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**The importance of manufacturing in economic development: Past, present  
and future perspectives**

**Wim Naudé and Adam Szirmai**

**Maastricht Economic and social Research institute on Innovation and Technology (UNU-MERIT)**  
email: [info@merit.unu.edu](mailto:info@merit.unu.edu) | website: <http://www.merit.unu.edu>

**Maastricht Graduate School of Governance (MGSoG)**  
email: [info-governance@maastrichtuniversity.nl](mailto:info-governance@maastrichtuniversity.nl) | website: <http://mgsog.merit.unu.edu>

Keizer Karelplein 19, 6211 TC Maastricht, The Netherlands  
Tel: (31) (43) 388 4400, Fax: (31) (43) 388 4499

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# The Importance of Manufacturing in Economic Development: Past, Present and Future Perspectives

Wim Naude\* and Adam Szirmai\*\*

## Abstract

The structural transformation of a traditional economy dominated by primary activities into a modern economy where high-productivity activities in manufacturing assume an important role remains a defining feature of economic development. The challenges to attain such structural transformation may be more daunting than in the past. Based on a recent UNU-WIDER/UNU-MERIT project on industrialization this paper discusses the past and present roles of the manufacturing sector in structural change and analyses new challenges facing industrial policy. New challenges discussed in the paper include: (i) integration into global value chains, (ii) the shrinking of policy space in the present international order, (iii) the rise of the Asian driver economies, (iv) new opportunities provided by resource-based industrialization, (v) the accelerating pace of technological change in manufacturing, (vi) how to deal with jobless growth in manufacturing, (vii) creating adequate systems of financial intermediation, and (viii) how to respond to the threats of global warming and climate change. We argue that structural transformation of developing countries requires a type of manufacturing sector development that can deliver high-quality employment, that is aligned with the international division of labour, and that would not lead to autarky, or a reversal of global gains in establishing openness in trade. Industrial policy can make valuable contributions in this regard if the lessons of the past and the challenges of the future are sufficiently taken into consideration.

Keywords: manufacturing, industrialization, growth, development, structural change, industrial policy

JEL classification: L60, O25, O40

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\* Professorial Fellow UNU-MERIT and Professor of Development Economics and Entrepreneurship, Maastricht School of Management, Maastricht, The Netherlands, email : [naude@merit.unu.edu](mailto:naude@merit.unu.edu)

\*\* Professorial Fellow, UNU-MERIT, Maastricht, The Netherlands, email: [szirmai@merit.unu.edu](mailto:szirmai@merit.unu.edu)

# **The Importance of Manufacturing in Economic Development: Past, Present and Future Perspectives<sup>1</sup>**

## **1. Introduction**

This paper is about the past, present, and future role of manufacturing in economic development. The structural transformation of economies from traditional to modern economies driven by high-productivity activities in manufacturing has been a defining feature of the ‘great takeoff’, that is to say the period since the mid-eighteenth century when first Britain, then other European countries and the USA underwent a historically rapid phase of economic development. It was followed in the twentieth century by Japan, the East Asian Tigers, and most recently China.

In the twenty-first century manufacturing development remains relevant for poor countries trying to catch up with more advanced economies and to provide increasing standards of living for their populations. Although the need for such ‘industrialization’ remains, the challenges are more daunting than in the past. The emergence of global value chains has affected the nature of international competition. The prominence of multi-national companies in the global economy influences access to knowledge and technology. The rise of China as a workplace of the world makes it harder for late industrializers to enter markets for manufactured products. Jobless growth in manufacturing may contribute to unemployment and social tensions. The challenge of climate change and global warming calls for new more sustainable patterns of production, innovation, and energy use.

In a setting where poor countries wish to catch up through manufacturing development, while advanced economies struggle to maintain their competitiveness in a manner consistent with a reduction in CO<sub>2</sub> emissions and growing resource scarcity, the vector of national and international policies chosen to influence the direction and pace of manufacturing growth across the world needs careful scrutiny. Such policies, subsumed under the term industrial policy (IP), and referring to the processes whereby governments aim to deliberately affect the structural

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<sup>1</sup> This paper is based on work the authors did in the context of a UNU-WIDER/UNU-MERIT and UNIDO workshop on “*Pathways to Industrialization in the 21<sup>st</sup> Century: New Challenges and Emerging Paradigms*”, held in Maastricht in October 2009. It will be included as two chapters in a forthcoming OUP volume with the same title as that of the conference. We thank the conference participants, as well as three anonymous referees for their sharp and helpful comments. The usual disclaimer applies.

characteristics of their economies, are among the central concerns in this book. Focusing on new challenges and emerging paradigms with respect to manufacturing, this paper makes a case for carefully designed, well-coordinated, and appropriate industrial policies aiming to guide and shape the structural transformations of the twenty-first century.

The case for industrial policy is not one that is made lightly. Although there has always been a strong theoretical case for industrial policy, based on market failures, the practical difficulties including the identification of firms and sectors to target, the threat of government failure, survival of inefficient firms, rent-seeking and misallocation of resources are considerable. Since the 1980s, these difficulties have generated a strong ideological opposition to industrial policy, especially with regard to more selective industrial policies<sup>2</sup>. But this may be changing. Ideological opposition to industrial policy is weakening, even in the USA.<sup>3</sup> Industrial policy has “like a phoenix, risen from the ashes” (Evenett 2006: 1; see also Johnson 2009). In the EU much greater attention is now being given to industrial policy in the light of climate change<sup>4</sup> and concerns about a shrinking manufacturing base. In recent times, many developing countries have adopted new industrial policies or industrial development frameworks, including Botswana, India, South Africa, Uganda, Ethiopia and countries in Latin America (Peres and Primi 2009; ul-Haque 2007; Rodrik 2007a). In the resurgence of industrial policy, there is a danger that the lessons from past policy failures are forgotten. In this paper we attempt to give careful

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<sup>2</sup> Industrial policies range from extremely selective to non-discretionary (functional) policies. Selective policies attempt to pick winners, supporting specific firms, industrial champions, conglomerates or investment projects. Functional policies do not ‘pick winners’ but promote the ‘competitiveness’ of the entire manufacturing sector, or even the entire supply side of the economy through educational investment, tax measures or deregulation. At the intermediate level of sectors or technologies, selective industrial policies attempt to ‘defy’ a country’s static comparative advantage and develop its ‘latent’ comparative advantage, for example through supporting selected industries through subsidies, tariffs, or quotas. Industrial policy as such is not limited to manufacturing. But in paper the focus is on the manufacturing sector.

<sup>3</sup> In the USA ‘the term industrial policy has been taboo within the leadership of both major parties for many decades, carrying the taint of planned-economy socialism’ (Pemberton 2008: 1).

<sup>4</sup> The Federal Government of Germany’s Ecological Industrial Policy of 2006 calls for an ‘ecological industrial policy that will adapt our industrial structures to the ecological and economic challenges.’ And in October 2009 the [European Trade Union Confederation](#) adopted a resolution calling for an ‘urgent need to launch the 3rd European industrial revolution based on green, sustainable and decent jobs’.

consideration to these past experiences with industrial policy focusing on lessons from successes as well as failures.

Given the potentially important role industrial policy can play in shaping manufacturing in the twenty-first century a number of questions need to be addressed:

- Is industrialization still the most important engine of growth in light of the rise of the service sector? To what extent should manufacturing be the main focus of industrial policy in developing countries?
- What are the recent patterns of structural change within manufacturing in the world economy?
- Is deindustrialization a threat to sustained economic development?
- What lessons can be learned from already successful industrializing countries in Asia?
- What lessons can be learned from past policy failures?
- What are the challenges facing industrial policy in Africa and Latin America?
- Can developing countries still industrialize after the rise of China?
- What about the least developed countries (LDCs)—can industrial policy be successful when good governance is lacking?
- How should industrial policy take global climate change into account?
- What are new directions and paradigms in thinking about industrial policy?
- How do the relationships between the state and entrepreneurs evolve across different stages of development and how does the nature of state-entrepreneurship relationships influence the choice of industrial policies?

The answers to these questions are explored—and further questions are raised—in the various sections that follow. We discuss manufacturing and structural change in the world economy in Sections 2 and 3. In Section 4 we analyze the challenges for industrial policy in greater detail. In Section 5 we draw on various contributions to the UNU-WIDER/UNU-MERIT/UNIDO project on industrialization to provide answers to the questions posed above. Section 6 concludes.

