

Comparing Industrialization in Pakistan and the East Asian Economies

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Abstract

Drawing on the successful industrialization and catch-up experience of the UK, the US, Germany, France, Italy, Sweden and Japan, and later South Korea and Taiwan, we argue that industrialization is a necessary phase for normal economies to stimulate rapid economic growth and structural change. This paper compares Pakistan's industrialization with that of selected economies in East Asia. The evidence shows that Pakistan not only has the lowest GDP per capita of this group, it has also industrialized the least. Pakistan enjoyed its highest manufacturing growth rates in the 1950s and 1960s. Thereafter, manufacturing grew slowly and unevenly until the 1990s and 2006, largely through clothing exports.

While Pakistan has faced deindustrialization since 2006, technology upgrading was never an integral part of its industrial policy. In contrast, the developmental role of the state, with a strong focus on technological catch-up and science-based education, is what propelled South Korea's leading firms to the world's technology frontier. Clientelist pressures compromised a similar role in Malaysia, the Philippines and Indonesia, although foreign-owned firms helped expand their manufactured exports. A structured technology upgrading framework was never part of policy planning in the Philippines, Indonesia and Thailand, while Malaysia's technology upgrading blueprint, launched in 1991, lacked sound execution. Export manufacturing in the Philippines, Indonesia, Thailand and Malaysia through imports of cheap foreign labor has benefited from low wages and foreign direct investment. The comparison offers Pakistan an opportunity to learn from both the more successful and less successful industrializers in East Asia, that it might create the conditions for rapid economic growth and structural change.

Keywords: Industrialization, deindustrialization, industrial policy, technological upgrading, Pakistan.

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1. Introduction

The East Asian countries' successful transformation from poor to rich and middle-income economies has always attracted policymakers' interest in the rest of Asia, Africa and Latin America (Rasiah, 1998). The successful development models of Singapore and Hong Kong are often removed from such policy lessons, given that they are city-states and inherited strong baseline conditions as entrepôts under British colonialism and the gateway to trade with China and Southeast Asia. East Asia has produced the successful models of the Republic of Korea (henceforth referred to as Korea) and Taiwan, which became developed in one generation. Malaysia and Thailand had reached upper middle-income status by the 1990s, while China, Indonesia and the Philippines enjoy middle-income status despite their enormous populations.

Among the East Asian developing economies, China's GDP per capita grew fastest (by 31.9 times), followed by Korea (by 22.2 times) over the period 1960–2015. Thailand, Malaysia and Indonesia's GDP per capita grew by 9.9, 7.5 and 6.4 times, respectively, over the same period. In contrast, Pakistan's GDP per capita grew by only 3.7 times, exceeding that of the Philippines, which expanded by 2.4 times in 1960–2015.

While a wide range of reasons can be found to explain such contrasting growth outcomes, from political leadership to human capital development policy and trade strategies, the nature of structural transformation promoted through institutional change has increasingly gained currency as a key factor in explicating such unequal growth performance among these countries. That the Philippines' GDP per capita growth was smaller than that of Pakistan shows that geography (being located in East Asia) is not a decisive factor in determining why some countries develop faster than others. In searching for answers, it is also critical to assess the type of industrial policy implemented rather than referring to it as a 'black box' in explaining unequal outcomes.

Pakistan and the East Asian economies examined in this paper started to deindustrialize when their share of manufacturing in GDP began to fall. Korea began to deindustrialize after achieving developed status, but its manufacturing productivity continued to grow. China, Indonesia, Malaysia, the Philippines and Thailand began deindustrializing before they had achieved developed status. Since Pakistan has begun experiencing deindustrialization at such an early stage, when the economy is still poor, it is important to compare its industrialization experience with that of the East Asian economies.

This paper seeks to analyze the growth and competitiveness of manufacturing in Pakistan in comparison with selected East Asian economies. Owing to problems of data, we exclude Taiwan from the analysis, although its stellar experience is worth studying. We also exclude Singapore for the reasons cited earlier. Thus, we evaluate the economic growth experience of, and the significance of manufacturing for, Pakistan against that of China, Indonesia, Korea, Malaysia, the Philippines and Thailand.

Section 2 compares the GDP per capita growth rates of these economies, followed by a review of the theoretical considerations that underpin our analysis of their industrialization experience (Section 3). Section 4 analyzes changes in the composition, growth and competitiveness of manufacturing. Section 5 gives a critical account of the policies targeted at promoting industrialization and the technological performance of the high-tech industry of integrated circuits. Section 6 presents the study's conclusions and implications for industrial policy.

2. Growth in GDP per Capita Compared

Pakistan has the lowest GDP per capita of the countries compared at US\$1,317 in current prices in 2014 (World Bank, 2015). Korea has the highest GDP per capita at US\$27,970, followed by Malaysia in distant second place at US\$11,300. The commensurate figures for China, Thailand, Indonesia and the Philippines are US\$7,590, US\$5,977, US\$3,492 and US\$2,813, respectively. Pakistan's real GDP per capita grew on average by 2.4 percent per annum over the period 1960–2014, exceeding the commensurate growth rate of 1.6 percent per annum for the Philippines (Table 1). However, the other East Asian economies grew faster than Pakistan. China grew fastest at 6.6 percent per annum on average, although it had the lowest starting base in 1960. Korea had the second highest average GDP per capita growth rate at 5.9 percent per annum. Thailand and Malaysia followed at 4.3 and 3.8 percent per annum, respectively.

