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THE FIVE VARIETIES OF INDUSTRIALISATION: A NEW TYPOLOGY OF DIVERSE EMPIRICAL EXPERIENCE IN THE DEVELOPING WORLD

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ABSTRACT

This short paper takes a closer look at the diverse experiences of industrialisation across major middle-income countries. Focusing on the direction of changes in manufacturing value added and employment shares, five varieties of industrialisation, namely 'primary industrialisation,' 'upgrading industrialisation,' 'advanced industrialisation,' 'stalled industrialisation,' and 'secular deindustrialisation' are outlined on the basis of empirical experience. We provide an indicative country case to illustrate each variety, provide a comparative discussion of the set of varieties, and outline movements between different varieties. We conclude with a set of future avenues for exploration relating to the dynamics of economic development, inclusive growth, and technology in each variety.

KEYWORDS

Structural change; industrialisation; economic development; typology;

About the GPID research network:

The ESRC Global Poverty and Inequality Dynamics (GPID) research network is an international network of academics, civil society organisations, and policymakers. It was launched in 2017 and is funded by the ESRC's Global Challenges Research Fund.

The objective of the ESRC GPID Research Network is to build a new research programme that focuses on the relationship between structural change and inclusive growth.

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THE DEVELOPER'S DILEMMA

The ESRC Global Poverty and Inequality Dynamics (GPID) research network is concerned with what we have called 'the developer's dilemma'.

This dilemma is a trade-off between two objectives that developing countries are pursuing. Specifically:

1. Economic development via structural transformation and productivity growth based on the intra- and inter-sectoral reallocation of economic activity.
2. Inclusive growth which is typically defined as broad-based economic growth benefiting the poorer in society in particular.

Structural transformation, the former has been thought to push up inequality. Whereas the latter, inclusive growth implies a need for steady or even falling inequality to spread the benefits of growth widely. The 'developer's dilemma' is thus a distribution tension at the heart of economic development.

1. Introduction

This paper presents a new typology of different patterns, or varieties, of industrialisation by analysing the empirical dynamics of the manufacturing shares in countries' value added and employment. It compares the recent trends of manufacturing shares in countries with notable industrialisation experience during the second half of the 20th century. These countries currently tend to have a manufacturing value added share above 15% and a manufacturing employment share above 10%. They have typically graduated from the low-income status and do not have considerable natural resources rents as a proportion of the size of their overall economies. Therefore, not all developing countries would fit neatly into the varieties highlighted in this paper. More precisely, these varieties are not suited for developing countries that still remain largely agrarian or those which are heavily dependent on the mining sector. We believe a separate analysis is needed for these countries in which notable industrialisation is yet to begin.

Our paper does not argue that the countries are fixed within the variety to which this analysis has assigned them. Rather, the paper aims to demonstrate that countries have shown diverse patterns of industrialisation and therefore face different policy challenges. Shifting between different varieties is possible and, in some cases, even desirable. Our paper focuses on describing industrialisation patterns. It does not discuss potential causes behind these patterns though this discussion would be an important future research avenue.

The structure of the paper is as follows: Section 2 discusses the need for a typology. Section 3 presents our typology. Section 4 discusses movements between different varieties. Section 5 concludes.

2. DIVERSE PATTERNS OF STRUCTURAL TRANSFORMATION

The heterogeneity of structural transformation (ST) experience in the developing world is immediately evident from a scan of different regions of the world. One characterisation for example is that made by the United Nations Research Institute for Social Development (UNRISD) (2010). UNRISD characterised several ST pathways thus. A 'classic manufacturing growth path' of several East Asian countries was led by a strong state, and predicated, in some instances, on substantial land reform or agricultural modernization, and public investment in rural areas. Import substitution industrialisation was synthesised with export-led growth based on industrial policies and state-directed credit. Foreign investment was managed through joint ventures and performance requirements to extract benefits for the host economy.

In contrast, UNRISD noted a different pathway of ST which was followed by natural resource-abundant developing countries including many in sub-Saharan Africa. This pathway is characterised by a shift from agriculture to mining, including or excluding oil. In short, an intra-sectoral structural change is confined to the natural-resource sector and higher productivity within this sector drives economic growth. This pathway provides export earnings but few jobs, given that mining is typically capital intensive. Governments can then use mineral rents to invest in productive sectors or increase social spending. However, exchange rate appreciation may hurt the tradable sector, and growth may be rather exclusive due to enclave economies.

Yet another outlined is a pathway of service sector-led growth, such as that followed in India, ideally in higher value-added and internationally traded services. This approach tends to disconnect labour market participation and welfare regimes because much of employment is in the informal sector and not covered by social protection programmes.