## 2. The Rise of Manufacturing

Major technological breakthroughs in textile production and the application of steam power to production in Britain in the second half of the eighteenth century made a deep impression on contemporary and later observers. In the nineteenth century the term *industrial revolution* was coined to describe these developments in retrospect.<sup>5</sup>

In many respects the term industrial revolution is misleading. It disregards the incremental nature of increases in productive capacity in the eighteenth century, the continuity with earlier developments in northwest Europe (in particular in the low countries) as well as the importance of developments in other sectors of the economy. Also, the acceleration of British productivity growth only started in the early nineteenth century, rather than in the eighteenth century as widely perceived (Maddison 1982, 2007a; Crafts 1983).

In other respects, industrial revolution remains an apt term. It captures the introduction of radically new production technologies which diffused across the globe and which have fundamentally affected the nature of global production. The emergence of modern manufacturing has led to dramatic changes in the structure of the world economy and to sustained increases in the growth of labour productivity and economic welfare (Maddison 2001, 2007a).

Britain was the first country to industrialize and it became the technological leader in the world economy. It was the exemplar for other countries. Manufacturing became the main engine of accelerating economic growth in the nineteenth century. A global race for industrialization had begun.

Industrialization should be seen as a single global process in which the industrial mode of production has diffused across the globe. Individual country experiences with industrialization can only be understood as part of this global and ongoing process of technological diffusion. But this does not mean that country experiences are identical. Individual countries follow different paths of industrial development depending on their initial conditions and the moment of their entry into the global race for industrialization (Pollard 1990). The first industrial followers were

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<sup>5</sup> In this paper the term ‘industrialization’ will henceforth refer to the increasing importance of manufacturing. In international standard industrial classification, the industrial sector also includes mining, utilities, and construction.

European countries such as Belgium, Switzerland, and France. Between 1815 and 1850, Belgium faithfully copied the British pattern of industrialization based on coal mining, engineering and textiles. It profited from rich mineral resources in the south of the country.<sup>6</sup> Switzerland was a landlocked economy with no coal, iron, or mineral resources and a limited internal market. It successfully concentrated on technologically-advanced products such as fine silks, embroidery, and watch making. France followed the British model, but with typical variations based on its own initial conditions. It focused more on high-quality and luxury goods, made more use of its artisanal and artistic skills and at the same time exploited its cheaper labour (Crafts 1977; Bergier 1983; Pollard 1990; Von Tunzelmann 1995).

In the nineteenth century, the USA followed a radically different path towards industrialization based on primary exports, abundance of land and natural resources, and scarcity of labour. Labour scarcity encouraged highly capital-intensive production techniques. In the nineteenth century, technology was taken over rapidly and creatively from the technological leader Britain and there was an inflow of skilled labour from Europe. Technological advance was labour-saving. Productivity growth in the USA was so rapid that it would overtake Britain by the end of the nineteenth century. The USA has retained its technological leadership ever since.

Famous latecomers to the process of industrialization were Germany, Russia, and Japan. As argued convincingly by Gerschenkron (1962), latecomers profit from the availability of modern technologies developed in the leading industrial economies, without bearing all the risks and costs involved in research and development (R&D). Gerschenkron referred to this as the 'advantages of backwardness'.<sup>7</sup> In modern economic terminology, latecomers profit from international technology spillovers. They do not pay for the full costs of R&D embodied in imported machinery<sup>8</sup>, equipment and inputs (rent spillovers) and they can learn about

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<sup>6</sup> The foundations for Belgian industrialization were laid when Belgium was still a part of the Kingdom of the Netherlands from 1815 until 1830.

<sup>7</sup> Earlier versions of this idea are to be found in the work of Veblen (1915) on imperial Germany and the Dutch historian Romein (1937), who both tended to stress the disadvantages of technological leadership and its associated danger of lock in into technological trajectories that could become obsolete.

<sup>8</sup> These costs include the costs of R&D of failed innovation projects, which did not result in commercialized products and processes.

international state of the art knowledge and technology through copying, imitating, reverse engineering, and scientific, professional and technological interaction (knowledge spillovers).

Gerschenkron reasoned that technological developments had increased the scale of manufacturing production in the nineteenth century. This required a larger scale of resource mobilization than before. Therefore, late industrialization would either not take place at all or it would be very dynamic. If the conditions were right and economic growth took off in a late developing country, it would take the form of a growth spurt. Productivity growth in the late developer would be much more rapid than in the technologically leading country and the late developer would start catching up.

According to Gerschenkron, the role of government policy and large financial conglomerates was more important in late industrialization than in early industrialization. The self-financing of firms, characteristic of early industrialization in Britain was incapable of raising sufficient resources to match the required scale of investment. Governments and financial institutions took over this role. They invested directly in industries and transport infrastructure. They played a crucial role in the mobilization of resources for investment and they were very active in education and technology acquisition.<sup>9</sup> Development-oriented governments set themselves the task of eliminating historical obstacles to industrialization and challenging the economic, political, and military dominance of the early industrializing countries.

What about the developing countries? From the middle of the nineteenth century onwards, the world economy had divided into industrial economies and agricultural economies (Lewis 1978a, 1978b; Maddison 2001, 2007a). Colonies and non-colonized countries in the tropics remained predominantly agrarian or mining economies, while the Western world and the Asian latecomer Japan industrialized. Industrial growth in the West created an increasing demand for primary products from developing countries. Technological advances in transport, infrastructure, and communication expanded the opportunities for trade. Thus, the colonial division of labour came

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<sup>9</sup> With the wave of mergers in the 1980s and 1990s, the role of government in resources mobilization has become again less important. The resources of the mega multi-national companies dwarf those of many of the smaller national states and they are able to mobilize financial resources for very large investment projects, without any public support. However, policy incentives for investment and innovation are more important than ever.

into being. Developing countries exported primary agricultural and mining products to the advanced economies. Industrial economies exported their finished manufactured goods to the developing countries. Industrialization became synonymous with wealth, economic development, technological leadership, political power, and international dominance. The very concept of development came to be associated with industrialization. Industrialization was rightly seen as the main engine of growth and development.

In developing countries, moves towards industrialization were scarce and hesitant. Towards the end of the nineteenth century, one finds such beginnings in Latin American countries such as Brazil, Argentina, Chile, and Mexico, and large Asian countries such as India and China.<sup>10</sup> But developing countries still remained predominantly dependent on agriculture and mining. Lewis (1978a, 1978b) has argued that the sheer profitability of primary exports was one of main reasons for the specialization of developing countries in primary production. But colonial policies also played a negative role. For instance, in India, textile manufacturing suffered severely from restrictive colonial policies which favoured production in Britain.

Whatever the reasons, the groundswell of global industrialization, which started in Britain in the eighteenth century, swept through Europe and the USA and reached Japan and Russia by the end of the nineteenth century, subsided after 1900 (Pollard 1990). With a few exceptions, developing countries were bypassed by industrialization. The exceptions were countries such as Argentina, Brazil and South Africa which profited from the collapse of world trade in the crisis years of the 1930s to build up their own manufacturing industries, providing early examples of successful import substitution. In Asia, China and India experienced some degree of industrialization in the late nineteenth century, but industrialization only took off after these countries freed themselves from colonial influences and external domination. On the whole, the developing world remained overwhelmingly oriented towards primary production.

This started to change in 1945. After a pause of 50 years developing countries rejoined the industrial race in the post-war period (e.g. Balance, Ansari, and Singer 1982). Since the Second World War, manufacturing has emerged as a major activity in many developing countries and the shape and structure of global manufacturing production and trade has changed

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<sup>10</sup> Around 1750, the Indian textile industry was producing around one quarter of global textile output (e.g. Roy 2004). However, the basis of production was more artisanal than industrial.

fundamentally. The colonial division of labour of the late nineteenth century has been stood on its head. Large parts of manufacturing have relocated to developing countries which supply industrial exports to the rich countries. Some developing countries have experienced a process of rapid catch-up which was invariably tied up with successful late industrialization (Szirmai 2008).

Table 1 summarizes catch up experiences since the nineteenth century. Very rapid growth is the norm in catch-up economies since 1950.

Per capita growth rates of GDP in the catch up economies vary from 5 to 9 per cent per year. GDP growth varies from 6 to 11.5 per cent. With the exception of recent trends in the Russian Federation, all examples of catch-up are associated with the widespread and rapid emergence of manufacturing. Industrialization appears to be a key driver of catch-up.