Table 1: Annual average GDP/capita growth rates, selected Asian economies

Country	1960–70	1970–80	1980–90	1990–2000	2000–10	2010–14	1960–2014
China	1.8	4.3	7.7	9.3	9.9	7.5	6.6
Indonesia	1.3	5.2	4.2	2.6	3.8	4.3	3.5
Korea	5.9	7.2	8.4	5.6	3.9	2.5	5.9
Malaysia	3.4	5.3	3.1	4.4	2.7	3.8	3.8
Pakistan	4.5	1.6	2.9	1.4	2.1	1.7	2.4
Philippines	1.7	3.0	-1.0	0.5	2.9	4.2	1.6
Thailand	5.0	4.2	6.0	3.3	3.9	2.5	4.3

Source: Authors' calculations based on data from the World Bank (2015).

Yet Pakistan started off well, with an average annual growth rate of 4.5 percent per annum in 1960–70, which was exceeded only by Korea (5.9 percent). The commensurate growth rates of Indonesia, the Philippines and China all fell below 2.0 percent over the same period. Pakistan grew the slowest on average among these economies in 1970–80, 2000–10 and 2010–14 at 1.6, 2.1 and 1.7 percent, respectively, per annum. Its real GDP per capita on average grew faster only than that of the Philippines during 1980–90, 2000–10 and 2010–14.

Comparing Pakistan with the East Asian economies shows that it did better than the Philippines in terms of GDP per capita, but worse than China, Korea, Thailand, Malaysia and Indonesia over the period 1960–2014. Can their diverging GDP per capita growth rates be attributed to their experiences of industrialization? We turn to analyzing the key tenets of the argument that the manufacturing sector's differentiating and increasing returns give countries the potential to stimulate rapid economic growth and structural change (see Smith, 1776; Young, 1928; Kaldor, 1967).

3. Theoretical Considerations

Industrial policy has a long history: the first such policy is considered to have originated accidentally in Britain in the 15th century (Reinert, 2007). Early efforts to define industrial policy referred to it as a policy or set of policies targeted at expanding industry in general, and manufacturing in particular, with a focus on the shares of value-added and employment in the economy (Kaldor, 1967). Given the rapid expansion of automation in all manufacturing industries and its impact on reducing employment, we focus on the share of value-added rather than that of employment as a measure of industrialization and deindustrialization.

While structural economists such as Young (1928) and Kaldor (1967) focus on the differentiating characteristics of industrialization and its impact on the division of labor and economic expansion, they do not specifically analyze technological deepening. Chenery, Robinson and Syrquin (1986) attempt to do this, but confine their analysis to categorizations by capital goods, consumer durables, intermediate goods and raw materials. Lall, Weiss and Zhang (2006) subsequently use the classifications of high-tech, medium-tech and low-tech industries to address the sophistication of countries' economic structure. This became the basis of UNIDO's competitive industrial performance (CIP) index. However, these classifications do not address innovation and technology directly.

Past accounts show that a wide range of industrial policies, both explicit and implicit, were introduced to stimulate economic growth in the East Asian economies. China, Korea, Malaysia and the Philippines had explicit industrial policies targeted at stimulating particular manufacturing industries. Korea and Malaysia even targeted champions selected for state-led promotion, such as Samsung, Hyundai, Daewoo and POSCO in Korea (Amsden, 1989) and Proton and Perwaja in Malaysia (Jomo, 1990). The Philippines launched the 'People's car' in the 1960s (Ofreneo, 2016). Thailand and Indonesia had trade and investment policies targeted at stimulating manufacturing, but without any handpicked firms for specific support (Rasiah, 2009).

The differential outcomes of industrial policy among the East Asian economies suggest that specificities are important and particular strategies are key as to when industrial policy will work. This is all the more so when we consider that Pakistan has grown faster than the Philippines over the period 1960–2014. Thus, we examine the extant literature below to identify key signposts in analyzing industrial policy against its impact on economic and manufacturing growth.

The transformation of production into different stages and the evolution of embodied knowledge in which innovation depth transcends the nature and type of goods and services means that it no longer matters whether countries experience structural transformation by specializing in consumer, intermediate to capital goods. For example, Taiwan and Singapore show greater specialization in components and intermediate goods than Malaysia, but the former two are technologically superior to the latter, as reflected in their respective value-added activities. Hence, a successful industrial policy should be viewed as an exercise that stimulates sustainable economic transformation from low- to high-value-added

activities in targeted as well as other industries in the economy. Technological change is the fuel that powers upgrading in value-added.

Marx (1957), Veblen (1915) and Schumpeter (1942, 1961) laid the foundation for a real assessment of technology by unbundling the 'black box' (Rosenberg, 1975, 1982). This led to a plethora of work defining technological capability (see, for instance, Dahlman, 1984; Pavitt, 1984; Lall, 1992). While technology and technological capabilities were the prime focus of these scholars, manufacturing became a key platform for stimulating productivity through learning and innovation in process, product and organizational technologies (Rasiah, 2002, 2004). The catch-up literature, which has its historical origins in Marx (1957) and Luxembourg's (1967) notion of capitalist integration and accumulation, was expanded by Veblen (1915), Gerschenkron (1962) and Abramowitz (1956). These works gave rise to the developmental function of the state, which goes beyond a regulatory role.

The empirical foundations of the developmental state, articulating the active role of the government in stimulating industrial structural change, can be found in works explaining industrial catch-up by Japan, Korea and Taiwan (see Johnson, 1982; Amsden, 1989; Wade, 1990). However, while Amsden (1989), Amsden and Chu (2003), Chang (1994) and Kim (1997) provide explicit accounts of catch-up in particular industries, Johnson (1982) and Wade (1990) give no empirical evidence on innovation and technology against the particular industrial policies pursued by Japan and Taiwan, respectively. Hence, there is a need to reinvestigate this topic. In doing so, we attempt to compare a range of countries, with Korea being clearly successful while Pakistan and the Philippines were the least successful.

