CHAPTER 2

Revisiting Colonial Industrialization in Malaya

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Introduction

Historical narratives on colonial industrialization have tended to vacillate between one of largely free trade within the domain of particular sphere of colonial empires (e.g., Bauer, 1948; Benham, 1949; Corden & Richter, 1963; Little, 1982) and hostile interventionist efforts by colonial grandmasters to protect colonial interests (e.g. Puthucheary, 1960; Lim, 1977; Jomo, 1986). As colonies acted as labour-surplus economies dominated by disguised unemployment, the neoclassical dictum should have seen a specialization in agriculture and labour-intensive industrialization. Using the experience of colonial Malaya, we show in this article that colonial rule in Malaya saw the aggressive opening of tin mines and rubber plantations to serve the interests of the British empire rather than capitalist accumulation in Malaya. However, in its quest to extract surplus from tin mines and rubber plantations, the colonial government did effect institutional change that left the country with fairly good basic infrastructure, security and political stability for the post-colonial government

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to pursue, inter alia, industrial development. While the brutal methods through which surplus extraction evolved raised serious questions about British rule (Fauconnier, 2003; Cheah, 2012), colonial rule did quicken capitalist integration and sowed the seeds for industrial transformation in the country.[1]

Both plantation agriculture and physical infrastructure benefitted from technology transfer as the deployment of farming instruments, such as rubber processing and coagulation, hybrid seeds in agriculture, hydraulic sluicing, gravel pumping and dredging in tin mining, and the construction and maintenance of infrastructure relied on foreign technology (Allen & Donnithorne, 1957; Thoburn, 1977). However, colonial rule also limited industrialization to servicing agriculture and services, as well as into petty commodity manufacturing. While British rule under an imperial power focussed on protecting British capitalist interests restricted the potential for local industrial accumulation, it also exposed Colonial Malaya to modern manufacturing targeted at servicing the agricultural and infrastructure sectors.

I begin my analysis by arguing that the colonial government generally limited its role to supporting capitalist interests by assuming market-enhancing policies but on a number of times departed from deterministic relative price arguments owing to asset specificity and production control requirements affected by distance and war-time disruptions. Subsequently, I examine the extent and shortcomings of industrialization achieved under colonial policies. In doing so, we seek to use evidence to present the history of colonial industrialization in Malaysia in the tradition of Carr (1961) rather than rationalizing it *ex post* in the, which is consistent with the historical accounts undertaken by Shaharil (1995, 2005).

Theoretical Considerations

While colonial trade was largely laissez faire in nature within colonial spheres of influence, governments did intervene to protect the colonial

[1] While Chinese labour recruitment and control were handled by Chinese headman without direct management by Western owners (Cheah, 2012), the colonial government was more directly involved in Indian labour recruitment and management. The oppressive labour conditions in estates were pursued through repressive labour control methods, which included supervisors from different ethnicities and castes, and aggressive treatment meted out to those attempting to organize labour (Jomo, 1986; Jain, 1988, 1993).

interests. Three significant institutions were critical in shaping colonial economic governance.[2] Relative prices (markets) had a critical role in that the mining and smelting of tin and cultivation, tapping and processing of rubber were driven strongly by relative resource endowments. This line of economic argument was advanced by Ricardo (1817), Heckscher (1935) and Ohlin (1933),[3] which was later modelled mathematically by Samuelson (1948) to form the neoclassical model of specialization on the basis of relative factor endowments. Although subsequent refinements have taken place, the free trade arguments of Bhagwati (1988) and Krueger (1997) essentially emphasize the dominant role of markets.

The new institutionalists of Coase (1937), North (1990) and Williamson (1985) made the case for circumstances when market failures occur and how institutions, such as trust help correct market failures.[4] Scale effects and frequency of transactions, and asset specificities are examples of when markets are adapted to correct market failures. However, Veblen (1915), Nelson and Winter (1982) and Rasiah (2011) argue that markets often do not dictate circumstances when economic agents seek to pursue trust and other non-formal institutions to determine their choices.[5] It is in this way that economic agents often capture opportunities to introduce technologies that deviate from relative factor prices. For example, the economics of distance and war-time disruptions, as well as the need to coordinate adaptations to capital goods (e.g. heavy) machinery by locating their manufacture close to mining, cultivation and processing operations offer the opportunity for economic agents to enter in the manufacture of complementary goods that defy relative factor endowments. Albeit specific examples are scant, Hirschman (1958, 1970) made the case that the expansion in exports offers host-governments the opportunity to stimulate institutional change to promote backward linkages that often enter into the production of intermediate and capital

[2] Institutions are defined as influences that shape the conduct of economic agents (individuals, firms and organizations) (Veblen, 1915).

[3] In the two factor model of free trade, Heckscher (1935) and Ohlin (1933) used assumptions of perfect mobility of capital and labour within country borders and their perfect immobility across country borders.

[4] Such views are often referred to the new institutionalist account of institutions (Rasiah, 2011).

[5] These views are popularly known as the evolutionary view of institutions (Rasiah, 1995a, b; 2011).

goods. Businesses and governments closely working with them often appropriate these pecuniary and technical external economies to stimulate structural transformation.

Given the risks and uncertainties involved in entering the production of scale- and capital-intensive goods, the extent of entry of economic agents into such economic activities often require support from host-governments and business associations to check cut-throat competition and that the right incentives are in place to underwrite risks and uncertainties (Rasiah, 2019).