One of the most interesting results in Table 1 is the way catch-up has accelerated since the nineteenth century, due to increased globalization, greater possibilities for international technology transfer, and increasing advantages of backwardness. In the nineteenth century, GDP per capita in the catch up countries was growing at between 1.4 and 1.9 per cent per year, compared to the 5–9 per cent after 1950. The ratio of per capita GDP growth to that of the UK in the corresponding years prior to 1913 was between 1.3 and 2. After 1950, the catch up countries were growing on average three times as fast as the world leader USA.

### **3. The Emergence of Manufacturing in Developing Countries**

The tables 2 and 3 document the global development of manufacturing over the period 1950 to 2005. Table 2 presents shares of agriculture, industry, manufacturing and services for a sample of 29 larger developing countries and regional averages for a larger sample of in total 68 developing countries and 21 advanced economies. Table 3 presents more detailed trends in the share of manufacturing for the same 89 countries.

**Table 1: Catch-up since 1820**

Country	Period <sup>a</sup>	Growth of GDP	Growth of GDP per capita	Rate of catch-up <sup>b</sup>
<i>1820–13</i>				
USA	1820–1905	4.1	1.5	1.3
Germany	1880–1913	3.1	1.9	1.8
Russia	1900–1913	3.2	1.4	2.0
Japan	1870–1913	2.5	1.5	1.5
United Kingdom	1820–1913	2.0	1.1	
World average	1820–1913	1.5	0.9	
<i>1950–2003</i>				
China	1978–2006	8,1	6,9	3.6
West Germany	1950–1973	6,0	5,0	2.7
India	1994–2006	6,7	5,1	2.4
Indonesia	1967–1997	6,8	4,8	2.4
Ireland	1995–2006	6,2	6,2	2.8
Japan	1946–1973	9,3	8,0	3.6
Korea	1952–1997	8,2	6,3	3.0
Malaysia	1968–1997	7,5	5,1	2.6
Russia	1998–2005	7,2	7,2	3.9
Singapore	1960–1973	10,0	7,6	2.5
Taiwan	1962–1973	11,4	8,7	2.8
Thailand	1973–1996	7,6	5,8	3.2
Vietnam	1992–2005	7,6	6,1	2.9
World average	1950–1973	4,9	2,9	
World average	1973–1997	3,1	1,4	
World average	1997–2003	3,5	2,3	

Notes: <sup>a</sup> the periods have been chosen so as to maximize sustained high growth rates over an extended period, <sup>b</sup> ratio of growth of GDP per capita compared to growth in lead economy in corresponding period. Prior to 1913, the comparison is with the UK, after 1950 with the USA.

Sources: Country data 1990 and before, plus figures for world total from Maddison (2007b). Country data 1991-2006 and West Germany from: The Conference Board/GGDC (2007).

In 1950, 37 per cent of developing country GDP originated in the agricultural sector. The share of agriculture declined dramatically to 16 per cent in 2005. It is worth noting that the average share of services in 1950 was already 42 per cent of GDP, far higher than the total share of industry. Thus, the pattern of structural change in developing countries differs radically from the

traditional patterns of structural change, in which the rise of industry precedes that of the service sector. This is in line with the Gerschenkronian observation that latecomer patterns of structural change are not simple copies of earlier experiences.

In 1950, the average share of manufacturing in developing countries was only 12 per cent of GDP compared to 29 per cent in the advanced economies. 12 per cent is low in comparative perspective, but much higher than one would have expected for countries that are just embarking on a process of industrialization.<sup>11</sup> The only countries which really had negligible shares of manufacturing were Tanzania, Zambia, Nigeria, and Sri Lanka. Latin America was by far the most industrialized developing region in 1950.

The average share of manufacturing increased in all developing countries between 1950 and 1980, peaking at around 17.4 per cent in the early 1980s. China and Taiwan are the extreme cases with manufacturing accounting for 40, respectively 36 per cent of GDP in 1980. Between 1980 and 2005, the share of manufacturing remained high and stable in many Asian economies, but there were processes of deindustrialization in Latin America and Sub-Saharan Africa (SSA). This was most marked in Latin American countries where the average share of manufacturing declined from 20 per cent in 1980 to 15 per cent in 2005. In SSA the shares of manufacturing also declined by some two percentage points to 10 per cent in 2005. In the advanced economies, the share of manufacturing plummeted from 29.4 per cent in 1950 to 16 per cent in 2005. In 2005, the most important sector is the service sector, accounting for around 71 per cent of GDP, up from 44.6 per cent in 1950.

In comparative perspective we observe a long-run net increase in the shares of manufacturing in developing countries and a long-run net contraction in the shares of manufacturing in the advanced economies. By 2005, the average share of manufacturing in the developing world is only slightly lower than that in the advanced economies (15.2 against 16.1 per cent). The share in Asia is substantially higher than in the advanced economies.

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<sup>11</sup> It is likely that the early national accounts for developing countries focus on the formal sector and thus will exaggerate the share of manufacturing. They tend to underestimate informal activities and the agricultural sectors, even though several of the national accounts present estimates for the non-monetary sectors.

**Table 2: Structure of production, 1950–2005***(Gross value added in agriculture, industry, and services as percentage of GDP at current prices, selected countries and regional averages)*

	1950 <sup>a</sup>				1960 <sup>b</sup>				1980				2005 <sup>c</sup>			
	AG	IND	MA	SERV	AG	IND	MAN	SERV	AG	IND	MAN	SERV	AG	IND	MAN	SERV
Bangladesh <sup>d</sup>	61	7	7	32	57	7	5	36	32	21	14	48	20	27	17	53
China	51	21	14	29	39	32	27	29	30	49	40	21	13	48	34	40
India	55	14	10	31	43	20	14	38	36	25	17	40	18	28	16	54
Indonesia	58	9	7	33	51	15	9	33	24	42	13	34	13	47	28	40
Malaysia	40	19	11	41	35	20	8	46	23	41	22	36	8	50	30	42
Pakistan	61	7	7	32	46	16	12	38	30	25	16	46	21	27	19	51
Philippines	42	17	8	41	26	28	20	47	25	39	26	36	14	32	23	54
South Korea	47	13	9	41	35	16	10	48	16	37	24	47	3	40	28	56
Sri Lanka	46	12	4	42	32	20	15	48	28	30	18	43	17	27	15	56
Taiwan	34	22	15	45	29	27	19	44	8	46	36	46	2	26	22	72
Thailand	48	15	12	37	36	19	13	45	23	29	22	48	10	44	35	46
Turkey	49	16	11	35	42	22	13	36	27	20	17	54	11	27	22	63
Argentina	16	33	23	52	17	39	32	44	6	41	29	52	9	36	23	55
Brazil	24	24	19	52	21	37	30	42	11	44	33	45	6	30	18	64
Chile	15	26	17	59	12	41	25	47	7	37	22	55	4	42	16	53
Colombia	35	17	13	48	32	23	16	46	20	32	24	48	12	34	16	53
Mexico	20	21	17	59	16	21	15	64	9	34	22	57	4	26	18	70
Peru	37	28	15	35	21	32	20	47	12	43	20	45	7	35	16	58
Venezuela	8	48	11	45	7	43	11	50	6	46	16	49	4	55	18	40

	1950 <sup>a</sup>				1960 <sup>b</sup>				1980				2005 <sup>c</sup>			
	AG	IND	MAN	SERV	AG	IND	MAN	SERV	AG	IND	MAN	SERV	AG	IND	MAN	SERV
Congo, Dem. R.	31	34	9	35					27	35	15	38	46	27	7	28
Côte d'Ivoire	48	13		39	48	13		39	26	20	13	54	23	26	19	51
Egypt	44	12	8	44	30	24	14	46	18	37	12	45	15	36	17	49
Ghana	41	10		49	41	10		49	58	12	8	30	37	25	9	37
Kenya	44	17	11	39	38	18	9	44	33	21	13	47	27	19	12	54
Morocco	37	30	15	33	32	26	13	42	18	31	17	50	13	29	17	58
Nigeria	68	10	2	22	64	8	4	28	21	46	8	34	23	57	4	20
South Africa	19	35	16	47	11	38	20	51	6	48	22	45	3	31	19	67
Tanzania	62	9	3	20	61	9	4	30			12		46	17	7	37
Zambia	9	71	3	19	12	67	4	21	15	42	19	43	23	30	11	47
Averages																
Asia (15)	49	14	10	36	37	22	14	41	23	33	22	44	14	33	22	53
Latin America (25)	29	25	15	46	23	29	17	48	16	32	20	51	10	31	15	59
Middle East and North Africa (10)	31	23	9	46	23	27	11	49	12	39	14	49	11	33	13	52
Africa (18)	43	22	11	34	42	21	8	37	29	28	12	43	28	27	10	45
Developing countries (68)	37	22	12	42	31	25	13	44	21	32	17	47	16	31	15	53
Advanced economies (21)	16	40	29	45	12	41	30	47	4	35	23	60	2	27	16	71

#### Notes

<sup>a</sup> Earliest year for which data are available: 1950, except for Morocco, Taiwan and Thailand, 1951; China and Tanzania, 1952; South Korea, 1953; Malaysia and Zambia, 1955; Ghana, Ivory Coast, 1960. Belgium, 1953, West Germany, Italy, and Norway, 1951, Japan, 1952; <sup>b</sup> China, 1962, proportions for 1960 not representative due to collapse of agriculture in great leap forward 1958–60; Morocco, 1965, manufacturing share Tanzania, 1961; <sup>c</sup> Canada 2003 instead of 2005, Venezuela 2004, <sup>d</sup> Bangladesh 1950–59, same data as Pakistan.