Finally, a pathway of ST which may be labelled stalled structural change was also outlined by UNRISD that is evident in upper middle-income countries in Latin America which once followed import-substitution industrialisation and retained dualism. These countries have the economic structures of some capital-intensive sectors and low-productivity, self-employed, urban informal service sectors. In these countries, growth reduced poverty to some extent, but structural change is stagnant, welfare regimes and labour markets remain segmented, and high levels of income inequality and unemployment or underemployment persist.

This characterisation illustrates the heterogeneity of ST experiences in the developing world. If we assume that the industrialisation pathway of ST is the preferable route in principle, then we can identify a set of varieties of industrialisation. This is what we do in the following section.

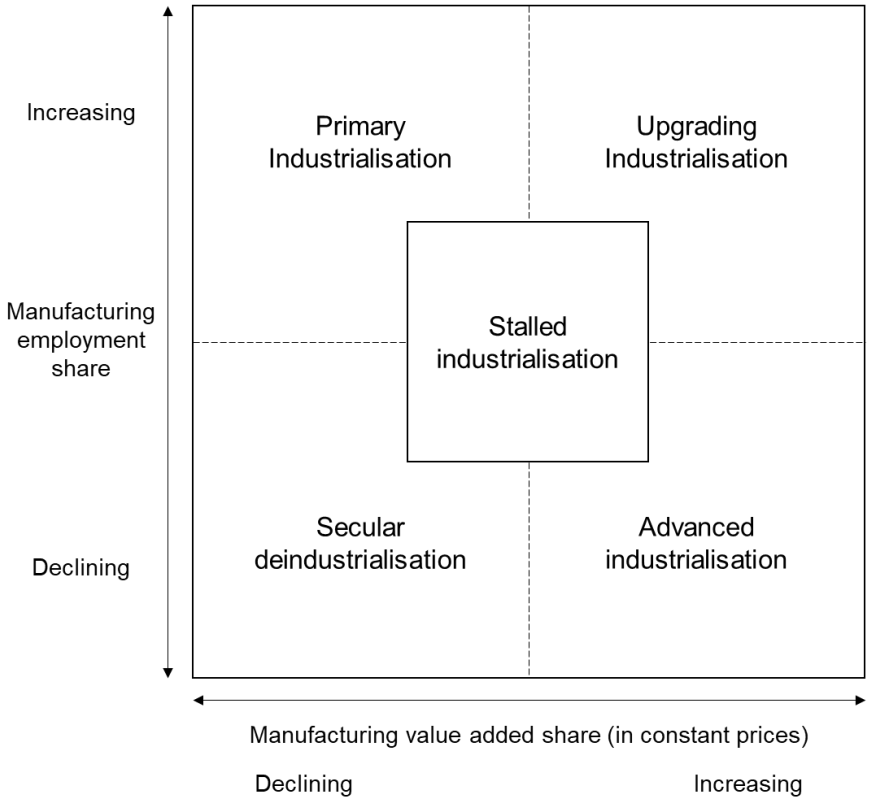
3. A NEW TYPOLOGY OF INDUSTRIALISATION

Based on the changes in manufacturing value added and employment shares, we categorise countries' *industrialisation* patterns between 1990 and 2010 into five types. We name these varieties of industrialisation as follows: 'primary industrialisation,' 'upgrading industrialisation,' 'advanced industrialisation,' 'stalled industrialisation,' and 'secular deindustrialisation' (Figure 1). We demonstrate how the recent industrialisation experience of four large middle-income countries (namely China, India, Brazil, and Indonesia) and one successful industrialiser and a high-income country since 2001 (South Korea) fit into these varieties.[1] We present an indicative country case for each variety using the Groningen Growth

[1] Of the countries included in the GGDC 10-sector database, these four countries are the largest middle-income countries in terms of GDP in purchasing power parity in 2017. South

and Development Centre (GGDC) 10-sector database (version 2015). In each case, five-year moving averages of manufacturing value added (in 2005 constant prices) and employment shares are used in order to smooth out annual fluctuations and find meaningful trends. The shares mentioned in the text of this paper are also five-year moving averages. For each country case, a graph showing manufacturing labour productivity (in 2005 constant prices and constant exchange rates) relative to the United States is also presented. The categorisation has been constructed based on the recent *direction of changes* in the manufacturing shares and not on the absolute *levels* of those shares. Therefore, a country with a lower manufacturing share may be categorised as going through industrialisation whereas a country with a higher manufacturing share may be categorised as experiencing deindustrialisation.