However much the colonial state avoided and in some cases discouraged the growth of manufacturing in Malaya, one can expect that the smooth functioning of the export-oriented colonial mining and agriculture would have required some departures from the role of markets as an institution of governance. Hence, in this chapter, we explore the interactions of a myriad of institutional influences in the emergence of manufacturing under colonial rule.

Precolonial Production

Although there are considerable accounts of precolonial Malaya that include other states, such as Kedah, Kelantan, Perak and Johore (Wong, 1965), Malacca is the most decorated precolonial kingdom that was involved in trading of Indian piecemeal goods for spices, aromatics and dyewoods, what Reid (1993) classified as early mercantilism in Malaya. Trade was mainly confined to few ports (especially Malacca), though Indian traders visited other parts of Malaya, such as Kedah. The Malays were largely involved in subsistence farming and fishing, locating their settlements close to the rivers (Ooi, 1961: 350). Only small-scale off-season mining was carried out with the Mandailings from Sumatra, important participants who used *Dulang* (bucket) to hand mine tin ore from the rivers (Burns, 1982). Petty commodity production characterized manufacturing, which was limited to craft-work and cottage industries. Handicrafts (e.g., floor mats, blinds and rattan baskets) and simple food processing (e.g. keropok [fish crackers]) were among the main manufactures. Traditional human skills characterized the technology deployed in such manufacturing activities. Traditional wood- and rattan-based home and boat making were the most sophisticated manufacturing operation then.

Production organization in precolonial Malaya was based on a tribute-paying mode of production in which the debt bondsman and the commoner tilled the land, which was in the control of the rulers and chieftains (Jomo, 1986). The social relations that existed then were organized around the palace with a strong emphasis on culture, religion, ceremonies and security. Except for the emerging tin and cash crop trade involving foreign labour along the West coast, free wage labour was largely non-existent. There were often plots and counter plots involving the rulers and chieftains, which continued after British colonialism emerged (Shaharil, 1977, 1995).

Colonial Production

Western influence, especially since the advent of British colonialism in 1874, turned Malaya into a major raw material exporter, starting with tin and later rubber to feed the industries of the West, including the United States, which became a major importer of natural rubber. Tin and later rubber became the two most important revenue earners. Other primary commodities of significance included oil palm, pineapple and coconuts. Malaya was endowed with rich deposits of tin ore. However, commercially produced rubber and oil palm owed much to seeds brought originally from Brazil and Nigeria, respectively. While immigrants were brought by the British from India to farm, weed and tap natural rubber, Chinese settlers were brought by Chinese headmen to mine tin initially using chain pumps, and later through acquisition from the British, hydraulic sluicing and gravel pumps (Thoburn, 1977).

Furthermore, there is also considerable debate on the preferential treatment provided by the colonial government to foreign estate owners and dredging companies (see Yip, 1964; Bauer, 1948; Silcock, 1948; Knorr, 1945).[6] The bulk of colonial Malayan revenue came from import tariffs and excise duties on opium, tobacco and liquor.[7] Income taxes were only introduced in Malaya and Singapore in 1948 (Loo & McKerchar, 2014: 245). Tariffs on goods imported from non-British empire were

[6] British ownership in tin mining began to rise following the introduction of dredging through the Malayan Tin Dredging Company, which was opened in 1912 (Fermor, 1939: 74; Allen & Donnithorne, 1957: 152).

[7] For instance, In Kedah revenue from opium accounted for 40% of total revenue in 1919 (Sultan Nazrin Shah, 2019: 41).

important, but also important were tariffs on exports of tin and rubber, which together accounted for a peak of 36.8% in 1906 and a trough of 5.2% in 1947 (see Fig. 2.1). The contribution of tin revenue was strong in the early years owing to massive output, which fell in trend terms owing to exhaustion in tin deposits despite the introduction of dredging from 1912. While claims that the colonial government selectively imposed tariffs to favour British owners are misplaced as tariffs were a function of prices (cf. Lim, 1967; see Rasiah, 1995a, 1995b), the colonial government did allocate favourable lands to foreign companies (see Drabble, 1973: 72–74, 249; Lim, 1977; Yip, 1964: 151–152), and excluded taxation from merchants and professionals (Sultan Nazrin Shah, 2019: 41). Research was largely concentrated among large foreign companies with

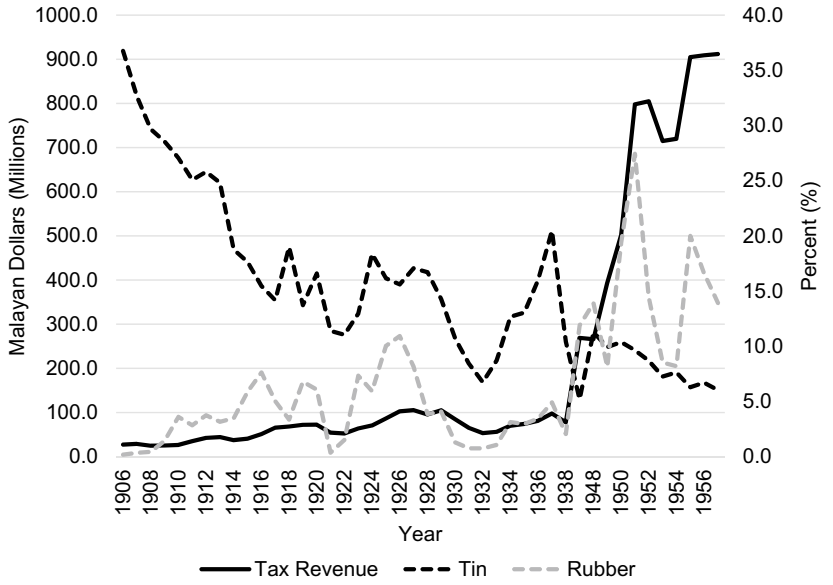

Fig. 2.1 Contribution of export taxes from tin and rubber in colonial revenue, Malaya, 1906–1957 (*Source* Plotted from Federation of Malaya [1957])

local interests confined mainly to small firms that lacked the capital to engage in such activities.[8]