4. Industrialization Experience: Pakistan and East Asia

This section analyzes the importance of manufacturing in the economic growth of Pakistan and selected East Asian economies. We avoid using labor productivity and total productivity in this assessment because of measurement problems. The first can be biased by a productivity-less transition from labor- to capital-intensive technologies in production, while the second does not take account of learning and gestation periods and flows of disembodied systemic knowledge from abroad (Rasiah, 2015). Also, total factor productivity accounts poorly for technology embodied in machinery and equipment, humans and organizational structures. Thus, we use simpler measures such as the manufacturing share of GDP, growth in manufacturing value-added (MVA), manufactured export

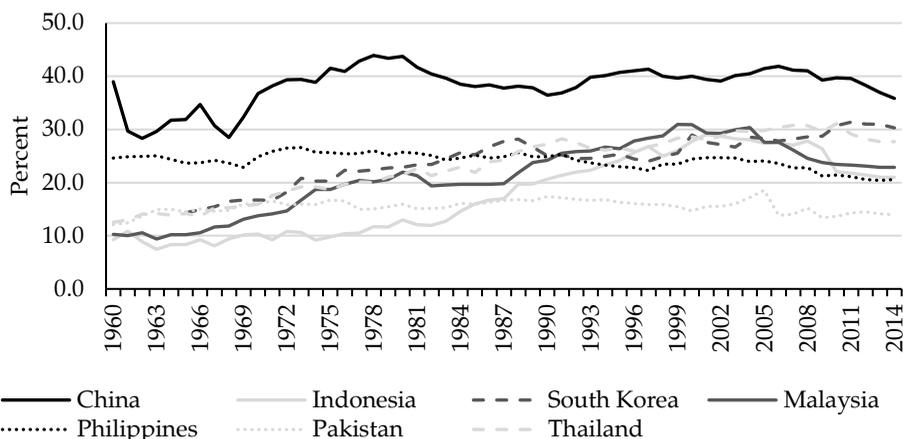
specialization, CIP and patents filed in the US in the high-tech integrated circuit (IC) industry.

1.1 Manufacturing Share of GDP

Since 1987, Pakistan has had the lowest share of manufacturing in GDP among the economies shown in Figure 1. Apart from a brief rise in 2004/05, the contribution of manufacturing to GDP has either declined or stagnated. Indeed, Pakistan’s manufacturing sector had its highest share of GDP at 18.6 percent in 2005. Its share of GDP over long spells during 1960–2014 was, however, less than 10 percent.

Pakistan’s industrial experience contrasts sharply with that of a number of East Asian economies. For example, manufacturing as a share of GDP in Korea peaked at 31.4 percent in 2011 before falling to 30.3 percent in 2014. The commensurate share of manufacturing in GDP for China peaked at 40.4 percent in 1978 – the year that economic reforms were introduced – before falling gradually to 30.1 percent in 2013. Thailand’s manufacturing share of GDP rose to 30.7 percent in 2007/08 before falling to 27.7 percent in 2013/14. Malaysia’s manufacturing share of GDP was highest in 1999/2000 at 30.9 percent before falling to 22.9 percent in 2014. For Indonesia, it peaked at 29.1 percent in 2001 before falling to 21.0 percent in 2014. Although the Philippines has performed more dismally than Pakistan, its manufacturing share of GDP was relatively high at 24.6 percent in 1960, peaking at 26.6 percent in 1973. Since then, it has fallen in trend terms to 20.6 percent in 2014.

Figure 1: Share of manufacturing in GDP, selected Asian economies



Source: Authors’ calculations based on data from the World Bank (2015).

1.2 *Manufacturing Growth*

Pakistan's manufacturing sector recorded a real average growth rate of 6.6 percent per annum over the period 1960–2014 (Table 2), which is higher than the commensurate growth rate achieved by the Philippines (4.1 percent).

Table 2: Annual average % growth in MVA, selected Asian economies

Country	1960–70	1970–80	1980–90	1990–2000	2000–14	1960–2014*
China	–	–	9.6	13.9	10.5	11.2
Indonesia	4.6	14.0	12.2	6.6	4.7	8.1
Korea	23.2	16.2	11.9	8.1	5.8	12.1
Malaysia	–	11.6	9.8	9.9	4.0	5.7
Pakistan	9.9	5.4	8.2	3.8	5.9	6.6
Philippines	5.8	6.1	0.9	2.6	4.7	4.1
Thailand	11.6	10.1	9.9	6.8	4.1	8.1

Note: * 1980–2014 for China, 1970–2014 for Malaysia.

Source: Authors' calculations based on data from the World Bank (2015).

Malaysia experienced real annual average manufacturing growth of 5.7 percent over the period 1970–2014. Korea (12.1 percent) had the highest growth rate, followed by China (11.2 percent over the period 1980–2014), Thailand (8.1 percent) and Indonesia (8.1 percent). Only during 1960–70 (under the Ayub Khan government, which promoted the growth of industrial capitalists) did Pakistan's manufacturing growth reach almost 10 percent per annum on average, exceeding the growth rates of Indonesia and the Philippines.

1.3 *Composition of Manufacturing*

Changes in the composition of manufacturing by industrial sophistication of exports is another measure of industrial performance (see Lall, 1992). While the concept of industrial sophistication advanced by Lall has its flaws (the 4-digit standard classification does not differentiate products by value-added segments), we use it with some modifications in this exercise. We include 'other manufacturing', which consists of a small share of professional goods in the low-tech category, and transport equipment in the high tech category, owing to the increased sophistication of the industry. We do not expect the adjustment to change the results much as professional goods account for less than 5 percent of the 'other manufacturing' category, while the assembly of transport equipment is