Figure 1. The five varieties of industrialisation

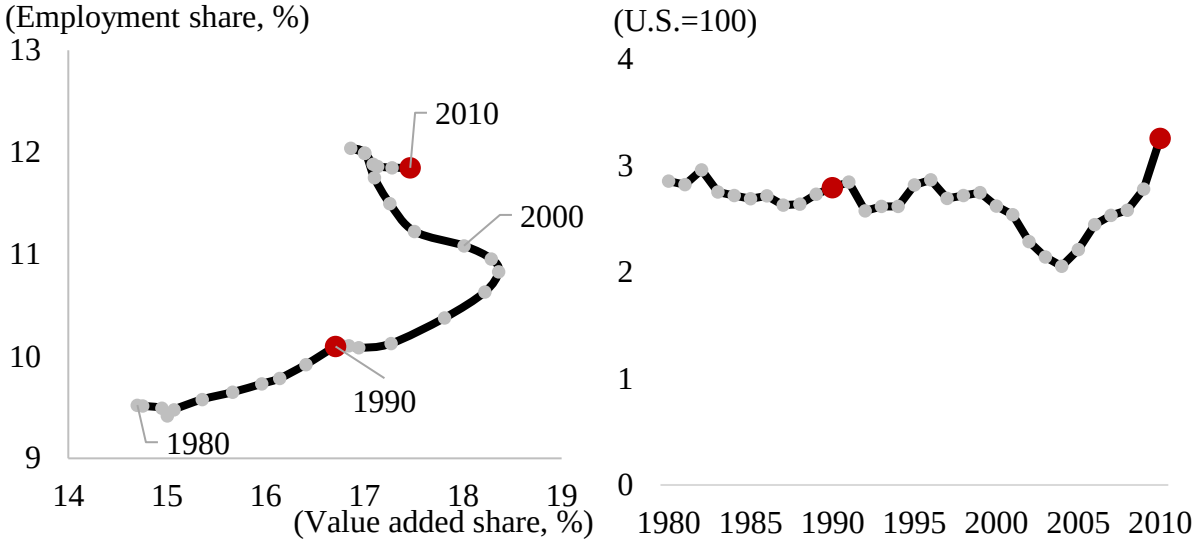


Korea first became a high-income country in 1995, but fell back into the upper-middle income category in 1998 as the economy experienced the Asian financial crisis.

3a. Primary industrialisation: India (Figure 2)

India's manufacturing value added share rose between 1980 and 1998, yet this increase was not dramatic. Similarly, the manufacturing employment share displayed a steady yet small increase during this period. On annual average, the value added and employment shares increased a mere 0.20 percentage points and 0.07 percentage points, respectively. Then from the late 1990s, the manufacturing value added share reversed its course and declined, followed by a stagnation at around 17% in the second half of the 2000s. In contrast, the manufacturing employment share continued to rise gradually until the mid-2000s and then stayed at around 12% in the second half of the 2000s. As a result of these trends, India's industrialisation between 1990 and 2010 was more about employment shares than about value added shares. India's relative manufacturing productivity did not show any meaningful trends during the 1980s and 1990s. It then declined during the first half of the 2000s, followed by a recovery in the second half of the 2000s. It was at 3.3% of U.S. manufacturing productivity in 2010.

Figure 2. India's manufacturing share (left) and manufacturing labour productivity (right)



Source: GGDC 10-sector database (Version 2015); IMF World Economic Outlook

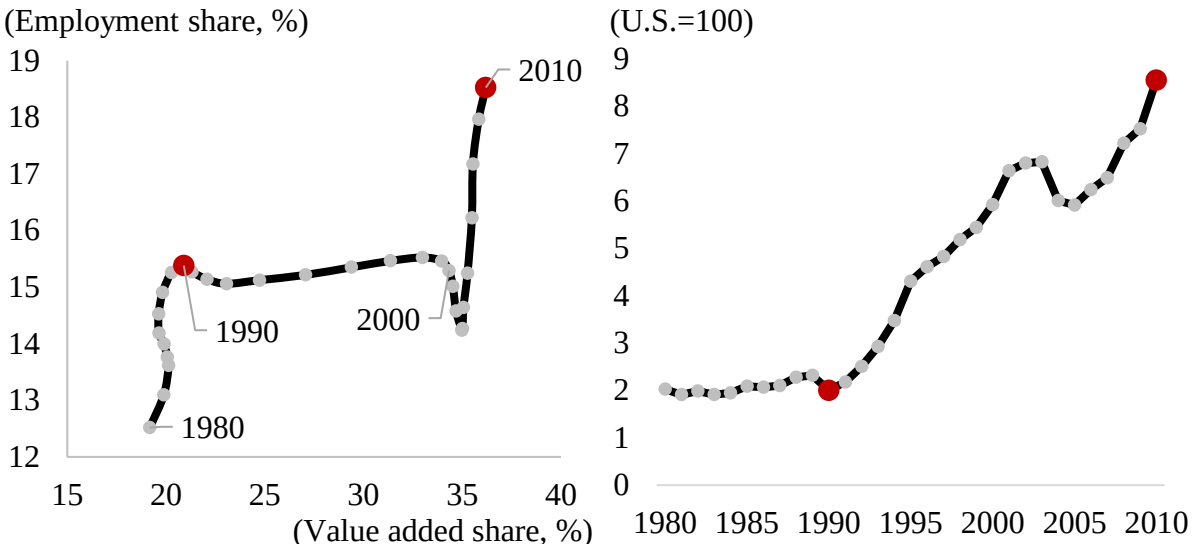
3b. Upgrading industrialisation: China (Figure 3)