The colonial government's four most important developmental functions helped modernize Malaya, namely, establish and maintain order and security, infrastructure and labour supply (Sultan Nazrin Shah, 2017, 2019). The most obvious interventions were tariffs and quotas imposed on manufactured imports from non-British spheres of control (especially Japan and the United States) (see Jomo, 1986: 145–147), and the Stevenson Restriction Scheme introduced in 1935 to regulate rubber supply following the depression of the 1930s (see Bauer, 1948). The colonial government also generated revenue from export taxes, which were determined based on prices.

The first task the colonial government assumed after the Pangkor treaty in 1874 was to establish law and order. Anarchy in the states had reached such proportions that tin mining output had begun to fall (Turnbull, 1964: 135–136); from 6 thousand tons annually in 1871–1872, output fell to 5 thousand tons and 4 thousand tons, respectively, in the years 1873 and 1874 (Lim, 1967: Appendix 2.1). The feuding Malay chiefs and sultans showed little signs of establishing a peaceful platform for the extraction and transfer of tin ore, which was escalated by gang fights among the Chinese miners. British efforts to intervene directly were economic in nature, which was dominated by efforts to protect and strengthen tin trade. Although colonialism was repressive and the Malay chiefs were increasingly frustrated with foreign governance,[9] the British helped reduce chaos and establish law and order. In addition, British rule also reduced the threat of other Western powers (especially the Netherlands, Germany and Japan) intervening in the Malay states. It was only after security was established did Western capital invest extensively in the extraction and export of raw materials from Malaya.

Secondly, the colonial government embarked on a massive development of infrastructure. Transport networks, health service, education and public utilities were developed and maintained. The colonial government's policy promoted capitalist production and distribution, which was driven by demand from the West. Railways and roads were constructed

[8] Schumpeter (1934) had argued that entrepreneurs are too small to have the financial capacity to invest in research and development activities.

[9] Among the resistance from local forces that emerged include that by Maharaja Lela in Perak and Tok Janggut in Kelantan (Cheah, 1995, 2006; Shaharil, 1995).

to connect administrative centres and ports with mining and plantation centres. Over the period 1884–1937, the colonial government spent MS228 million on building railways. By 1931, it had laid 1028 miles of railway lines (Lim, 1967: 272). From the short stretches of cart tracks in 1874, the colonial government had also built 6060 miles of roads by 1948. The port facilities at Georgetown, Port Swettenham, Dungun, Malacca, Port Dickson and Telok Anson were also expanded. Health facilities were built at the towns (especially at administrative centres) and the estates. There were 70 hospitals and 72 mobile dispensaries in 1947 (Lim, 1967: 310), and 80 rural health centres in 1949. The Federated Malay States' (FMS) expenditure on health rose from MS3.4mn in 1924 to M$15.8mn in 1957 (Lim, 1967: 304). While the hospitals and schools were built at towns, dispensaries were established at estates. The FMS expenditure on education rose from M$1.8mn in 1927 to M$l7.9mn in 1957. By 1957, there were 1.l (1.1?)mn school students and 35.7 thousand teachers in Malaya. Technical training institutes were located close to the major public utilities and railway maintenance departments. Albeit demand for skilled labour in the erection and maintenance of mining operations (e.g. pumps, sluices and dredges) and agricultural milling (e.g. latex sheeting machines) machinery rose strongly (Thoburn, 1977), the government did little on its own initiative to raise skilled labour supply for manufacturing.

Nevertheless, in its efforts to boost tin mining and rubber cultivation, the government had to violate a number of free market tenets because of the specific technologies essential to mine tin and cultivate rubber effectively. This is the third contribution the colonial government made to modernize the extraction of surplus from the primary sector. For example, Perak's British Resident, Hugh Low introduced the first steam engine and centrifugal pump to overcome flooding in tin mining. Its technology, as with dredging, was capital-intensive. Indeed, the Railway and Public Works departments had to pay for British instructors to train local employees to maintain their huge structure. That largely explains why the government placed priority on establishing technical schools in the twentieth century. Third, the British introduced the Torrens system (which with the mukim register started off free ownership of land), resulted in the transfer of significant patches of lands to the foreigners. The prime objectives of this policy were to alienate land for commercial use smallholdings under government control (Kratoska, 1975: 135). However, the reluctance of the British colonialists to engage the peasants meant that the

peasants did not experience large-scale emancipation from pre-capitalist relations. Nevertheless, free ownership of land attracted foreign investors. Immigrant labour formed the main mass of free wage labour in colonial Malaya.