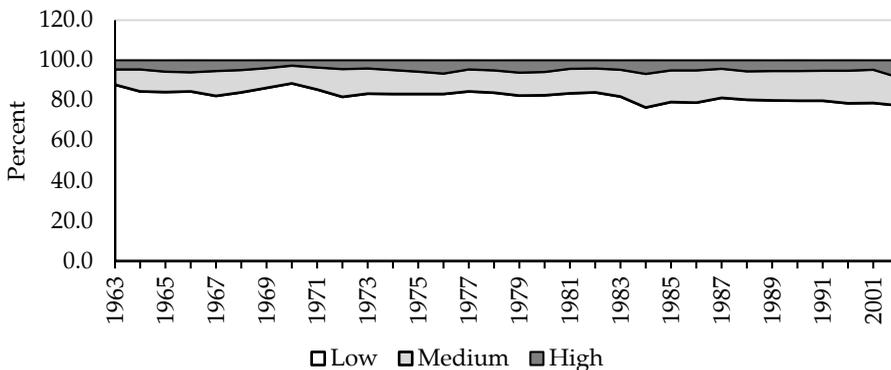
more sophisticated than the assembly of printed circuit boards in the electronics industry (which Lall classifies as a high-tech industry).

Figures 2–8 illustrate the degree of MVA specialization in Pakistan and selected East Asian economies. Indonesia shows the strongest specialization in low-tech industries in 1970, accounting for 92.6 percent of MVA compared to 88.7 percent for Pakistan. The other economies are not significantly different: low-tech industries dominate MVA in Korea (82.4 percent), Malaysia (85.9 percent), the Philippines (82.9 percent) and Thailand (72.0 percent) in 1970. Low-technology industries also dominate China’s MVA in 1980 at 71.8 percent.

Pakistan’s MVA composition has changed very little over the period 1963–2006 (Figure 2). The low-technology industries of textiles and clothing; foods, beverages and tobacco; and wood, paper, furniture and nonmetal products still accounted for 77.5 percent of MVA in 2006. Indeed, cotton-based textiles and clothing dominate Pakistan’s exports (Rasiah & Nazeer, 2015). The shares of medium-tech and high-tech industries reach only 14.0 and 8.5 percent, respectively, of MVA.

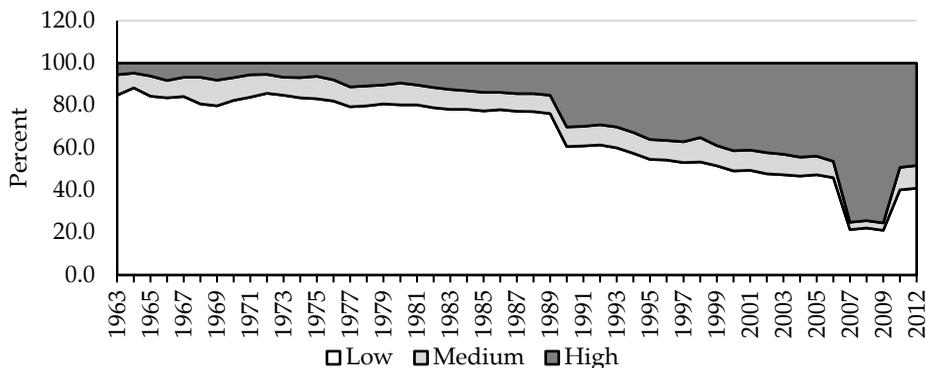
In contrast, high-technology industries grew rapidly to become the leading contributor to Korea’s MVA, peaking at 75.4 percent in 2009 before falling to 48.3 percent in 2012 (Figure 3). China (62.1 percent in 2009), Indonesia (66.0 percent in 2011), Malaysia (60.2 percent in 2012), the Philippines (62.1 percent in 2010) and Thailand (63.8 percent in 2011) were also doing better than Pakistan by the turn of the millennium, their specialization in low-technology industries having fallen faster than that of Pakistan (Figures 4–8).

Figure 2: Composition of MVA, Pakistan, 1963–2006



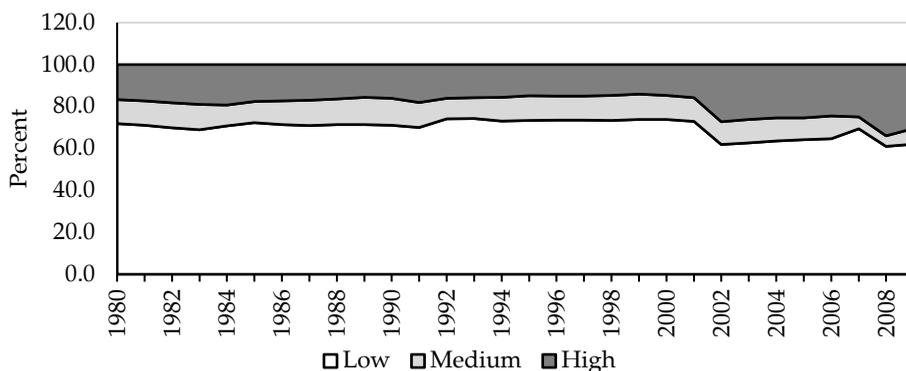
Source: Authors’ calculations based on data from the World Bank (2015).

Figure 3: Composition of MVA, Korea, 1963–2012



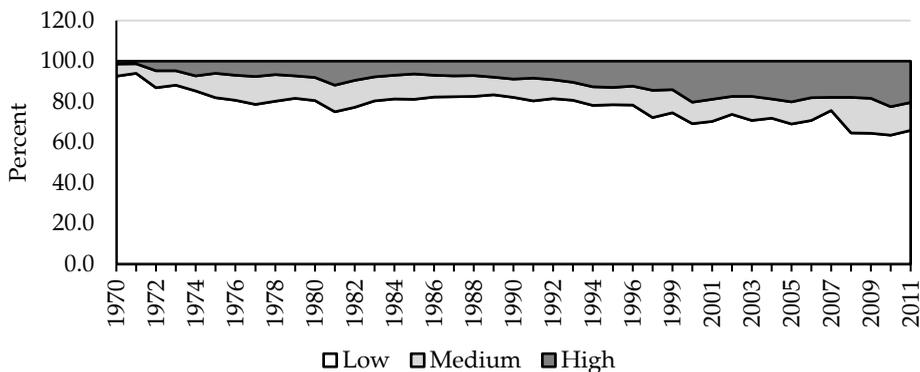
Source: Authors' calculations based on data from the World Bank (2015).