China's manufacturing value added share was maintained at around 20% in the 1980s and then increased dramatically during the 1990s. The share jumped from 20.9% in 1990 to 34.3% in 2000, and then it grew more moderately to 36.2% in 2010. In the case of manufacturing employment share, sudden spurts occurred during the 1980s and 2000s. As a result of these trends, both manufacturing value added and employment shares were substantially higher in 2010 compared to 1990. China's relative manufacturing productivity also increased significantly during this period. After staying at around 2% of U.S. manufacturing productivity during the 1980s, it more than quadrupled between 1990 and 2010, reaching 8.6%.

3c. Advanced industrialisation: South Korea (Figure 4)

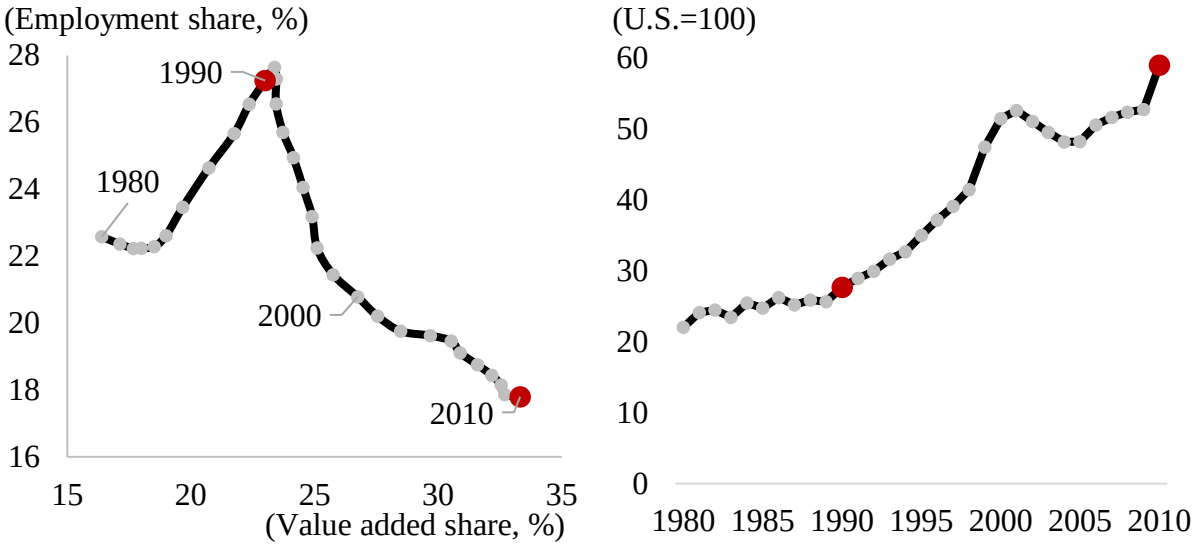
Korea's manufacturing value added and employment shares both grew notably during the 1980s. Beginning in the early 1990s, while the increasing trend of value added share continued, that of employment share was reversed. Changes in both shares between 1990 and 2010 were substantial, with the value added share increasing by 10.3 percentage points, and the employment share declining by 9.4 percentage points. This pattern suggests a significant shift of the manufacturing sector from labour-intensive activities to capital-intensive activities. During this period, Korea's relative manufacturing productivity more than doubled, reaching 58.9% of U.S. manufacturing productivity in 2010.