Fourth, the colonial state encouraged and administered the import of immigrants from India and China as the main source of labour supply (Amarjit, 2014). Although Malay-centric politicians in independent Malaysia have often contended that imports of foreign labour undermined national unity and disfigured Malaya's cultural identity, one can also argue that imports of foreign labour laid the foundations for capitalist development through the participation of free wage labour.[10] Although wage labour (especially Chinese) was already emerging prior to direct intervention, colonialism accelerated the deployment of free wage labour in production relations. Officials from Ceylon were also engaged to manage and administrate port facilities, postal service and estates (see Drabble & Drake, 1981: 309). Free wage labour was initially dominated by Chinese and Indian labour in tin mining and rubber production, respectively. The British were cautious in utilizing the indigenous Malay labour who derived their livelihood from sedentary farming and shifting cultivation. The large reserves of impoverished masses from India and China offered a better source of cheap labour. By excluding the Malays from the main mining and plantation agriculture, the government also ensured that the food supply (especially rice) to mining and plantation workers was not disrupted.[11] Obviously, the government stimulated the movement of a generally immobile factor to harness the growing potential offered by Malaya. By 1938, 80.4% of the estate labour force constituted Indians (Jomo, 1986: Table 7J). By 1946–1950, the Chinese contributed 60.9% of the tin mining labour force in Malaya (Yip, 1964: Table V-19). Although the government subsidized imports of foreign

[10] See Sultan Nazrin Shah (2019) for a lucid account of the emergence of foreign labour, and the political arrangements agreed upon by the ethnic representatives at the time of independence, which included, inter alia, the provision of citizenship to foreign labour in return for recognition of the special position of the Malay royalty, and the Bumiputras.

[11] The Japanese colonial government strengthened paddy cultivation in Malaysia over the period 1941–1945 through heavy promotion of paddy cultivation, though a significant share of the surplus was exported through highly regulated procedures (Yoji & Mako, 2008).

labour (Thoburn, 1977; Jomo, 1986), they were more than compensated by tariffs levied on commodity exports (Rasiah, 1995a, 1995b).

Industrial Development

The only area where the British colonial government was involved directly in manufacturing is in the promotion of rural industry. However, as the government's main intention here appears to have been in offering off-season employment for the rural population, especially to the paddy cultivators whose produce was crucial in supporting the mining and plantation labour force, and to arrest support for the growing communist insurgency, it hardly took-off (see Rasiah, 1995a, 1995b). Thus, despite the promotion of rural industry such as handicraft (e.g. rattan and attap basketware), employment in related industries, which was started by the Japanese over the period 1941–1945 fell sharply between 1947 and 1957 (see Fig. 2.2).[12] Although the government also offered loans to smallholder associations to erect latex processing plants (e.g. Johore Smallholders Association), albeit in small scale, they were market related.

The British colonial government's fiscal revenue (which was accumulated largely from export taxes on primary commodities with tin and rubber) amounting to over 90% of it in the period 1947–1957 (Lim, 1967: 267–269), was also used to provide indirect subsidy to manufacturing firms from the utilization of infrastructural support services. Meanwhile geographical distance that separated Malaya from the industrial West offered the best natural protection for several industries, especially during the war and between colonial spheres. Especially tin smelting and rubber processing grew strongly in Malaya. Other agricultural processing activities also grew substantially. For example, by 1906, 16 factories with strong associations with the local Chinese produced over 29,000 cases of canned pineapples a year (Kennedy, 1962: 218; Rasiah, 1995b: 538). Output rose to 2.7 million cases in 1939 before falling sharply as a consequence of destruction during the Second World War. Following rehabilitation efforts after the war, output reached 102,000 cases in 1947 with 86,600 cases exported to Britain and the Middle East (Benham, 1951: 33). Meanwhile, in 1947 the 24 palm oil factories in

[12] Japanese economic interests in Malaya started well before the Second World War, including in plantations, iron mines, and commercial fishing (Kratoska, 1988).

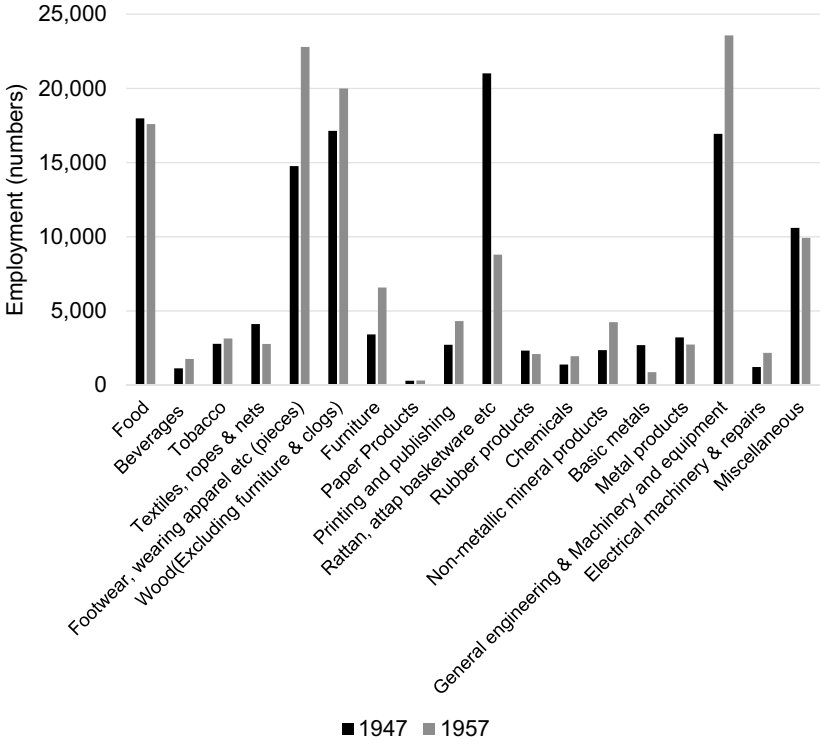

Fig. 2.2 Manufacturing employment, Malaya, 1947 and 1957 (*Source* Federation of Malaya [1957])

Malaya generated 5700 tons of palm kennels (Benham, 1951: 24), while coconut oil and copra-cake production totalled 138,000 tons.

