in production for distant markets in competition with medium and large-scale producers (DEZ 1949: 68).

Only for the 1939 and 1940 industrial surveys did the Central Bureau of Statistics use specific definitions to include firms in the survey (see also KPS 1955: vi-vii; Siahaan 2000: 192-193):

- 1939: firms with mechanical power under the *Veiligheidsreglement* of 1910, and using mechanical power of more than 5 hp or with 10 employees or more.
- 1940: firms with mechanical power of more than 5 hp, or firms without mechanical power but with 50 or more employees.

The 1949-53 surveys used a more strict definition that was gradually widened. By 1953, the definition again approached the coverage of the 1939 survey, and by 1954 the survey again covered the medium sized plants (Stepanek 1955: 63).

The Department of Industry assisted the Central Bureau of Statistics survey, but compiled its own industrial statistics in 1949, using questionnaires sent to its regional offices. It did not use strict definitions to gauge the size of ventures, but it was understood that the following definitions applied (Stepanek 1955: 65-66):

- Large = firms employing 50+ workers and/or operating power machinery of more than 5 hp
- Medium = firms employing 10-49 workers and/or operating power machinery of less than 5 hp
- Small = firms employing less than 10 full-time workers and not using mechanically driven tools and machinery (includes household and cottage industry)

In 1954, BPS introduced the following definition, which it used in the 1954-64 industrial surveys:

- Large = firms operating power machinery of more than 5 hp or employing 50+ workers
- Medium = firms operating power machinery of less than 5 hp or employing 5-49 workers
- Small = firms employing 1-4 workers

BPS changed the definition for 1965-1975 and for the 1963-64 industrial census to:

- Large = firms operating power machinery and employing 50+ workers, or without power machinery and employing 100+ workers
- Medium = firms operating power machinery and employing 5-49 workers, or without power machinery and employing 10-99 workers
- Small = firms operating power machinery and employing 1-4 workers, or without power machinery and employing 1-9 workers
- Cottage = ventures without paid workers

Since the industrial census of 1974-75, the BPS definition has been:

- Large = firms engaging 100+ workers
- Medium = firms engaging 20-99 workers
- Small = firms engaging 5-19 workers
- Cottage = ventures engaging 1-4 workers, including unpaid workers.

To complicate matters, the Ministry of Industry, the Capital Investment Coordinating Board and the central bank continued to use different criteria to define the size of manufacturing enterprises (Thee 1994: 101).

Table A1: Employment in manufacturing industry in Indonesia, 1930-76 (x 1,000)

Data source	L &M	S	C	Total	Source
1930 population census*	100	1,400	709	2,209	L,M Van Oorschot 1956: 86; S Sitsen 1943c: 468; Total Segers 1987: 82; C residual
1930 Factory Act registration	153				<i>Indisch Verslag</i> , also Segers 1987: 77
1931 Factory Act registration	155				<i>Indisch Verslag</i> , also Segers 1987: 77
1932 Factory Act registration	151				<i>Indisch Verslag</i> , also Segers 1987: 77
1933 Factory Act registration	154				<i>Indisch Verslag</i> , also Segers 1987: 77
1934 Factory Act registration	155				<i>Indisch Verslag</i> , also Segers 1987: 77
1939 industrial survey	173				Van Assen 1940:86
1940 estimate	300	2,500	750	3,550	L,M S, Sitsen 1943a: 5; C estimate
1940 industrial survey / estimate	307	2,600	750	3,657	L,M Segers 1987: 104; S Sitsen 1943c: 469; C estimate
1940 Factory Act registration estimate	550				Segers 1987: 75
1942 estimate	325				Davis 1946: 2
1949 industrial survey	341				Nationaal Archief 2.21.281.07 Van Oorschot, no.8
1950 estimate				2,525	White 1953:11 (mining excluded at 75,000)
1951-52 estimate	2,000		1,000	3,000	Neumark 1954: 37
1953 estimate				4,000	BPN 1956: 139
1952 industrial survey	105				KPS 1955
1953 industrial survey	119				KPS 1955
1954 registration of enterprises	560				BPN 1955: 454
1954 industrial survey	443				BPS 1956
1955 industrial survey	460				BPS 1957
1956 industrial survey	461				BPS 1958
1957 industrial survey	465				BPS 1959
1958 industrial / labour force survey	447			2,531	L,M BPS 1960; Total Adyanthaya 1963: 18 (Java extrapolated with 1961 population census results)
1959 industrial survey	430				BPS 1961
1960 industrial survey	459				BPS 1962
1961 industrial survey	477				BPS 1963
1961 population census				1,856	BPS 1963a: 4
1962 industrial survey	489				BPS 1964
1963 industrial survey / estimate	440			2,700	BPS 1965; Total Soebroto 1964: 22
1963-64 industrial census	1,000	2,102		3,102	L,M BPS 1967: 32; S,C extrapolation of Java employment with firm numbers, Laporan 1975: 287
1964 industrial survey, 1964-65 household survey	436	1,623		2,059	DDPR 1971: 12-13
1970 industrial survey	849			2,635	BPS 1971: 303
1969-70 Ministry of Industry registration		1,786			BPS 1974a: 1
1970 industrial survey and estimate	849	1,962		2,811	World Bank 1979, vol.1: 21
1971 industrial survey	999			2,787	BPS 1973b: xix
1971 Ministry of Industry registration		1,788			BPS 1973a: 1
1971 industrial survey and estimate	972	1,978		2,950	World Bank 1979, vol.1: 21
1971 population census				2,682	<i>Sensus Penduduk 1971, Seri D</i> (March 1975)
1972 industrial survey and Ministry of Industry registration	1,229	1,744		2,973	L,M BPS 1974b: 1; Total BPS 1973a: 1; S,C residual
1972 industrial survey and estimate	1,229	1,853		3,082	World Bank 1979, vol.1: 21
1973 industrial survey and estimate	932	2,289		3,221	L,M BPS 1975: 1; S,C World Bank 1979, vol.1: 21
1974-75 industrial census	662	343	3,900	4,905	BPS 1987: 202-03
1975 I-O Table				4,562	BPS 1980: 513
1975 estimate	1,026	443	1,904	3,373	Hill 1992: 246
1976 industrial / labour force survey	808	3,161		3,968	L,M BPS 1978: 9; Total BPS 1979a: 129; S,C residual