Figure 3. China's manufacturing share (left) and manufacturing labour productivity (right)



Source: GGDC 10-sector database (Version 2015); IMF World Economic Outlook

Figure 4. South Korea's manufacturing share (left) and manufacturing labour productivity (right)



Source: GGDC 10-sector database (Version 2015); IMF World Economic Outlook

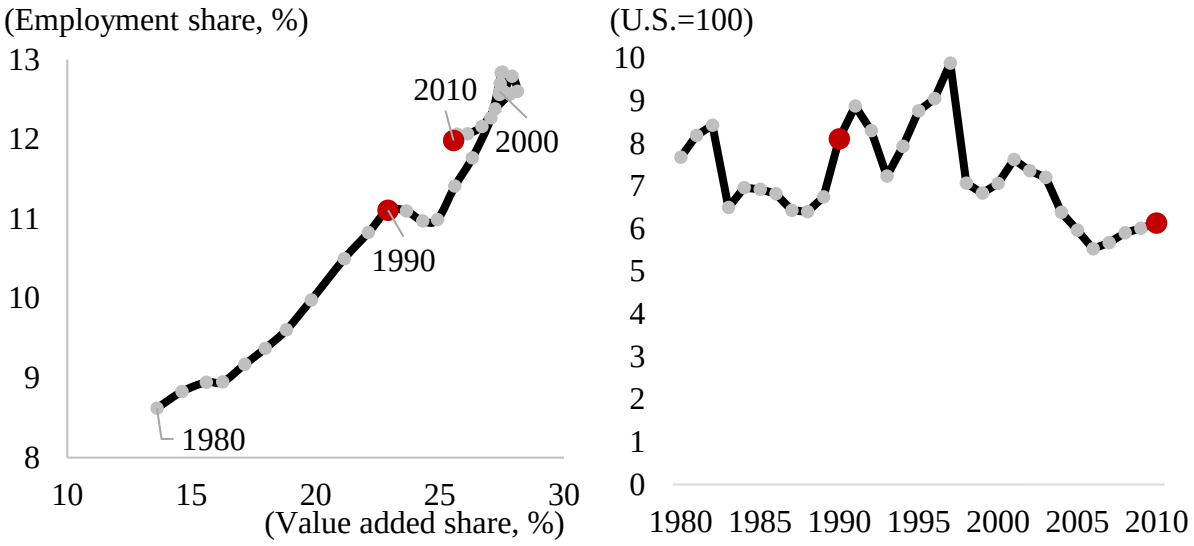
3d. Stalled industrialisation: Indonesia (Figure 5)

Indonesia experienced a rapid increase in the manufacturing value added and employment shares in the 1980s and 1990s. The initial driver was labour-intensive manufacturing. In the 1990s, following this initial driver, signs emerged of the sector moving towards higher value-adding activities. The relative manufacturing productivity, which stagnated for much of the 1980s, showed a notable improvement during the mid-1990s and reached 9.9% of U.S. manufacturing productivity in 1997. However, the increasing trend of manufacturing value added and employment shares suddenly stopped in the late 1990s. The shares stagnated during the first half of the 2000s then began declining in the mid-2000s. As a result, the shares in 2010 were similar to those in the mid-1990s. After 1997, the relative manufacturing productivity declined notably, falling to 6.1% of U.S. manufacturing productivity in 2010.

3e. Secular deindustrialisation: Brazil (Figure 6)

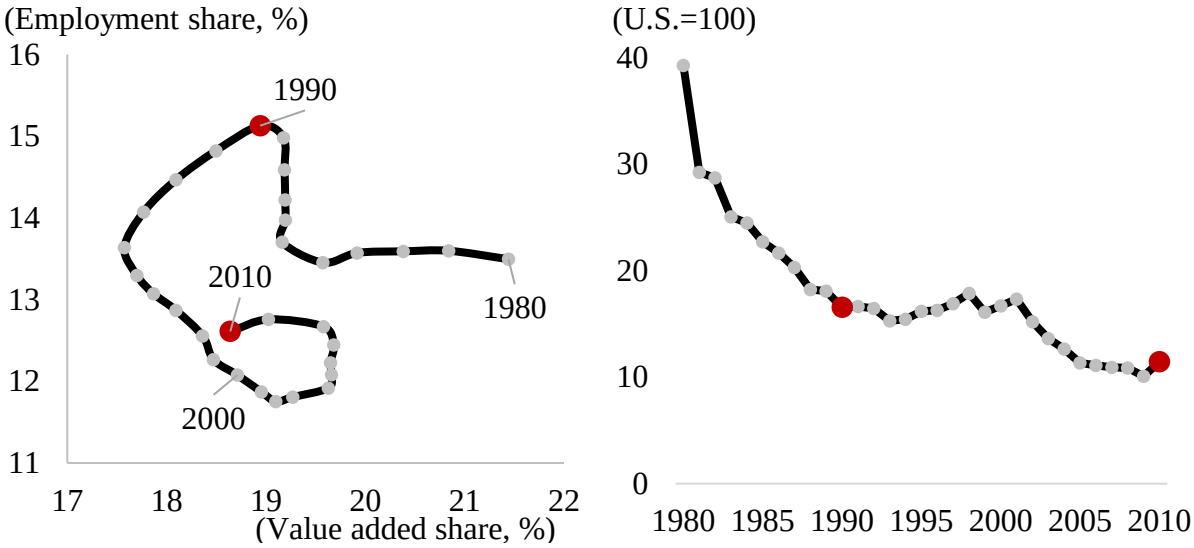
Brazil experienced a visible decline in the manufacturing value added share in the first half of the 1980s, followed by an increase in the employment share in the second half of the 1980s. Between 1990 and 2010, the changes in manufacturing value added and employment shares showed varied patterns over time, but the shares generally declined, with both shares lower in 2010 than in 1990. A large decline in the value added share during the early 1990s was recovered in the following decade, but the share declined again during the second half of the 2000s. The decline in employment share was more unidirectional during the 1990s, and then the share hovered around 12% during the 2000s. Brazil's relative manufacturing productivity stagnated during the 1990s after a substantial decline in the previous decade. It began declining again in the early 2000s and was recorded at 11.4% of U.S. manufacturing productivity in 2010.