Figure 4: Composition of MVA, China, 1980–2009



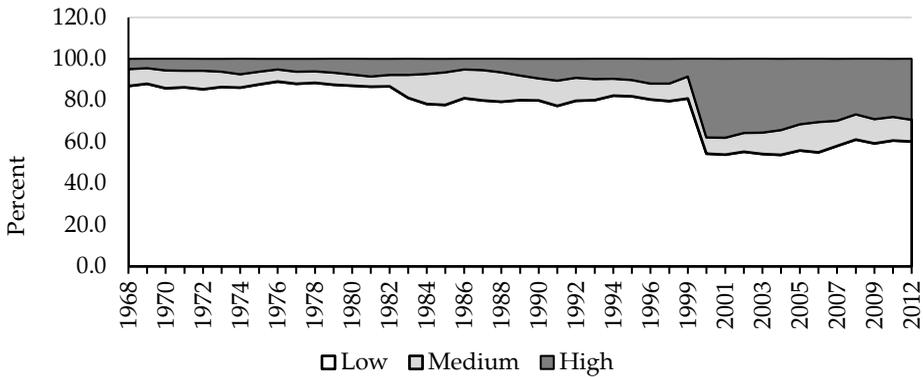
Source: Authors' calculations based on data from the World Bank (2015).

Figure 5: Composition of MVA, Indonesia, 1963–2011



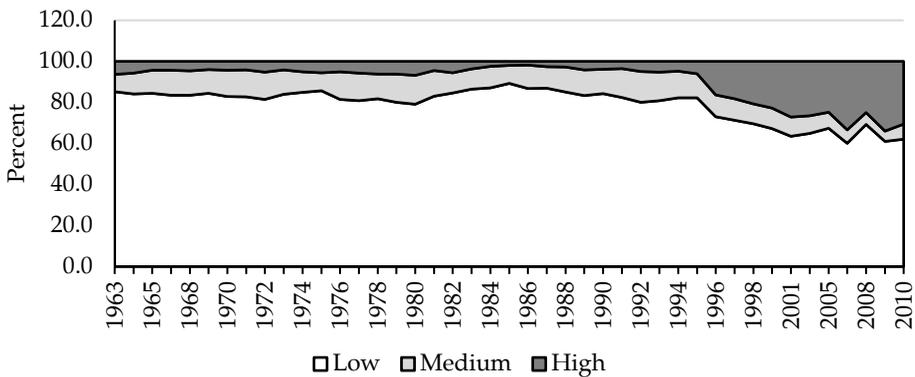
Source: Authors' calculations based on data from the World Bank (2015).

Figure 6: Composition of MVA, Malaysia, 1963–2012



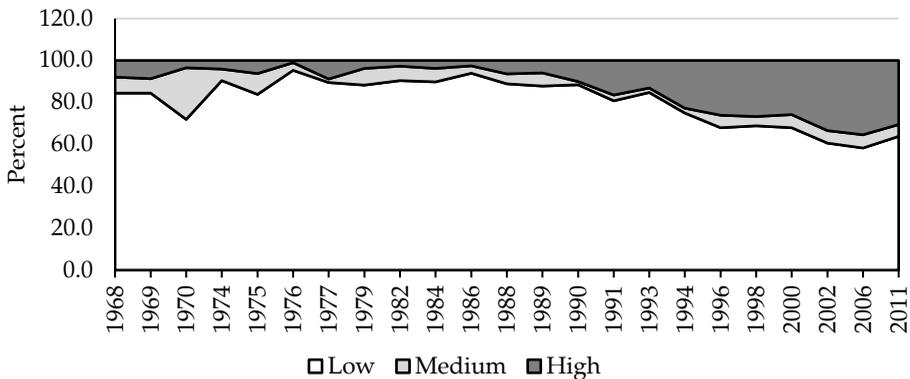
Source: Authors' calculations based on data from the World Bank (2015).

Figure 7: Composition of MVA, the Philippines, 1963–2010



Source: Authors' calculations based on data from the World Bank (2015).

Figure 8: Composition of MVA, Thailand, 1963–2011



Source: Authors' calculations based on data from the World Bank (2015).

In addition, Pakistan had the smallest share of high-tech industries in 2006, accounting for only 8.5 percent of MVA. In contrast, high-tech industries had a far higher share of MVA in China (30.5 percent in 2009), Indonesia (20.4 percent in 2011), Korea (48.3 percent in 2012), Malaysia (29.4 percent in 2012), the Philippines (30.5 percent in 2010) and Thailand (30.5 percent in 2011). Korea has the most sophisticated high-tech industry by far, with extensive research and development (R&D) operations and specialization in high-value-added segments of the industry (Rasiah, Yap & Yap, 2015).

Not only is Korea powered strongly by high-technology industries, its national firms also lead several of the world's high-tech industries, e.g., Samsung in electronics, POSCO in steel manufacturing and Daewoo in shipbuilding (Chang, 1994). With the exception of Korea, MVA in the remaining countries examined is dominated by low-tech industries. In contrast, Pakistan's manufacturing shows the highest concentration of low-technology industries. Its chief exports, cotton fiber, textiles and clothing, are still exported largely to higher-value-added downstream producers abroad or using foreign brand names (Rasiah & Nazeer, 2015).