The Japanese colonial government introduced more comprehensive central control than the British, whereby the sale of essential goods was regulated and a Five-Year Production Plan was introduced in 1943 (Kratoska, 1988). Also introduced was a Five-Year Industrial Plan with the goal of transforming Malaya from a liberal to a planned economy largely because of war-time restrictions on imported manufactured goods from Japan while supplies from Europe and the United States were cut. Consequently, the Japanese colonial government promoted the smelting

of iron, and chemical industries (Kratoska, 1998: 174–175), and essential light consumption goods, such as soaps and toothpaste (Kratoska, 1998: 178–179; Rasiah, 1995b: 528). Although some of these industries re-emerged following the introduction of import-substitution following the enactment of the Pioneer Industry ordinance by the post-colonial state in 1958 (Rasiah, 1995a), Japanese participation in modern manufacturing ended upon the return of the British. Japanese involvement in the processing of agricultural food crops to food items, such as biscuits and beverages, also complimented such activities by local Chinese (Kratoska, 1998: 178).

Efficiency improvements from the introduction of technically superior smelting methods soon attracted the attention of other Southeast Asian miners. Until 1933, about 30% of all tin smelted in Malaya came from Indonesia and Siam (Fermor, 1939: 79–80; Allen & Donnithorne, 1957: 160–161). Both the large-scale nature of Western smelting and transport facilities, which the colonial state built using mainly revenue collected from tax on tin exports, supported vibrant smelting operations at major ports, such as Georgetown and Port Swettenham. Although the smelting of tin imports fell after 1933 (following Indonesia's introduction of its own smelter in Arnhem), it was still around 25% in 1937 with new supplies coming from Burma, French lndo-China and China.

In rubber milling, the replacement of paired rollers with continuous sheeters enabled continuous processing, which helped reduce rubber processing costs from 5 cents per pound in the early 1920s to 0.5 cents per lb in 1932–1933 (Bauer, 1948: 265). It was during colonial rule that the first massive rubber research ground was founded in Malaya. From its conception in 1925, the research land was started at Sungai Buloh in 1927 with 2000 acres. The research institute itself was started initially at Bungsar Estate in 1926 before it was moved to Ampang in Kuala Lumpur in 1937.

The specificity of machinery and equipment required in both tin mining and smelting, and rubber cultivation and processing increasingly made them capital-intensive. Thus, although primary production in Malaya emerged as largely labour intensive ventures (e.g. dulang washing by the Malays and chain pumping by the Chinese in tin mining and charcoal furnaces in smelting, and simple planting and tapping methods in plantation agriculture), competition and the quest of raising productivity necessitated a shift towards capital-intensive technology. The problems of organizing and controlling labour, and inefficient smelting and processing

methods were the prime forces that forced the introduction of capital-intensive methods in tin production. For example, the dredge, first introduced by Malayan Tin Dredging Company in 1912, reduced sharply the utilization of labour and therefore problems of control. Meanwhile, the regenerative gas-fired reverberator furnaces, first introduced in 1902, improved tin smelting efficiency considerably (see Fermor, 1939: 74; Allen & Donnithorne, 1957). In addition, dredging enabled mining in deep and swampy grounds. The exhaustion of surface ores and the efficiency of capital-intensive methods led to the Chinese displacing their traditional chain pumps with gravel pumps and hydraulic sluices. As dredges required lump sum investment, local firms generally could only afford them after independence in 1957. Rubber and oil palm milling machines were located in estates.[13] Even smallholders usually sent their produce to the estates for milling. Thus, although market forces were important, the drive to sustain competitiveness and efficiency meant that planters and miners in Malaya were increasingly resorting to power-driven machinery. This is endemic to capitalist production.

The specificity of particular technologies and restrictions imposed on foreign trade through colonial spheres of influence and hostile war zones were instrumental in the emergence of heavy consumer, intermediate and capital goods industries in colonial Malaya. The utilization of power-driven technology offered immense potential for diffusion in colonial Malaya. A subsidiary of United Engineers started building small crafts and repairing ships in Singapore in 1881 (Allen & Donnithorne, 1957: 261), which gradually spread its activities to the construction of dredges and rubber machinery. These industries were supported by its iron and steel plants, and machine and boiler shops especially in Ipoh (Perak), where it fabricated the machines and parts. This firm formed the training ground for local Chinese workers who carried the skills to the local firms, including foundries that they foundered subsequently (Thoburn, 1977: 201). From simple foundry work, power-driven machinery gradually diffused into several other industries (see Fig. 2.3). By 1955, even the once traditionally human-skills dominated pottery making industry had become mechanized. Strong cooperation among the Chinese ensured that cut-throat competition was avoided. This development led to foreign mining companies increasingly subcontracting servicing and later dredge

[13] British miners also had difficulty controlling Chinese labour (Rasiah, 1995b).