Figure 5. Indonesia's manufacturing share (left) and manufacturing labour productivity (right)



Source: GGDC 10-sector database (Version 2015); IMF World Economic Outlook

Figure 6. Brazil's manufacturing share (left) and manufacturing labour productivity (right)



Source: GGDC 10-sector database (Version 2015); IMF World Economic Outlook

4. Discussion

4a. Comparison of varieties of industrialisation

Country classifications for economic development analyses need to integrate countries' diverse industrialisation experiences. A comparison of varieties of industrialisation demonstrates that countries in the same income group, such as India and Indonesia, or China and Brazil, face significantly different challenges in invigorating structural transformation and advancing development (Table 1). Indonesia's manufacturing value added and employment shares have both peaked whereas India's employment share has not. Brazil's manufacturing value added and employment shares have also both peaked whereas China's shares have not.

Comparing developing countries' industrialisation trends allows us to understand the causal pathways from independent variables such as factor endowment, geography, and economic policies to the level of economic development. Placing the current economic structures and productivity levels in the context of industrialisation experience is particularly important. For example, while India and Brazil recorded similar manufacturing shares in 2010, Table 1 (row 3) shows that these two countries are at different points in their industrialisation paths. Also, while Brazil had higher manufacturing labour productivity than China in 2010, China is expected to catch up and overtake Brazil soon considering the recent trends. Thorough analyses of the industrialisation experience are also vital in devising policies that focus on the 'productionist' aspects of development.

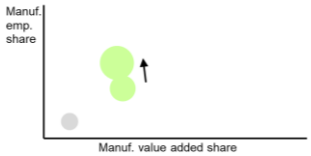
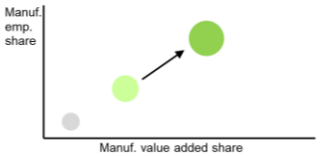
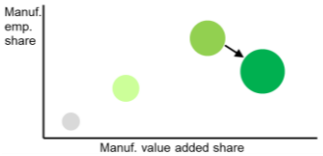
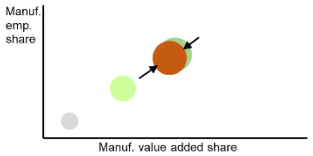
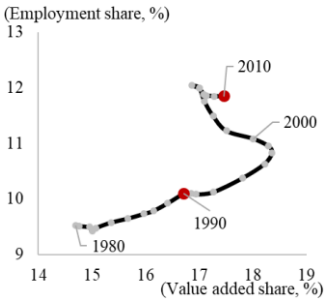
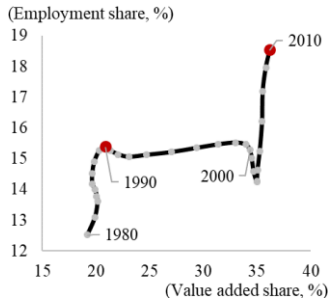
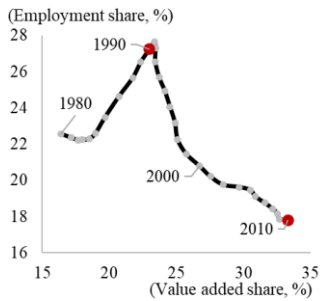
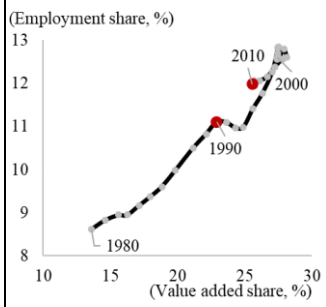
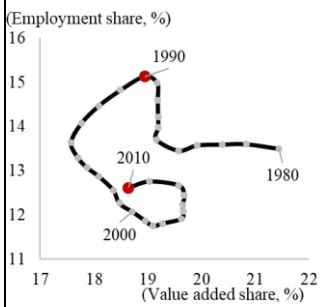
While the comparison in Table 1 focuses on manufacturing value added and employment shares and relative manufacturing labour productivity, it could be extended to include other variables for refining the typology of industrialisation. Comparing variables

such as the skills and technology intensity of manufacturing activities (for example, see row 9), labour unit costs, and the level of participation in global value chains could reveal important information on different industrialisation pathways.