* Including 1.5 million full-time workers (Sitsen 1937a: 140).

Notes: L = large, M = medium, S = small, C = cottage industry. The 1936 'estimate' (see e.g. Sitsen 1937b: 713) is not included, as this was actually an estimate of employment by firm size in Java for 1930 (Segers 1987: 80; Gordon 1998: 9-10).

Appendix 2: Estimates of industrial output, 1930-75

Available national accounts data for Indonesia in the 1930s and 1950s did not use an output approach to estimating value added in manufacturing industry, but an income approach that estimated the total wage sum paid by manufacturing firms on the basis of rough estimates of employment and equally rough estimates of average wages. The national accounts data for 1958-75 sought to use the output approach, but could only rely on underestimated data for large and medium sized firms from the industrial surveys. The only alternative estimates were made for the 1971 and 1975 Input-Output (I-O) Tables, whose compilers were able to use additional information from special surveys, the 1971 population census, and the 1974-75 industrial census. The I-O tables found that GVA in the national accounts was 68%, respectively 36% too low.

For the purpose of this paper, GVA in manufacturing industry for 1971 and 1975 from the I-O Tables were re-grouped to a comparable 75 sub-sectors in both years. For 29 sub-sectors, GVA was retroplated back to 1930, using indicators of the most important inputs in each sub-sector. The relevance of these inputs could be identified on the basis of the I-O Tables. For example, GVA in the motor vehicle industry was estimated on the basis of the total weight of imported chassis, bodies and parts for motor vehicles. As many sectors depended largely on imported raw materials and semi-manufactures, Indonesia's foreign trade statistics were an important source for the retroplation exercise, together with data on agricultural production and some manufacturing data in large-scale industries, such as cement. The methodology implicitly assumes that the 1971 and 1975 input-output ratios are constant for 1930-75, and yields GVA estimates in constant 1971 and 1975 prices. The 29 sub-sectors cover 77% of total manufacturing GVA in 1971 and 73% in 1975.

Table A2: Industrial sub-sectors included in the 1930-75 estimation of output

Industrial sub-sector	Input indicator, quantity or weight
1 Rice milling, cleaning, polishing	Estimated % of produced paddy commercially milled
2 Cigarettes	Two-year moving average of an unweighted index of: 1. tobacco production less exports plus imports, 2. imports of cloves for <i>kretek</i> production, 3. imports of cigarette paper
3 Petroleum refining products	Crude oil production less exports plus imports
4 Repair of vehicles	Stock of registered automotive vehicles
5 Motor vehicles	Imported motor vehicle chassis, bodies and parts
6 Sugar refining	Sugar production
7 Motor cycles, bicycles, other vehicles	Imported parts for motorcycles and bicycles
8 Wearing apparel	Imported and domestically produced fabric
9 Weaving industry	Imported and domestically produced yarn
10 Printing, publishing etc.	Imported and domestically produced paper
11 Soybean products	Imported and domestically produced soybeans
12 Spinning industry	Imported and domestically produced raw cotton (cleaned)
13 Leather footwear	Imported and domestically produced hides, less exports
14 Leather products (excl. footwear)	
15 Fertilisers, pesticides	Fertiliser production (all chemical fertilisers)
16 Bread, bakery products	Imported wheat (flour equivalent) and flour
17 Noodles, macaroni etc.	
18 Cement	Cement production
19 Soap, cleaning aids	Imported and domestically produced caustic soda
20 Glass, glass products	
21 Wheat flour, grain milling	Imported wheat
22 <i>Batik</i>	Imported and domestically produced undyed fabric
23 Pulp, paper, cardboard	Paper production
24 Textile bleaching, printing, dyeing etc.	Imported and domestically produced undyed fabric
25 Coconut oil, cooking oil	Copra production less exports, and palm oil production
26 Paint, varnish, lacquer	Import of dyes
27 Coffee grinding	Coffee production, less exports
28 Tanneries, leather finishing	Domestically produced hides, based on animal slaughter data
29 Tea processing	Tea production

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