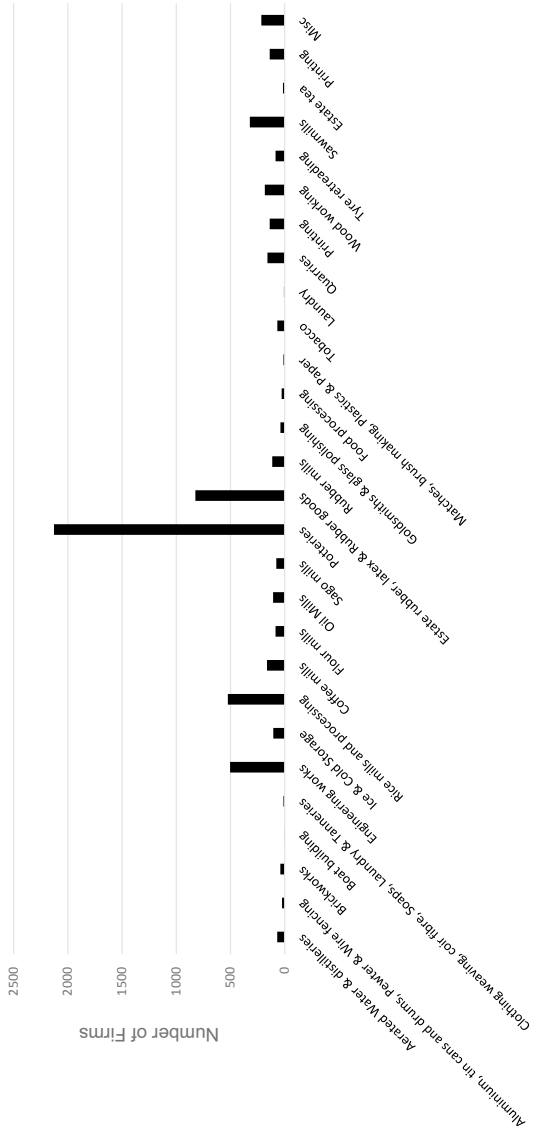

Fig. 2.3 Manufacturing firms using power machinery, Malaya, 1955 (*Source* Adapted from Federation of Malaya [1957])

construction work to local firms, followed by a complementary two-tier system in which United Engineers did the designing while the local firms did the fabrication and assembly (Thoburn, 1977: 201). From foundry, machining, fabrication and other engineering works, foreign firms acted as training grounds for consumer industries. Singapore Rubber Works, which was founded in 1889 to extract gutta-percha, branched into the manufacture of rubber-based products. Bata started its shoe factory in Singapore in 1937 and Port Swettenham in 1939 (Allen & Donnithorne, 1957: 261).

In addition, local firms (e.g. Ho Hong and Tan Kah Kee) opened operations to manufacture steam ships, cement, milled oil, sheet rubber, sweets, boots, shoes, bicycle tyres, hoses, biscuits, bricks and soaps. Indeed the production of these items grew strongly as local demand increased with the development of the cash-based primary commodity economy (Rasiah, 1995a, 1995b), which enjoyed considerable impetus from war-time disruptions of 1914–1918 and 1939–1945, the communist insurgency in the late 1940s and 1950s and the Korean war boom in the 1950s. Production of plywood and cement met around three-quarters and half, respectively, of domestic demand (Federation of Malaya, 1957: para 78). Exports of rubber footwear, and bicycle tyres and tubes accounted for 5.3 million and 0.4 million pieces, respectively, in 1955 (Federation of Malaya, 1957: Appendix V, Table A). Manufacturing, albeit on a small scale, was indirectly subsidized by the mining and agricultural sectors during colonial rule through the infrastructure developed and maintained by the colonial government using taxes collected from primary exports.

Other than the skilled staff and technology offered by the foreign companies operating in Malaya, local companies also gained from the government's technical training programmes developed largely to support the railway, port and public works departments. Several skilled personnel from these departments eventually left to work in the more lucrative private sector. Compared to the M$5 bonus offered by the state departments, private firms were offering M$20–25 monthly wages in the early 1900s (Chai, 1967: 260–262). Indeed the acute shortage of skilled labour in state departments led to the government introducing various incentives and training schemes. Perak and Selangor offered scholarships of M$3000 and M$2000, respectively, in 1899 to enable boys from English schools to undergo training in the workshops of the public works and railway departments. This was boosted by an engineering instructor hired from England

in 1906. They were augmented by technical schools. The four junior technical schools in Penang, Ipoh, Kuala Lumpur and Johore Bharu trained a total of 784 residential and 235 non-residential students in 1955 (Federation of Malaya, 1957: Appendix VI). The government also set up a techno-factory in Kuala Lumpur and nationally coordinated training schemes by 1957. Learning by doing, adaptive engineering and in-house apprenticeship training schemes were also important in enhancing technology of the local Chinese firms (Song, 1923). Unlike Western firms, which had difficulty controlling local Chinese labour, Chinese firms, housed in backyard workshops enjoyed closer cooperation, which often ran along family and clannish lines.