4b. Movements between different varieties of industrialisation

Korea is one of only a few late-developing countries that have successfully gone through the phases of primary industrialisation, upgrading industrialisation, and advanced industrialisation (Figure 7(a)). In this transition process, industrialisation is initially driven by a noticeable shift of labour into the manufacturing sector (primary industrialisation), which is later joined by a rapid productivity growth in the sector. After a sustained period in the manufacturing sector of labour and productivity growth (i.e., a phase of upgrading industrialisation), the former's role weakens while the latter's role strengthens as the country's manufacturing sector becomes concentrated in capital- and knowledge-intensive activities (i.e., enters a phase of advanced industrialisation).

Compared to such a smooth transition between industrialisation phases, today's many middle-income countries are on the verge of entering deindustrialisation (i.e., experiencing stalled industrialisation). One definition of 'premature deindustrialisation' (Rodrik 2016) that this paper provides is a developing country's structural transformation in which the industrial transition depicted in Figure 7(a) fails to develop. Countries experiencing premature deindustrialisation are economies that have seen a sustained decline in both manufacturing value added and employment shares (secular deindustrialisation) before reaching the phase of advanced industrialisation or even the phase of upgrading industrialisation, as depicted in Figure 7(b).

	Primary industrialisation	Upgrading industrialisation	Advanced industrialisation	Stalled industrialisation	Secular deindustrialisation
Abstract depiction					
Recent example	India 	China 	South Korea 	Indonesia 	Brazil 
Income group	Lower-middle	Upper-middle	High	Lower-middle	Upper-middle
Value added share	Peaked	Not peaked	Not peaked	Peaked	Peaked
Employment share	Not peaked	Not peaked	Peaked	Peaked	Peaked

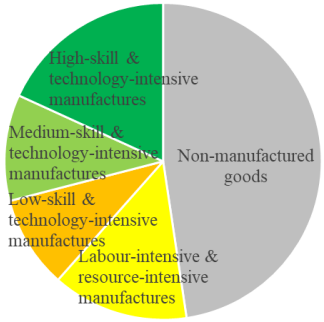
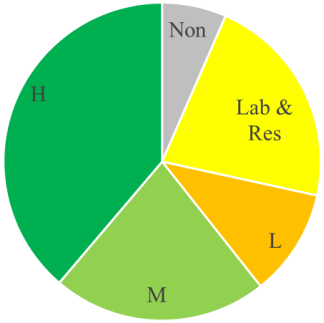
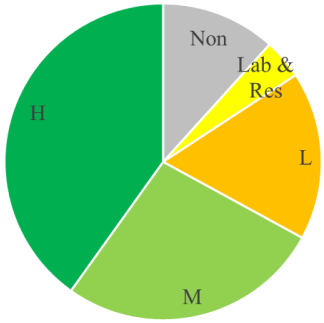
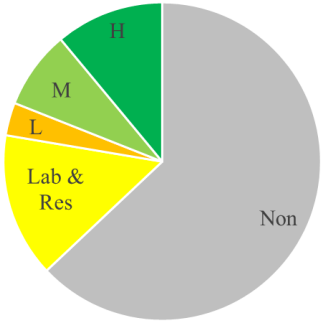
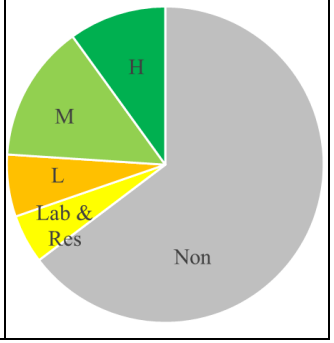
Relative manufacturing productivity (2010)	Very low	Low	Medium	Low	Low
Recent trend in relative manufacturing productivity	Stagnating	Increasing	Increasing	Declining	Declining
Export composition by degree of manufacturing (2010)					