1.4 Competitiveness of Manufacturing

We use UNIDO's CIP index to analyze the competitiveness of manufactured exports in Pakistan and the selected East Asian countries. This measure was first used by UNIDO to benchmark and rank countries' industrial competitiveness in 2003. It has since evolved, with eight indicators grouped through three subcategories (UNIDO, 2013, p. xv). The first subcategory assesses a country's capacity to produce and export manufactures and is measured by MVA per capita and manufactured exports per capita. The second subcategory indicates levels of technological deepening and upgrading and is measured by industrialization intensity and export quality. The third subcategory assesses a country's impact on world manufacturing and is measured using proxies for its share of MVA in world MVA and of manufacturing trade in world manufacturing trade.

Table 3 gives the CIP index, MVA per capita and manufactured exports per capita (MX/capita) for the sample. With a CIP score of 0.032, Pakistan was ranked at 74 in the world in 2010, far below all the East Asian economies examined in this paper. Korea was ranked fourth, with a CIP score of 0.404. Taiwan and Singapore were ranked just below Korea in fifth and sixth place, respectively, followed by China in seventh place. Malaysia, Thailand, Indonesia and the Philippines were ranked at 21, 23, 38 and 44, respectively.

Table 3: CIP of selected Asian countries, 2010

Country	CIP	MVA/capita	MX/capita
China	0.3293 (7)	820.0	1,123.6
Indonesia	0.0823 (38)	302.3	395.7
Korea	0.4044 (4)	4,782.7	9,280.3
Malaysia	0.1834 (21)	1,426.9	5,930.9
Pakistan	0.0315 (74)	116.9	99.8
Philippines	0.0726 (44)	296.0	516.6
Singapore	0.3456 (6)	8,198.3	35,709.1
Thailand	0.1712 (23)	1,053.7	2,517.2
Taiwan	0.3649 (5)	6,153.1	10,825.2

Source: UNIDO (2013).

Pakistan also shows the least industrialization intensity among the countries compared: its per capita MVA and manufacturing exports were only US\$117 and US\$100, respectively, in 2010. With its small population, Singapore had the highest figures (US\$8,198 and US\$35,709, respectively), followed by Taiwan (US\$6,153 and US\$10,825, respectively). Korea had the next highest, at US\$4,783 and 9,280, respectively, followed by Malaysia with US\$1,427 and 5,931, respectively.

1.5 Technological Upgrading in IC Manufacturing

We focus on the state of technology in East Asia's leading high-tech manufactured export, ICs, to augment our analysis. Pakistan does not export ICs, which are a key component of all electronics (and many other) goods. China, Indonesia, Korea, Malaysia, the Philippines and Thailand accounted for 17.2, 0.1, 10.5, 7.2, 2.8 and 1.6 percent of world exports of ICs in 2014 (World Trade Organization, 2015). Taken together, these six countries contributed 39.2 percent of world IC exports in 2014.

Using the number of patents filed in the US as a proxy for the state of technological upgrading in the industry over the period 1981–2011, we can see that the contrast in technological depth among these countries is sharper than that of export shares. As shown in Table 4, Korea dominates the filing of patents, followed by Taiwan, Singapore, China and Malaysia. The presence of foreign firms makes the Philippines the next highest patent taker. No patents were filed from Indonesia, while the number filed from Thailand is very small, which shows that firms in these countries participate little in R&D operations (see also Rasiah et al., 2015).

Table 4: Patents filed in the US, selected Asian economies

Country	1981–85		1986–90		1991–95		1996–2000		2001–05		2006–11	
	N	F	N	F	N	F	N	F	N	F	N	F
China	0	0	0	0	0	3	0	27	11	52	177	436
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0
Malaysia	0	0	0	0	0	1	0	5	4	39	3	270
Philippines	0	0	0	0	0	0	0	5	0	40	0	70
Singapore	0	0	0	1	0	14	0	36	4	216	290	545
Korea	1	0	103	2	1,526	1	5,095	11	8,049	139	25,014	409
Taiwan	0	0	2	0	278	5	3,063	124	4,826	43	5,223	107
Thailand	0	0	0	0	0	0	0	3	0	4*	0	3

Source: Available from <http://www.gartner.com/technology/home.jsp>

Although their performance is markedly unequal, the evidence generally shows that the industrial experience of Korea, China, Malaysia, Thailand, Indonesia and the Philippines was superior to that of Pakistan. Their performance record was strongly influenced by their specialization in export manufacturing as well as the shift from low- to high-tech industries. However, the differential outcomes for these countries also show that their industrialization experience was different: Korea experienced the strongest transition from specializing in low- to high-tech industries while Pakistan and the Philippines were the least successful. It is thus important that the institutional frameworks shaping industrialization in each country are examined in detail to explain these differences (Section 5).

5. Implications for Industrial Policy

In this section, we discuss the particular policies introduced, or the absence thereof, by Pakistan and the selected East Asian governments to promote industrialization against the nature of deindustrialization that has, in each case, set in. Korea, the Philippines and Malaysia introduced explicit industrial policies, while Pakistan, Thailand and Indonesia introduced specific measures from time to time to stimulate investment in manufacturing.

1.6 Pakistan

Burki (2008, p. 28) traces five industrial policies implemented through five-year development plans in Pakistan. The Ayub Khan government played something of a developmental role till the late 1960s, offering liberal imports of raw material and intermediate products as well as protection for agriculture and industry (Haque, 2015, p. 95). Indeed, as

shown in Tables 1 and 2, Pakistan's highest growth in GDP per capita and manufacturing was in the 1960s. As Naseemullah and Arnold (2015, p. 10) note, an industrial class was also created during this period. Subsequent efforts to dismantle economic concentration since the late 1970s, followed by the deregulation of the economy in the 1980s, have undermined Pakistan's capacity to promote industrial widening and deepening.