The planning framework that the Japanese colonial government introduced in 1941–1945 resembled strong pro-active industrial policy elements but was quickly ended by the returning British colonial government. Thus, although Malaya was largely labour- and natural resource-rich, the nature of production and institutional framework that emerged encouraged the utilization of capital-intensive power-driven technology. Nonetheless, the natural protection offered by distance, and the war-time trade disruptions enhanced production for domestic use. However, as the demand for engineering support services were generally infrequent and fluctuated considerably, the engineering firms remained relatively small despite using power-driven machinery. Consequently, these small firms did not enjoy the scale to grow into large machine tool manufacturers. Besides, large orders were met from imports from Britain. Thus, the World Bank (1955: 422) noted that the average manufacturing firms in Malaya were small, employing on average of 20 employees but mostly less than 10 employees. Nevertheless, the economics of flexibility, where small firms specialized horizontally in similar technologies, switching quickly production to adjust with demand, ensured that these firms continued to utilize power-driven machinery.

Nevertheless, the impetus offered by war-time disruptions in trade, growing local demand as the cash-based raw material economy flourished, and massive government efforts to build new villages to quell the communist threat, and the Korean war boom generated sufficient demand to draw a handful of Western consumer and intermediate firms. Bata, Ford Motors, Unilever Brothers, Imperial Chemical Industries (ICI), Metal Box, OU Associated Portland Cement Manufacturers and Malayan Collieries were some of the big firms that opened production in consumer and intermediate goods' manufacturing. Unilever Brothers

opened in 1952 equipped with the latest machinery to manufacture soaps and cooking fats from local oil palm costing M$l0 million with an employment size of 700 workers (Allen & Donnithorne, 1957: 262).

Between 1947 and 1957, employment in the beverages, tobacco, wearing apparel, furniture, printing and publishing, non-metallic mineral products, general engineering machinery and equipment, electrical machinery and equipment rose (Fig. 2.2).

Unilever began operations with a planned capacity of 10 million tons of oil per year (Nanjundan, 1953: 162). Domestic production of light consumption goods, such as soaps, tobacco and biscuits grew strongly in the period 1953–1955 (Rasiah, 1995a, 1995b). Domestic cement and plywood production met nearly half and three-quarters of domestic requirements, respectively, in 1955 (Federation of Malaya, 1957: para 78). Within simple modern manufacturings, the economy had become quite diversified. Food products, general engineering, machinery and equipment and wood products contributed 9.1, 18.9 and 14.1% of total manufacturing value added in 1947 (Benham, 1951: Table 3). Indeed, employment in the intermediate and capital goods' industries grew strongly in the period 1947–1957 (see Fig. 2.2), which happened alongside a sharp decline in the labor-intensive handicrafts industry (e.g. textiles, ropes, nets, rattan, and attap basketware). Employment in the basic metals' (mainly tin smelting) fell in the same period owing to a rise in capital-intensity as tin smelting value added did not decline in the period 1947–1957 (Rasiah, 1995a). The extent of structural change is reflected in a rise in the composition of imports of intermediate and capital goods as the share of import as of machinery and equipment, and transport vehicles and equipment increased, while the share of food, beverages and tobacco decline in the period 1953–1957 (Corden & Richter, 1963).

While expansion in the primary sectors and infrastructure powered the emergence of modem manufacturing, the lack of a profound industrial policy restricted large-scale manufacturing growth. Nevertheless, the expansion in local owned firms (especially Chinese firms) owed much to linkages that emerged in the engineering industries. In addition, as the mining and milling machines needed heavy engineering support, local firms gradually acquired power-driven technology, which was influenced by a blend of institutions, including markets and cooperation. Also, colonial policy encouraged the utilization and diffusion of heavy engineering technology to expand output to meet increasing demand in the West.

While markets were important, various extra-market institutions, such as transport costs, processing costs of plantation output, war-time blockages and asset specificities acted as critical propellants of early modern manufacturing. A combination of learning by doing, adaptive engineering and employee transfers stimulated the diffusion of power-driven technologies across industries such that even traditional pottery malting firms had begun to mechanize production; pottery making contributed more than a third of factories using power-driven machinery in Malaya in 1955 (see Fig. 2.3).[14] That significant amounts of technology that was transferred into colonial Malaya was capital-intensive shows that production is a dynamic process in which relative prices reflecting factor endowments were only one influence. However, in the absence of strong subsidies (e.g. in research and development [R&D], and exports) and elaborate industrial policies, the local firms remained small. Where large-scale manufacturing appeared profitable, foreign firms (which enjoyed strong R&D support and high technology from their parent plants) set up operations.

A network of institutions linking the primary sectors, infrastructure, engineering and technical support (both machinery and personnel) and training institutions evolved to support the extraction of surplus from mining and agriculture in colonial Malaya. While markets were important, capitalist interests resorted to the most effective technologies at their disposal to generate surplus.

Despite the opportunities that emerged, it appears that its potential for promoting large-scale industrialization was lost during colonial rule. As Hirschman (1958, 1970) and Warren (1980) had argued in the case of the developing economies, the massive exports generated from Malaya offered considerable room for promoting backward linkages. However, the colonial state was not focussed on national interests to pursue a policy of large-scale industrial promotion.[15] The colonial government's preoccupation with promoting British interests meant that even Malaya's precolonial socio-cultural social formation was not

[14] See Schumpeter (1934) for a lucid account of incremental innovations that entrepreneurs typically generate.