Source: Szirmai (2009), <http://www.merit.unu.edu/publications/wppdf/2009/wp2009-010.pdf>. This reference provides detailed source notes for the original sources used in this table.

**Table 3: Shares of manufacturing in GDP in developing countries, 1950–2005**

(at current prices)

	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005
Average 15 Asian countries	9.8	12.0	14.3	15.9	18.9	19.9	22.1	21.7	20.8	20.8	21.7	22.0
Average 25 Latin America countries	14.7	15.2	16.6	18.0	19.2	20.1	19.9	19.6	18.7	17.0	16.4	15.4
Average 10 Middle East and North Africa	8.6	9.0	11.0	10.8	11.7	13.2	13.8	12.6	16.3	14.8	13.1	13.3
Average 18 African countries	10.9	8.7	8.3	9.9	10.7	11.5	11.7	11.8	12.9	11.1	10.7	10.0
Average 68 developing countries	12.1	12.4	13.2	14.3	15.8	16.8	17.4	17.1	17.3	16.0	15.6	15.2
Average 21 advanced economies	29.4	30.0	30.3	31.0	27.4	25.0	22.9	21.7	20.6	19.3	18.2	16.1

Source: Szirmai (2009b), <http://www.merit.unu.edu/publications/wpdf/2009/wp2009-010.pdf>. This reference provides detailed source notes for the original sources used in this table, as well as the original country data for 89 countries.

There is no doubt that in the long-run all economies are becoming more service-oriented. But statistics tend to exaggerate the increase in the shares of services for two reasons: outsourcing and price effects. First, many services which used to be produced in-house by manufacturing establishments—catering, financial accounting, transport and logistics, programming, consultancy, warehousing, distribution—have now been outsourced and are registered as service activities. Next, the price of services has tended to increase more rapidly than that of manufacturing goods. At constant prices, the share of services will be lower than at current prices.

The net increase in the share of manufacturing in developing country value added and the net decline in the advanced economies expresses itself in an increasing share of developing countries in global manufacturing value added (see Table 4). In current prices, the share of developing countries increased from 13.7 per cent in 1980 to no less 32 per cent in 2007. Most of this change is due to a single country, China, which experienced an astonishing industrial transformation increasing its share in global value added from less than 2 to 13 per cent. The rest of the increase is generated in South and Southeast Asia. Latin America was the early manufacturing leader in the developing world, but its shares in global output have not changed

since the 1980s. The shares of Africa and West Asia are insignificant and show little or no change.

One should realize that these estimates, derived from UNIDO sources, seriously underestimate the share of developing countries in global value added, because they are calculated using exchange rates. A series of studies at the Groningen Growth and Development Centre show that industry of origin based unit value ratios in developing countries are often between 75 per cent and half of the exchange rates (e.g. Szirmai 1994; Szirmai and Ren 2000; Szirmai, Prins, and Schulte 2001; Yamfwa and Szirmai 2002). If similar patterns apply in 2007, the share of developing countries in global value added could well exceed 50 per cent.<sup>12</sup>

The change in the global structure of manufacturing is also manifest in Table 5, where developing countries have increased their world exports of manufactured goods from a marginal 5.9 per cent in 1963 to 30.9 per cent in 2005. Most of the increase is again generated in Asia, and in this case not exclusively in China. Note that the figure of 30.9 per cent includes exports from Hong Kong, Taiwan, South Korea and Singapore, which in recent years have been classified as high-income economies. What is interesting in Table 5 is that in 2005 two thirds of all manufactured exports still originate in the advanced economies (excluding the Asian Tigers). This runs counter to the common perception that South east Asia has cornered the world market in manufactured exports.

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<sup>12</sup> The unit values tend to converge on the exchange rates as GDP per capita becomes higher. So, the adjustments for the richer developing countries would tend to be smaller than for the poorest ones.

**Table 4:**  
**Developing country shares in world manufacturing value added, 1960–2007<sup>a</sup>**

	Africa	West Asia and Europe	South and East Asia, excl. China	China	Latin America	Developing countries
<i>Excluding China (constant 1990 prices)</i>						
1960 <sup>a</sup>	0.8	0.7	1.8		4.9	7.9
1970 <sup>a</sup>	0.8	1.3	2.4		6.0	10.5
1980	0.9	1.7	3.7		6.9	13.2
1990	0.9	2.0	6.2		5.5	14.6
2000	1.0	2.2	9.4		5.5	18.0
2004	1.1	2.4	10.8		5.3	19.6
<i>Including China (constant 1990 prices)</i>						
1980	0.9	1.7	3.6	1.4	6.8	14.4
1990	0.9	1.9	6.0	2.6	5.4	16.8
2000	0.9	2.1	8.8	6.6	5.2	23.6
2004	1.0	2.2	10.0	8.5	4.9	26.6
<i>Including China (current prices prices)</i>						
1980 <sup>b</sup>	0.9	1.6	2.4	1.7	7.1	13.7
1990	0.9	1.8	3.5	2.6	5.6	14.4
2000	0.9	1.2	8.4	6.7	6.6	23.8
2002	0.9	1.2	8.9	8.2	5.6	24.8
2005	0.8	1.6	9.7	10.0	5.9	28.0
2007 <sup>c</sup>	0.9	1.7	9.4	12.9	7.0	31.9

Notes:

<sup>a</sup> Extrapolated using the ratio of the shares of 1960 and 1970 to 1980 at 1980 constant prices; <sup>b</sup> China 1980 calculated using China South East Asia ratio for 1990; <sup>c</sup> the data for South and East Asia 2007 exclude those South Korea and Singapore. We have reincluded them for reasons of consistency with the earlier data. Korea and Singapore account for around 2.5 per cent of world value added.

The UNIDO data for 2006 and 2007 no longer distinguish West Asia from Asia. Europe is added as a special category.

Using ratios from the previous years, we have estimated figures for West Asia including Europe and South and Southeast Asia.

Source: Szirmai (2009), <http://www.merit.unu.edu/publications/wppdf/2009/wp2009-010.pdf>. Original Sources: Gosh, P.L. (1984); UNIDO, *Handbook of Industrial Statistics* 1990, 1999; UNIDO, *International Yearbook of Industrial Statistics*, various issues.