Premature deindustrialization became inevitable once liberalization began to dominate economic policy in Pakistan in the 1980s (Hamid, Nabi & Zafar, 2014; Hamid & Khan, 2015). However, the industrial policy that emerged in the 1950s and 1960s, and subsequent efforts to nationalize industry under the Bhutto government, did not demonstrate the use of technological catch-up policies. Industrial focus was largely on import substitution. Export manufacturing à la Southeast Asia – by stimulating the relocation of giant foreign multinationals (Rasiah, 2009) or supporting national firms through technology acquisition from abroad and learning and domestic R&D as in Korea and Taiwan (Amsden, 1989; Wade, 1990; Kim, 1997) – did not take off.

Not only did Pakistan become politically vulnerable when Zia-ul-Haq's military government took power in 1978, the country also lacked any system of incentives to attract foreign firms or to promote national firms. Liberalization fueled massive imports and the high exchange rate of the Pakistani rupee brought in the effects of 'Dutch disease', squeezing the manufacturing sector further (Corden & Neary, 1982). Hence, despite being endowed with some of the best raw materials in cotton and a highly educated diaspora, the lack of a technology policy left Pakistan primarily an exporter of cotton and low-value-added clothing and textiles, and an importer of high-value-added, finished clothing.

1.7 Korea

Korea has had an active industrial policy since the late 1960s when Park Chung Hee took power. Going against the grain of comparative advantage, the government launched heavy and technology-intensive industries in the late 1960s. Family firms were merged to create chaebols that sought to produce a wide range of goods as conglomerates (Jones & SaKong, 1980). While export-processing zones were also created (e.g., Masan and Inchon), government policy was targeted at spawning national firms (Amsden, 1989).

Fashioning this promotion after Japanese history, Park's government offered subsidized credit and protection in the domestic market to national firms such as Samsung, Hyundai, Daewoo and the originally state-owned Posco in a range of industries (electronics, iron and steel, automobiles, ships) (Chang, 1994). While these rents were given to targeted firms, the government also imposed performance standards in the form of export quotas, with severe penalties for abusers (Amsden, 1989). Nonperformers were quickly removed from the subsidies. While trade and financial coordination were important (implemented through quotas and tariffs, and subsidized interest rates for targeted firms), technological catch-up became the vehicle for upgrading and expanding the manufacturing sector in Korea (Kim, 1997). The won was fixed against the US dollar and banks were government-owned till 1985.

Human capital development became a major thrust of technological catch-up. On the one hand, the government invested heavily to widen and deepen the supply of science and technology-based human capital (Vogel, 1991). On the other hand, large outflows of students seeking science-based education in the West generated experiential knowledge gained from studying at the best research universities and working at frontier firms. They either returned in large numbers or participated in knowledge flows to stimulate technological-catch up (Saxenian, 2006). The government also supported initiatives by Korean firms to acquire technologically superior firms in order to move up the value chain. For example, Samsung purchased Schlumberger, Zilog and Micron Technology to accelerate its catch-up in memories (Edquist & Jacobsson, 1987).

Starting from the Park dictatorship, the Korean state has enjoyed autonomous power and been able to stave off any attempt to capture it. This autonomy allowed the government to play a developmental role (see Jessop, 1989; Skocpol, 1994, 1995). The stiff application of what Chakravarty (1987) and Sen (1983) call the 'carrots-and-sticks approach' spearheaded technological catch-up by Korean firms. Hence, national firms such as Samsung, Hyundai, Posco and Daewoo have evolved either as leaders in shaping the world technology frontier or been solely responsible for doing so in their respective industries (Mathews & Cho, 2000). This exercise has not only resulted in Korea's manufacturing sector being dominated by high-tech industries, but it has also driven rapid upgrading from low- to high-value-added activities. This is the primary reason that Korea was able to move from being a poor country in the 1960s to a developed country by the late 1980s.

1.8 *Malaysia and the Philippines*

The Philippines and Malaysia launched industrial policies in the 1950s through import substitution, but without any focus on stimulating technological upgrading. Both countries had enjoyed free trade practices under the American and British spheres of influence prior to the introduction of import-substitution industrialization.

Following the Bell Trade Act of 1946, American goods entered the Philippines without any trade restrictions until 1954 (Hutchcroft, 1989, p. 42). British goods could also enter colonial Malaya and, since 1957, independent Malaysia without trade restrictions until the enactment of the Pioneer Industry Ordinance (PIO) in 1958 (Rasiah, 1993). Industrial policy emerged in the Philippines in the mid-1950s to check the balance-of-payments crisis arising from massive imports from the US. Similarly, in Malaysia, the PIO came into effect because of very large imports of manufactured goods against volatile price fluctuations in rubber and tin exports (Edwards & Jomo, 1993).

While sugar processing, clothes manufacturing and car assembly were protected to control the domestic markets, the national oligarchies that owned these enterprises exerted strong clientelist power over the state in the Philippines. It was from this policy regime that the government launched the 'People's car' (Ofreneo, 2016). Foreign ventures that had previously imported consumer goods relocated their final assembly and processing to circumvent tariffs in Malaysia. However, until 1971, apart from imposing tariffs and quotas on final goods, the governments in both countries offered manufacturing firms liberal import policies on raw materials and intermediate goods.

The Philippines and Malaysia introduced export-processing zones in the early 1970s by attracting giant multinationals to manufacture for export, using imported inputs. However, both import substitution and export orientation coexisted in these countries. Apart from the Marcos regime of the 1970s and early 1980s, when the Communist rebellion threatened to undermine foreign manufacturing activities in the Philippines, foreign multinationals dominated manufactured exports in both countries.

While both countries introduced a range of incentives and offered excellent basic infrastructure (at least in the export-processing zones) to attract foreign direct investment, they had no strategy in place to stimulate technological upgrading for several decades. Malaysia attempted to do so in

1991, but lacked a policy framework to promote technological catch-up. Strategic industries were identified and lubricated with financial incentives and grants, but no roadmap taking account of appraisal was implemented. Hence, manufactured exports in these countries have remained primarily in low-value-added assembly and processing segments.