[15] As Bagchi (1982) argued on India, Rodney argued on Africa, Kay (1989) argued on Latin America, and Jomo (1986) and Shaharil (2005) had argued on Malaya, colonialism was not aimed at accumulation at host-sites. Instead, colonial plans were targeted at enriching the colonial grandmasters.

entirely broken down. Imperialism under the rule of a foreign power, as Charlesworth (1982: 70–71) had noted in the case of India, denied the local state an independent nationalist political drive necessary to promote local industrialization. However, it will be simplistic to argue that the colonial state denied colonial Malaya rapid industrialization as the counterfactual of an extension of the tribute-paying mode of production offers no evidence of any elements of modern manufacturing. Malaya did not possess the institutional framework for modem manufacturing to take-off prior to the establishment of colonial rule (see also Rasiah, 1995a, 1995b). Indeed, despite the repression and destruction brought about by colonialism, it did provide the early shake-up essential to initiate modern industrialization (Marx, 1976; Luxemburg, 1951).

Conclusions

With the exception of export taxes, it is clear that liberal trade policy instruments were used by the government in colonial Malaya within the British empire to extract surplus for accumulation in Britain. Official trade regulations in colonial Malaya did not impose tariffs on imports from within the British Empire but restricted them from other spheres of influence. However, significant departures from the doctrine of free markets did take place as Malaya's location, specificity of production, and nature of the embedding environment necessitated greater role for non-market institutions. Apart from intermittent restrictions on imports from non-British spheres of control, the colonial government hardly intervened in manufacturing. Its only direct promotional role within manufacturing was limited to rural industry, especially the traditional handicrafts sector. Although the government did offer loans to local petty producers, the extent was very small.

The economics of distance encouraged the emergence of modern manufacturing in colonial Malaya to support tin mining, smelting and processing, and rubber cultivation and processing. Given asset specificities, power-driven technology became an essential driver of these activities, which diffused to local firms (especially Chinese owned). The transfer of skilled staff from the government's railway and public works departments, and the technical schools started by the government provided sufficient supplies of technical labour to support such activities. Although markets were important, given the inherently uneven and segmented nature of labour markets in emerging economies, firms

gradually adopted capital-intensive technology in a number of operations to improve coordination between supply and demand. As the Chinese firms enjoyed a significant advantage in organizing local Chinese labour, foreign firms resorted to subcontracting various aspects of manufacturing to them. Consequently, collaboration became an important institution that blended with markets to shape production organization.

Although the British were more involved in the recruitment of Indian labour for rubber cultivation and processing, similar structures of control were established using Indian and Ceylonese supervisors. Since the early management among the big plantations were from the West, an ethnic division of labour differentiated by caste was used to control labour. Trade unionism was suppressed, while Indian supervisors were left with the task of managing the oppressive working conditions (Fauconnier, 2003). Since off-estate processing of latex into sheet rubber was undertaken in estates, similar labour controls were used in rubber processing.

As local manufacturing was exposed to international competition in which large-scale demand was met from imports, local manufacturing firms remained small despite absorbing capital-intensive power-driven technology. The two war-time disruptions and growth in effective demand locally and regionally stimulated the opening of large foreign firms. However, as the market economy was still in its early stages of development, even foreign firms operating in Malaya hardly competed against one another in the domestic product market. Therefore, the lack of a dynamic industrial policy restricted spill-over effects of technology diffusion from generating large-scale manufacturing expansion in Malaya.

Resources and later end-product markets were decisive in attracting capitalists to Malaya whose ventures to extract surplus led to the development of infrastructure and the other institutions to maintain them. This emerging institutional framework offered the potential for modern manufacturing to evolve. Despite its repressive imposition and administration, which are characteristics of capitalist integration (see Luxemburg, 1951), colonial rule created the conditions for the transformation of Malaya from one of traditional and stagnant economies to a market economy. The rich resources enabled the colonial state to support its fiscal, security and administrative role. The development and maintenance of infrastructure (especially railways, ports and public works) and the primary sectors offered considerable spin-off potential. However, governed by a foreign power to support British imperial interests, the Malayan state lacked

a nationalist focus, and with that, the nationalist drive to pursue proactive industrial policies to stimulate rapid industrialization (e.g. targeting, prioritization and subsidies and tariffs to shelter local firms). However, although it is impossible to imagine the counterfactual accurately without colonial rule, given the sluggish social formation that existed prior to British intervention and the lack of dynamic industrial policies after independence (see Rasiah, 1995a), there is little evidence to suggest that industrial transformation would have rooted more deeply if Malaya had not been colonialized.

Returning to the theoretical argument on what shaped colonial industrialization in Malaya, it is obvious that a myriad of institutions were critical. Markets were important and so were the different initiatives that defined *laisse fairism* within the colonial sphere of influence, though even here distance and the need to situate productive capacity at proximate locations gave rise to the manufacture of heavy machinery and equipment, and ships and foundries. Uncertainties and risks also drove the emergence of manufacturing to ensure smooth coordination of tin mining and smelting, and rubber cultivation and processing. Trust and collaboration between shipping companies, miners and smelters, cultivators and processors and infrastructure providers were also important to effectively manage risks and uncertainties for the transfer of tin and rubber to final markets, which helped make Malaya the prime earner of US dollars in the Sterling area (Sutton, 2016). Expanding trade offered considerable opportunities for widening industrialization,[16] but the colonial government was engrossed mainly on accumulation in Britain, which denied the requisite interventions essential to support full-scale industrialization in Malaya. Consequently, the task of industrializing Malaya was left to the post-colonial state, which became independent in 1957.

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[16] *A la* Hirschman's (1958, 1970) argument on the role of expanding export markets on the potential for developing backward linkages at host-sites.

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