**Table 5: Share of developing countries in world manufactured exports, 1963–2005**

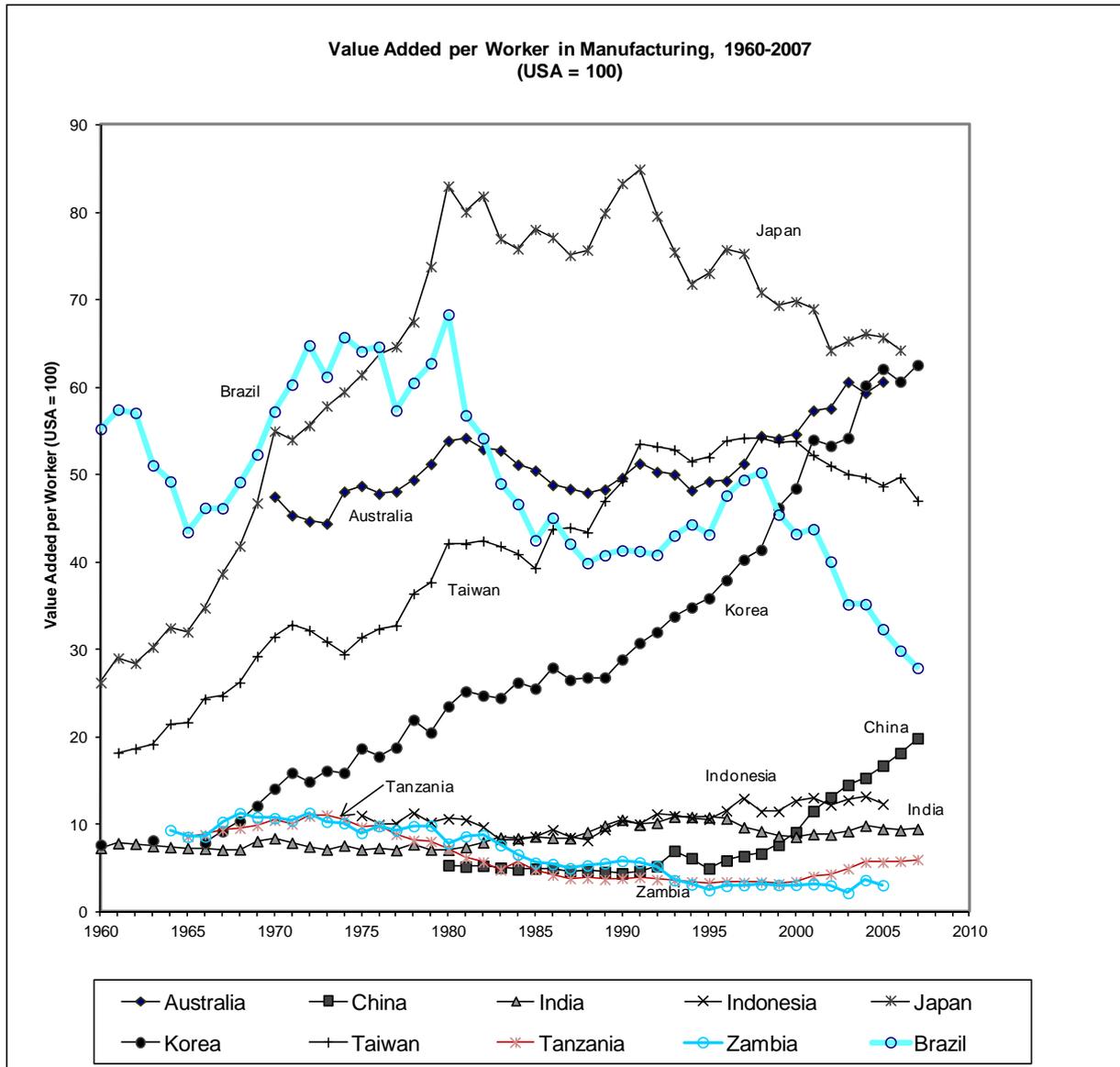
	1963	1973	1983	1993	2000	2005 <sup>c</sup>
Asia (excl. advanced economies)	2.6	3.9	7.0	14.8	18.9	25.0
China				2.6	4.5	9.4
India	0.7	0.4	0.4	0.6	0.7	1.0
Latin America	0.8	1.6	1.7	2.7	3.6	3.8
Brazil	0.05	0.3	0.7	0.8	0.7	0.8
Argentina	0.1	0.2	0.1	0.2	0.2	0.2
Mexico	0.2	0.3	0.2	1.4	2.9	2.2
Africa, incl. South Africa	1.3	1.2	0.7	0.9	0.9	0.8
South Africa <sup>a</sup>	0.6	0.6	0.3	0.4	0.3	0.4
Middle East	0.1	0.3	1.2	0.6	0.6	0.9
Developing economies <sup>b</sup>	5.9	8.8	14.5	20.5	23.8	30.9
Advanced economies	75.3	79.0	69.5	75.3	69.3	66.4

Sources: WTO *International Trade Statistics* (2001: 31); WTO *Annual Report 1997*, Volume 2: 22  
*WDI CDROM*, 2002; WDI online, downloaded February 2012.

Note: <sup>a</sup>Prior to 1993 South Africa refers to South African Customs Union; <sup>b</sup>Developing economies excluding former Soviet Asian Republics and Economies in Transition; <sup>c</sup> In recent years, Hong Kong, Taiwan, South Korea and Singapore are classified as high income economies. In the past they were developing economies and are therefore still included in the table as developing economies. Excluding these countries from developing Asia and developing economies total in 2005 results in much lower shares: 15.4 per cent for Asia and 21.3 for developing economies.

Finally, Figure 1 provides a first impression of catch-up and falling behind in manufacturing for a selected number of countries in the post-war period.

**Figure 1: Comparative productivity trends, 1960–2007**



Source: Szirmai (2009), updated 2005-2007. Authors' calculations from Groningen Growth and Development Centre, 10-sector data data-base and EUKLEMS database and GGDC country working papers. For detailed sources see Szirmai (2012), [www.dynamicsofdevelopment.com](http://www.dynamicsofdevelopment.com), figure 4.1

Figure 1 uses binary industry of origin unit value ratios to convert value added into US\$ for benchmark years. The productivity gaps for the benchmark years are subsequently extrapolated

using time series of employment and constant price value added. This provides a rough picture of comparative productivity trends—value added per person engaged—relative to the USA.

This figure highlights a number of important trends:

- Japan has experienced a spectacular period of catch up reaching 90 per cent of US productivity levels around 1990. But it then falls back, being unable to make a sustained shift from imitation to innovation at the technological frontier.
- Korea starts at low levels of productivity similar to those of the African countries Tanzania and Zambia, but achieves dramatic productivity catch-up, as does Taiwan, starting from a slightly higher level.
- Comparative productivity in the African economies of Zambia and Tanzania declines in line with the dismal manufacturing performance of Africa in general.
- Brazil experiences very high levels of comparative productivity till 1982, but after the debt crisis and the lost decade of the 1980s, its productivity performance plummets from a peak of 65 per cent of the US level to around 25 per cent in 2003. The lost decade had similar impacts on industrial development in other Latin American countries.
- China starts at extremely low levels of comparative productivity in the 1980s—around 5 per cent of US productivity, even lower than the African economies. It dramatically improves its performance since the mid-1990s, reaching 20 per cent of the US level in 2007. However, China remains a highly labour-intensive economy and it will still take a long period of sustained high productivity growth before it comes close to overtaking the productivity leader, the USA.

#### **4. The Policy Challenge in the Twenty-First Century**

The previous sections discussed the role of manufacturing in the structural transformation and catch-up of emerging economies. However, many countries are still industrially lagging. Here manufacturing plays a relatively minor role, and the sector is often stagnating. In yet other countries, earlier gains in manufacturing are under threat. To understand these features we need to understand the relationship between manufacturing development and policies. Two main points that are elaborated in this section are that (i) there have been, and still are, a variety of

policy approaches towards promoting manufacturing development – and quite some disagreements about the relative merits of these various approaches; and (ii) that any lessons one may learn from past manufacturing experiences, needs to take into account new challenges and paradigms. We discuss these in 4.1 and 4.2 below.

#### ***4.1 A variety of industrial policies and paradigms***

The aggregate trends in manufacturing performance discussed in Sections 2 and 3 obscure the variety of industrial experiences at the country level. These experiences are not only heterogeneous across countries, but also across policy choices and across time. Overall, it is clear that successful industrialization was rarely the result of accident or the unfettered operation of free markets. A variety of experiences attest to a pro-active role for industrial policy.

Perhaps the most famous case of industrialization is that of the (First) Industrial Revolution that took place in the UK in the eighteenth century, already mentioned in Section 2. The common perception of this period is that the role of the government and government policy was limited. Indeed the share of public expenditure in GDP was much lower than in the period since 1950. However, the Industrial Revolution was not just the fortunate outcome of the operation of free markets. Robinson (2009: 3) is even of the opinion that the Industrial Revolution was the result of “the mother of all industrial policies” ... “a vector of policies which probably constitute one of the world’s most successful, and most consequential industrial policies”.

Chang (2009) discusses the Walpole government’s comprehensive infant industry protection program that was implemented in 1721. Furthermore, the British government prohibited the exports of capital goods from the UK until 1843, and the emigration of skilled artisans until 1824, in order to protect and stimulate high-technology industries (De Araujo 1993). The focus on stimulating and protecting dynamic and technologically-advanced sectors of manufacturing is still a key element of industrial policy in the advanced economies. Today the primary instrument for achieving this is an emphasis on protection of intellectual property rights and an acceptance and promotion of R&D subsidies and tax credits as valid and legitimate industrial policy measures, whilst opposing export subsidies for all but the LDCs.