As Rasiah (2011, 2012) argues, clientelist pressures¹ have denied the state an effective developmental role in both countries. Malaysia has done better than the Philippines only because of attempts in 1991 to stimulate upgrading and resource endowments that have generated foreign exchange from oil and gas exports and oil palm processing. The institutions introduced and organizations set up from then on,² the corporatization of the Malaysian Institute of Microelectronics Systems, the creation of science and technology parks and the provision of R&D grants have all lacked effective selection, monitoring and appraisal of state-promoted industrial enterprises (Rasiah, 1999). Following the acceptance of structural adjustment packages by the Philippines since the mid-1980s, no active industrial policy has re-emerged in the country (Ofreneo, 2016).

1.9 Thailand and Indonesia

Thailand and Indonesia introduced import substitution policies in the 1950s, 1960s and 1970s, and continued these even when export-oriented manufacturing was promoted strongly in the 1980s and 1990s, respectively. Localization policies, especially in automobile assembly (based on components sourced domestically), and joint ventures were the norm in Indonesia until 2000.

Batam has enjoyed exemption from national ownership conditions since the 1990s when Indonesia joined Singapore and Malaysia to form the Singapore, Johore and Rhiau (SIJORI) growth triangle, which was announced in 1989 but formalized in 1994 (Rasiah, 2007). The Batam export-processing zone was even leased to Temasik Holdings of Singapore to handle its development and coordination of investment and manufacturing. However, Thailand abandoned its localization policies in the late 1980s to attract foreign automobile assemblers, while Indonesia was forced to abandon its protectionist policies following the collapse of the Suharto government in 1999 in the wake of the Asian financial crisis.

¹ In Malaysia, from the politically powerful component party, the United Malays National Organization of the National Front ruling coalition; in the Philippines, from its powerful landlords.

² Including the Human Resource Development Council, the Malaysian Technology Development Corporation, the Multimedia Super Corridor, the Malaysian-Industry Government High Technology Group and the Multimedia Development Corporation.

Low-end clothing, electronics, wood processing and automotive components dominate manufactured exports in these countries. Foreign ownership dominates electronics exports and automotive component exports in both countries. Thailand has also become Southeast Asia's primary export base for automobiles. National supplier firms, including the joint ventures that originally emerged under the localization policies, have managed to sustain component sales to foreign multinationals.

However, industrial specialization in both countries has been confined to low-value-added activities. Initiatives by firms – both national suppliers and foreign lead firms – to forge innovation ties with universities and organizations engaged in training and R&D have emerged in Thailand and Indonesia since 2000 (Intarakumnerd & Chaoroenporn, 2013; Intarakumnerd, Chairatana & Chaiyanajit, 2016; Rasiah, Shahrivar & Amin, 2016). Unless both governments introduce a focused policy to stimulate upgrading, using an effective selection, monitoring and appraisal strategy, such pockets of innovation and dynamism are unlikely to translate into upgrading on a national scale.

It is clear that the developmental role played by the Korean government was instrumental in turning a poor country into a developed one by focusing on technological catch-up in manufacturing activities. Its scarce resources and heavy emphasis on science-based education propelled the country's leading firms to the world's technology frontier. On the other hand, clientelist pressures have compromised such a role in Malaysia and the Philippines.

A clearly structured technology upgrading framework was never part of government planning in the Philippines, Indonesia and Thailand. While Malaysia launched a framework to stimulate upgrading in 1991, its execution fell short as the developmental role required to implement the policy was compromised by political interests. Pakistan's industrial policy of the 1960s was very similar to what the Philippines and Malaysia had in place in the 1950s, which focused on protection without an emphasis on technological upgrading. Subsequently, industrial policy was abandoned altogether in the 1980s, which explains the industrial stagnation that set in.

6. Conclusion

Of the countries examined, the evidence shows that Pakistan not only has the lowest per capita GDP income, but it has also industrialized the least. Pakistan enjoyed its highest manufacturing growth in the 1950s and

1960s, but this was not driven by instruments to promote technological upgrading. Thereafter, manufacturing gradually stagnated, with its share of GDP increasingly slightly in the 1990s until 2006; this is accounted for largely by clothes manufacturing.

The developmental role played by the state to varying degrees was instrumental in stimulating economic growth in South Korea, Malaysia, Thailand, the Philippines and Indonesia. South Korea, in particular, became developed in one generation through successful technological catch-up. Its scarce resources and strong emphasis on science-based education propelled the country's leading firms to the world's technology frontier.

Clientelist pressures compromised such a forceful role in Malaysia, the Philippines, Indonesia and Thailand, although foreign-owned firms helped expand their manufactured exports. A clear technology upgrading policy was never part of government planning in Indonesia, the Philippines and Thailand, although all three countries made an effort to stimulate heavy industry. While Malaysia launched a blueprint to stimulate upgrading in 1991, its execution fell short as the developmental role required to implement the policy was compromised by political interests. Export manufacturing in the Philippines, Indonesia, Thailand and Malaysia, through imports of cheap foreign labor, has benefited from low wages and foreign direct investment.

For Pakistan, the lesson to draw from East Asia is not to imitate the successful model of South Korea or the less successful examples of Indonesia, Malaysia, the Philippines and Thailand. Instead, Pakistan's industrialization will have to focus on technological catch-up in industries that have already evolved, but also in industries that complement existing economic activities, such as machinery and equipment, information and communication technology and biotechnology. Learning from both the more successful and less successful examples could help Pakistan adapt and adopt frontier technologies to fuel its industrialization. Government focus should be on institutional change so that there is vetting, monitoring and appraisal of the incentives system that has evolved to stimulate industrialization and technological catch-up in the country.

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