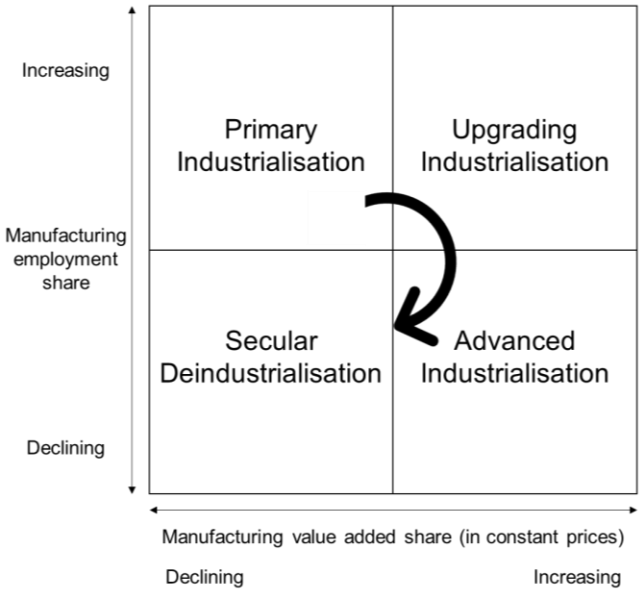
Table 1. Comparisons of the five varieties of industrialisation

Note: (i) Rows 5 and 6: If the value added or employment shares recorded the highest level since 1980 during 2005–2010 then the shares are regarded as 'not peaked'. If the highest shares were recorded during 1980–2004 then the shares are regarded as 'peaked'. (ii) Row 9: H = high-skill and technology-intensive manufactures; M = medium-skill and technology-intensive manufactures; L = low-skill and technology-intensive manufactures; Lab & Res = Labour-intensive and resource-intensive manufactures; Non = non-manufactured goods.

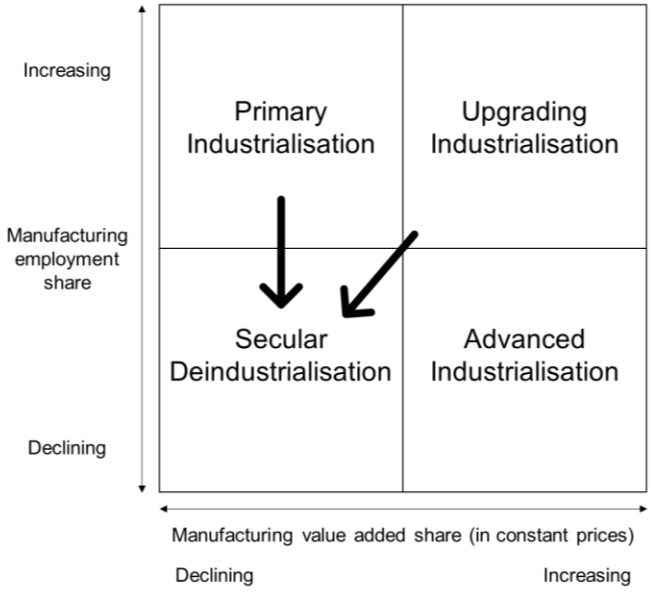
Source: GGDC 10-sector database (Version 2015); UNCTADstat

Figure 7. Paths of industrialisation

(a) Desirable industrialisation path



(b) Premature deindustrialisation path



Given these different industrialisation experiences and development stages, developing countries are expected to face diverse challenges in the coming decades. For India, the major challenge may be to sustain the labour-intensive primary industrialisation for some time in order to soak up the increasing labour force and devise a strategy to bring forward the transition to upgrading industrialisation. For China, the major goal may be to accelerate the process of upgrading industrialisation and prepare for the economic and social consequences of labour-intensive manufacturing phasing out as the country seeks to enter the phase of advanced industrialisation. For Indonesia, the challenge may be to return to the upgrading industrialisation that it experienced before the late 1990s. A failure to do so would mean the beginning of secular deindustrialisation. For Brazil, efforts may be made to shift the country towards advanced industrialisation while at the same time adopting a growth strategy focused on services. For Korea, now a high-income country, the major aims may be to close the technological gap separating it from the sophisticated manufacturing nations in order to delay entering the secular deindustrialisation phase and to continue searching for a source of employment in services.

5. Conclusions

In this short paper we have presented a new typology of industrialisation based on empirical experience. We have also provided indicative examples of each variety and compared varieties and discussed movements between different varieties over time. What next? Three avenues present themselves. The first would be to classify a larger group of countries into the five varieties as best possible (inevitably this classification will be imperfect) and identify similarities in the economic development challenges of countries within each group. This work will allow us to find a relationship between the varieties of industrialisation and the different stages of structural transformation (Baymul and Sen 2018). Second, a further angle would be to explore the distribution dynamics of each variety or the relationship between the different industrialisation patterns and variables that represent inclusive growth such as poverty, inequality, and employment growth. Finally, looking ahead to one key debate in economic development and developing countries, researchers could look at the potential different impacts of acceleration of automation on countries in different varieties in order to understand better the future challenges of middle-income countries.

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