Following Britain's rapid growth after the Industrial Revolution, industrial policies were adopted by other major European powers of the time, most notably France and Germany, and also in the next century by other European countries, the USA, and Japan. In Europe after the Second World War, selective industrial policy played an important part in reconstruction, as it did in Japan, with "state ownership and economic planning as key industrial policy instruments. By the end of the 1970s, most western European states had nationalized substantial proportions of their industries" (Ulltveit-Moe 2008: 13).

Compared to Europe the USA was a latecomer to industrialization—but very quickly caught up and even overtook the European economies in terms of productivity growth and technological leadership in the course of the nineteenth century (Szirmai 2009). This was again no accident of free markets. On the contrary, the USA made rigorous use of industrial policies, both in the nineteenth and twentieth century and presently (Lazonick 2009). Examples of industrial policy initiatives include the development of the steel-rail industry in the USA in the nineteenth century (Harrison and Rodriguez-Clare 2009) and the "huge if somewhat wasteful industrial policy program under the guise of R&D support for defense and public health" that was implemented between 1950 and 1980 (Chang 2009: 8). More recently, when faced by the 2008–09 financial crisis, the USA resorted strongly to industrial policies such as direct subsidies to ailing firms (bank and automobile manufacturing firms being bailed out), import protection (e.g. the imposition on tariffs on tire imports), and domestic content measures (the 'buy American' clause in the Recovery Act). Furthermore Rodrik (2010) cites reports that the US Department of Energy announced plans after the 2008 financial crisis to invest more than US\$40 billion to develop low-carbon technologies. The fact that industrial policy is back on the agenda, should not be taken to mean that all policies are uncontested. In particular, the bailout of General Motors in 2009 is sometimes seen as a revival of defensive industrial policies propping up non-viable and non-competitive firms.

In the second half of the twentieth century, the earlier catch up experience of the USA and other Western offshoots was followed by the even faster catch up and industrialization of Japan and the East Asian Newly Industrialized Economies (NIEs) (as mentioned in section 3, see also Szirmai 2009). The experiences of these countries, as well as that of China have become well-explored topics (e.g. Amsden 1989; Chang 2002; Nelson and Pack 1999; Wade 1990; World

Bank 1993). Although [Hobday](#) (2011), in a paper prepared for the WIDER/MERIT/UNIDO project on industrialization cautions against the simplistic drawing of lessons from the successes of the NIEs, their experience again illustrates that catch up industrialization is no accident left to unfettered free markets. All of these economies had in common industrial policies of varying degrees of selectivity (Chang 2009).

In both the UK's and USA's experience with industrialization and industrial policy, the role of technological innovation and technology leadership needs to be emphasized. Modern industrial policy also and importantly involves technology and innovation policy. Structural change and productivity growth require greater investments in learning, innovation, and the commercialization of innovations. This is confirmed by the experience of the East Asian Tigers (see [Hobday](#), 2011). In all explanations of why their industrial policies were more successful than in other regions, e.g. in Africa and Latin America) the role of education and skills formation, and the absorption of foreign technology through the accumulation of knowledge and technological capabilities stand out. Thus industrial catch-up is fundamentally dependent on innovation<sup>13</sup> and capability accumulation (Dosi 2009; Fagerberg, Srholec, and Knell 2007; Lucas 2008). Successful innovation and capability accumulation in turn requires the development of 'national systems of production and innovation' (Nelson 1993) which involves learning, development of absorptive capacities and an environment conducive to the commercialization of innovations (Cimoli et al. 2006). Industrial and innovation policies, together with the upgrading of the capabilities for adopting innovations, play a vital role as the accumulation of technological capabilities is far from automatic (Fagerberg et al. 2007). Examples of industrial policy that resulted in successful innovation and capability accumulation include that of Finland (associated with the success of Nokia) (Toivanen 2011), Japan (associated for instance with the success of Toyota and Sony), and South Korea (associated with the success of Samsung and Posco). In these countries industrial policy was crucial to 'defy' the then current comparative advantage of the respective countries. As argued by Lin and Chang (2009: 497):

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<sup>13</sup> According to Lucas (2008: 1) the industrial revolution contributed to rapid economic transformation as it was made possible, and further enabled, the process of generating new knowledge: 'the industrial revolution involved the emergence of a class of educated people, thousands—now many millions—of people who spend entire careers exchanging ideas, solving work-related problems, generating new ideas'.

“... the market gave Finland, Japan, and Korea unambiguous signals that they should not promote those industries; all the companies in those industries ran losses or earned profits on paper only because they were subsidized by profitable companies in the same business group and/or by the government.”

The above examples are all of generally successful experiences with industrialization and industrial policy. But there are also cases where industrialization has not been as successful, and where industrial policy has been seen to have failed. This is largely the case for Sub-Saharan Africa (SSA).<sup>14</sup> Many countries in SSA adopted industrial policies, where state-owned enterprises and import substituting foreign direct investment (FDI) played a central role in the 1950s and 1960s—with apparent little success. Protection did not promote much learning, but simply kept non-competitive firms in existence. It is not surprising that these firms were not capable of surviving in a more competitive environment once the economies started opening up (Collier and Venables 2007; Jalilian, Tribe, and Weiss 2000; Killick 1978, Lall and Wangwe 1998; Pack 1993; Robinson 2009; Szirmai and Lapperre 2001). However, it needs to be pointed out that after industrial policies were rolled back in the 1980s and 1990s under structural adjustment and trade liberalization programs of the World Bank and IMF, many African countries experienced significant deindustrialization of whatever manufacturing was built up under the previous policy regime (Carmody 2009). Today, the absence of effective policies in SSA is felt in the low levels of absorptive capacity, including skills and complementary technologies, and infrastructure; the difficulty for firms to break into and benefit from global value chains; and the inability to compete with newly industrialized countries (NIEs) in Asia.

In Latin America the situation is more complex—as the paper by [Peres](#) (2011) for the WIDER/MERIT/UNIDO project amply underscores. Three broad periods of industrialization can be discerned in Latin America: a period of industrial catch-up before the First World War; a period of consolidation and mixed successes after the war and up to the 1970s; and the experience after the 1970s when as in SSA IMF and World Bank led structural adjustment and liberalization deemphasized industrial policies. Each period has its particular characteristics and drivers.

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<sup>14</sup> The exception is South Africa, where active industrial policies have been (and still are being) followed. Central in the country’s IP instruments were import substitution measures, export promotion assistance, and the state-owned creation of the largest venture capital fund for manufacturing on the African continent, the Industrial Development Corporation of South Africa in 1940.

Gómez-Galvarriato and Williamson (2009) document Latin America's experience with industrialization between 1870 and the First World War. They show that many countries in Latin America experience a strong period of industrial growth between 1870 and 1910 and that by the latter date countries such as Brazil and Mexico were industrially more advanced than other developing countries in Asia, Africa, and the Middle East (Maddison et al. 1992). They explain this 'industrial lift-off' as the result of improvements in their terms of trade as well as effective industrial policies. The latter included tariff protection: 'Latin America was far more protectionist than anywhere else in the late nineteenth century' (Gómez-Galvarriato and Williamson 2009: 677).

Between the 1950s and 1980s, industrial policies are judged to have mixed success in Latin America. In Brazil, Argentina, and Mexico growth continued to be rapid till around 1980, but import substituting industrialization (ISI) was running out of steam and inward-looking policies were continued for much longer than in East Asia. Imbalances in the economies continued to mount resulting in the debt crisis of 1982 and adoption of structural adjustment policies. However, after the embarking on trade liberalization and privatization during the 1980s and 1990s there is disagreement about whether industrialization prospects in Latin America have improved. Some see the recent changes as fostering improvements in technical efficiency and productivity while others find no positive impact. For instance, a recent study using longitudinal firm level data from Brazil found that trade liberalization only benefited firms that also received government support to adjust and build their firm level capabilities, suggesting that supporting industrial and technology policies remain important even when countries open up to international trade (Figueiredo 2008). There is also an ongoing debate on whether the disappointing performance in Latin America from 1980 to 2000 is due to excessive liberalization or whether it is determined by the negative legacy of the inward-looking and protectionist post-war policy regime. For instance, a study of Mexican car manufacturing points to the lack of sufficient learning and capability building prior to liberalization. This made firms vulnerable to external competition when the Mexican economy opened up (Vallejo 2010).

Despite the failure of many industrial policies in the post-independence period, African and Latin American countries continue to pay attention to industrial policies. Rodrik (2007a) contains a

discussion and examples of renewed industrial policy initiatives in El Salvador, South Africa, and Uruguay.

The contrast between the industrial successes and catch-up of relative latecomers to industrialization such as China, Finland, Japan, the NIEs, and the industrial failures in Sub-Saharan Africa and parts of Latin America provides a good reminder that the *nature* and *content* of industrial policies differed in important ways between regions and countries, and that this should be at the centre of the debate. For instance, in Latin America import substitution industrialization (ISI) policies were widely followed before widespread trade liberalization in the 1980s, but with little monitoring and generally little punishment for inefficient firms. Latin America remained focused on domestic markets for too long and shifted to export orientation much later than the East Asian economies.

In Sub-Saharan Africa, patronage and political interference resulted in low-productivity activities being sustained with large welfare losses as a consequence (Killick 1978; Robinson 2009). In both Latin America and Sub-Saharan Africa macro-economic imbalances (overvalued exchange rates and inflation) further constrained the performance of firms. In contrast, in East Asia continued protection of domestic firms on the domestic market was often accompanied by strict conditions (such as achieving export targets), encouragement of domestic competition, by the political will to stop supporting unsuccessful firms and sunset industries (Hodler 2009; Pack 2000; Robinson 2009), and characterized by flexibility when the domestic and/or international contexts changed (Kaplinsky 1997; Ulltveit-Moe 2008). These policies allowed much more rapid innovation and capability accumulation to take place in East Asia. Hence, Dosi (2009) argues that it was the differences in national systems of innovation between East Asia and Latin America that led to the variety of experiences and the different outcomes of industrial policies. Having said this it should be noted that there is no single industrial policy model applicable to all East Asian countries. Despite commonalities, industrial policies differed considerably between countries—as Hobday (2011) illustrates.

The message of this section is that just as industrial policies differed in the past they will differ in the future. Just as in the past industrial policy was influenced by national contexts and contemporaneous challenges, so will industrial policy today and in the future be similarly informed. It is therefore necessary to consider some of the current contexts and challenges

## **4.2 *New challenges and emerging paradigms***

The old challenges for industrial policy, of how to build domestic capacities in the new Western offshoots in the eighteenth and nineteenth centuries, how to achieve reconstruction in post-Second World War Europe, and finally how to promote catch-up in developing countries since 1950, are increasingly giving way to new challenges since 2000 - see also the paper prepared by [Weiss](#) for the WIDER/MERIT/UNIDO project (Weiss, 2011).

Major challenges of the twenty-first century include (i) how to achieve industrialization in an highly unequal and globalized world economy, dominated by large multinational companies and characterized by fragmented global value chains; (ii) the shrinking of the policy space for latecomers to industrialization in the present international economic order; (iii) the rise of the Asian Driver economies (China and India) and its implications for the industrialization prospects of late entrants to industrialization. The Asian drivers also have implications for the continued industrial competitiveness of the advanced economies, but this will not be discussed here; (iv) responding to the new opportunities provided by resource based industrialization; (v) responding to the accelerating rate of technological change and automation in manufacturing (vi) how to deal with jobless growth in manufacturing; (vii) creating adequate systems of financial intermediation that ensure that the long-term funds needed for industrial investment are forthcoming; and (viii) how industrial policies should respond to the threats of global warming and climate change.

The globalization of trade and investment, and the need for countries and regions to partake in international trade are not new challenges as such. Thus the world economy from 1870–1913 also experienced a dramatic increase in trade and financial flows. In terms of the stock foreign capital as a percentage of developing country GDP, the world economy in 1914 was even more globalized than in 2000 (Maddison 2001). What is new in the present era of globalization is that industrially lagging countries now face new and different obstacles to partake in global supply chains and to benefit from these, if they do. In the first place the very nature of globalization has changed. In the globalization era of 1870–1913, international trade focused on trade in final

goods. Presently, international trade focuses on intermediate goods at different stages of the production process in global value chains. Production processes have become distributed across the globe, with different regions and countries specializing on different phases of production—research, design, intermediate inputs, semi-fabricated components, final assembly, marketing, post-sales services, and so forth.

The emergence of global value chains has been driven by two broad ‘unbundling’ forces (Baldwin 2001). The first unbundling was driven by improvements in transport and freight handling and the progressive liberalization of trade. It made it possible for production to be concentrated in specific places (to facilitate coordination) that were at a distance from final goods markets. The second was driven by improvements in information and communication technologies which made coordination across space easier and hence also alleviated the need for the physical bundling of production. Since the mid-1980s multinational enterprises (MNEs) used the opportunity created by these improvements to fragment production across the globe – described as the spatial ‘disintegration of production’ (Feenstra, 1998). It hugely benefited these MNEs as they came to benefit by combining ‘the high technology they developed at home with low-wage workers abroad’ (Baldwin, 2011:7). Through this truly global value chains<sup>15</sup> (GVCs) (‘global production sharing’) in production came into being (see for instance Houseman et al. 2010; Grossman and Helpman 2005; Kaplinski 2011; Nordas 2008; Yi 2003; Hummels et al. 2001). International trade started to shift from ‘trade in goods’ to ‘trade in tasks’ (Bournakis et al. 2011). World trade in parts and components increased from US \$ 502 billion in 1992/1993 to US \$ 1,1762 billion by 2005/2006 (Athukorala and Menon 2010).

The creation of these global value chains and the role of MNEs therein are discussed by Kaplinsky and Farooki (2010). It entails both benefits and costs for industrial development.<sup>16</sup>

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<sup>15</sup> This is defined as ‘the break-up of a production process into vertically separated stages carried out in two or more countries’ (Athukorala and Menon, 2010:1).

<sup>16</sup> China has been a key peg in global production sharing, having risen to become a ‘premier assembly hub’ (Athukorala and Menon 2010: 21). Kaplinsky and Morris (2008) discuss the rise of China and India – the ‘Asian Drivers’ - and their impact on the industrialization prospects of industrially lagging countries. China’s industrialization is discussed in greater depth by Harry [Wu](#) in a paper prepared for the WIDER/MERIT/UNIDO project (see Wu, 2011).

Discussions of these are contained in Altenburg et al. (2008), Baldwin (2011), Fu et al. (2010), Gimet et al., 2010; Kaplinsky and Farooki (2010) and Saliola and Zanfei (2009). We will briefly mention some of the major issues that have been raised in this literature.

For industrially lagging countries the rise of global production sharing has radically changed the industrial policy instruments open to affect industrial development. This is because successful industrial development will require countries to be competitive not in the complete production of some good, but in the production only of a component ('trade in tasks'). Integrating a country's producers into global value chains may imply that the traditional focus of industrial policy on 'lumpy, complex industry' is not appropriate anymore.

This is seen by some as positive since it may open up a wide range of opportunities for poorer countries, which may be more likely to be able to find a niche in which to specialize rather than be competitive along the entire production chain (Gimet et al. 2010). In other words finding a comparative advantage in a 'slice' of the production chain may perhaps be easier than finding a comparative advantage in the entire production chain and can be shaped by industrial policies (Coxhead and Jayasuriya, 2010). According to Baldwin (2011:2) global value chains have made industrialization for lagging countries much easier and quicker, stating that global value chains have "...opened a new industrialization path. Today, nations can industrialize by joining a supply chain...there is no need to build a supply chain...the concept of a one-nation supply chain has disappeared'. Global production sharing has also been shown, at least in theory, to result in static and dynamic efficiency gains (Bournakis et al. 2011; Rodriguez-Clare 2010 and Grossman and Rossi-Hansberg 2008).

The challenge or problem today is that although industrialization may be easier, it may also be less "meaningful" (Baldwin 2011). Thus we may not observe the same strong association between industrial exports and development as was the case in the twentieth century. As put by Baldwin (2011:27) "before the 2<sup>nd</sup> unbundling a nation had to have a deep industrial base before it could export, e.g. car engines. Exporting engines was a sign of victory. Now it is a sign that the nation is located along a particular segment of an international value chain". Meaningful

industrialization will require integration into global value chains and upgrading within the value chain. This twofold challenge has become an essential element of industrialization and industrial policy in the twenty-first century.

Integration into global value chains and upgrading within the value chain will require a greater emphasis than before on innovation, transport and agglomeration effects, and less emphasis on the old industrial policy instruments such as tariffs, exchange rate policy and quotas. Athukorala and Menon (2010) for instance argue that if a country's ability to manufacture and deliver a particular component of a larger production chain is the determining factor whether it will attract investment into that component production then exchange rate policy and tariff protection will be less effective to foster industrialization. Rather, they argue, the emphasis needs to be on innovation, transport and agglomeration, and the creation of a domestic environment that is conducive to business.

The emphasis should also be on the upgrading of firms. As Kaplinsky and Farooki (2010:4-5) note, meaningful industrialization with global value chains will ultimately require that developing country producers should be able to undertake four types of upgrading activity – process upgrading, product upgrading, functional upgrading, and chain upgrading. This has a number of implications for industrial policy.

First is that a country's national innovation system (NIS) matters (Altenburg et al. 2008). A strong NIS can potentially reduce “the risk of falling into a captive relationship or even of being captured by a leader” (Fu et al. 2010:1209). This is because, as Kaplinsky and Farooki (2010:4) note “suppliers of market requirements have their own interests to protect and will generally limit the upgrading path of their suppliers”. Being locked into such a captive relationship may lead to ‘immiserising specialization’ in developing countries, where a country's specializing in a particular component causes its relative real wages to fall and insufficient surpluses being generated to invest in higher value added activities (Gimet et al. 2010).

Second is the type of the global value chains that developing countries producers link into – according to Altenburg et al. (2008) the right type of global value chain can encourage innovation and upgrading and not stifle it, and allow professional and personal networks to

develop (Altenburg et al. 2008; Saxenian 2006). The latter has played a key role in China and India where many skilled professionals have migrated (as return migrants) from advanced economies to work in the Chinese and Indian manufacturing and service sectors.

Hence an important goal of industrial policy becomes strategic integration into global trade: creating the capabilities to participate in and subsequently to move to more profitable segments of global value chains (Westphal 2002). This is an important difference with the inward-looking industrial policies of the 1950s and 1960s as well as the Washington Consensus era policies of the 1980s and 1990s.

Addressing these challenges through policy is particularly difficult in many industrially lagging countries, especially the least developed countries and fragile states (Naudé et al. 2011). Here recent research has come to identify the upgrading of products, processes and function and position in global value chains of indigenous producers (including of agricultural businesses) as of key importance for development – and has asked how a partnership approach (between MNEs, local firms, government and donors) can provide an institutional vehicle when state capacity is lacking (Van Wijk et al. 2010).

While strategic integration into world trade requires active government policies as well as the establishment of partnerships to fill institutional voids in this regard, latecomers to industrialization are threatened by a loss of policy space. The loss of policy space stems from two sources. First, the prominence of multinational companies in global value chains gives these companies a crucial role in controlling access to new technologies. The Japanese and Korean strategies for accessing technology while keeping multinational companies at an arm's length no longer seems feasible (Lall and Narula, 2006). In the second place, governance mechanisms serve to limit policy space. The loss of policy space in part stems from the fact that the current degree of globalization of trade and finance is so far reaching that it has necessitated certain (imperfect) governance mechanisms. These include the World Trade Organization (WTO) and related multilateral<sup>17</sup> and bilateral agreements. While these agreements have benefits for global

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<sup>17</sup> These include the WTO agreements on the Trade Related Aspects of Intellectual Property Rights (TRIPS) dating from 1994, which stipulate minimum requirements for intellectual property protection, and on Trade Related Investment Measures (TRIMS) which aim to create a level playing field for foreign

trade they also restrict the options for industrial policy for developing countries. For instance the WTO prohibits adopting export subsidies or other incentives for export performance, the use of local content rules in government procurement or FDI and utilizing quantitative restrictions or measures that discriminate against investors by origin (Rodrik 2004). The WTO also promotes the reduction and harmonization of tariffs (ul-Haque 2007). But many, if not all, of these presently prohibited measures were actively applied by the present-day industrialized countries during their own industrialization processes, causing Chang (2002, 2003) to accuse them of ‘kicking away the ladder’ for industrial upgrading in industrially lagging countries (ILCs). Though many countries across the globe including India and China have experienced considerable degrees of liberalization since the 1980s, it should not be forgotten that all experiences of successful industrialization since 1870 have involved an inward-looking phase involving protection of and support for fledgling activities. WTO rules have also led to alternative forms of implicit industrial policies on the part of the advanced economies, such as the use of anti-dumping actions (ul-Haque 2007). Ludema (2007) notes, for instance, that the USA had no less than 274 anti-dumping duties in place in June 2005.

In addition to multilateral agreements such as WTO and TRIPS, many countries have negotiated bilateral trade and investment treaties or regional integration agreements that could erode their policy space even more (ul-Haque 2007). Due to this policy space erosion, Dosi (2009) strongly argues against developing countries entering into bilateral agreements. Indeed, bilateral agreements have become one of the favoured instruments of industrial policy of the advanced countries to protect and support their own industries to the detriment of the development of industries in industrially lagging countries. For instance in the USA the number of bilateral agreements increased from 3 to 29 between 2001 and 2006 (Ludema 2007). As Bhagwati (2005, as quoted in Ludema 2007: 1220) comments, “the various lobbies in the USA have now shifted from multilateral trade negotiations to bilateral free trade agreements because they expect a much richer harvest for their own agendas”.

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investors in member countries’ domestic economies (for instance, TRIMS ban government policies that discriminate against foreign firms with stipulations on local-content, exports, and technology transfer, amongst others. According to Dosi (2009), developing countries should find ways around the TRIPS and to promote the expansion of the domain of non-patentability, and work together for ‘looser’ intellectual property rights.

The challenges for the industrial policies of the industrially lagging countries are, then, to find ways to minimize the restrictions from multilateral agreements, and how to avoid being caught up unduly in unfavourable bilateral arrangements. It is also time to consider a return to the non-reciprocal arrangements under the general agreement on tariffs and trade (GATT), where advanced economies reduced the import tariffs, while emerging economies were allowed to engage in protection.

The third challenge is whether the option of entering the market for manufactured products and manufactured exports is still open to poor developing countries, in the face of the competition of Asian giants such as China and India. Thus, textile industries across Sub-Saharan Africa have all but disappeared under the onslaught of Chinese competition. In Latin America, the manufacturing base has narrowed and manufacturing has shifted towards resource-based activities. On the other hand, the experiences of Vietnam, Cambodia, and Bangladesh have shown that even today countries can embark on industrialization in spite of Chinese competition. This involves a focus on exploitation of reserves of cheap labour, in combination with heavy investment in education and industrial policies supporting domestic industry and technological learning. One should also realize that the period of unlimited supplies of cheap labour in China is starting to come to an end, as the population starts to age and wages start increasing. This will create new windows of opportunity for African industrialization in the years to come. In addition in recent times some Chinese FDI into Africa has also resulted in potential industrialization in certain corridors/special economic zones.

The fourth challenge is provided by the notion of resource based industrialization. In the past, the connotations of the primary sector have invariably been negative. Abundance of natural resources was described as a potential curse. Structural change and industrialization was required for countries to become less dependent on primary production. In recent years, resource abundance is starting to be viewed more positively, when linked with manufacturing. Examples include Brazil's industrial production of ethanol, new developments in technologically advanced forms of food manufacturing (e.g. Farinelli, forthcoming), backward linkages of mining industries or attempts to process diamonds in Botswana. For Latin America, Perez has argued for a shift towards resource-based industrialization, not as a second best option, but as a deliberate policy to capitalize on the continents' advantages (Perez 2008).

A fifth challenge is the accelerating rate of technological change in manufacturing. The digitalization, customization and increasing automation of production may affect the comparative advantages of developing countries, making cheap labour less important than in the past. Developing countries which have successfully industrialized will have to meet the challenge of technological upgrading, if they want to stay in the game. Technological advance may herald a shift of production back to the advanced economies and may make outsourcing less attractive (Marsh, 2012, forthcoming).

The sixth challenge is that of jobless growth in manufacturing, discussed among others in a paper prepared by [Tregenna](#) for the WIDER/MERIT/UNIDO project (see Tregenna, 2011). In many countries, the growth of employment in manufacturing has been slowing down under the influence of increasing capital intensity and labour saving technological change. Industrial development is no longer able to absorb large increases in labour supply. From a policy perspective, this will require a rethinking of the relationships between the industrial sector, the service sector and the agricultural sector.

A seventh challenge is that of creating adequate systems of financial intermediation that can mobilize the funds needed for industrial investment in developing countries. Alternative models of financial intermediation include lending through a commercial banking sector with a sufficiently long-term horizon, the use of equity through venture capital schemes, and state-owned industrial development banks. This challenge is further elaborated by [Weiss](#) (2011).

One of the most important challenges for industrial policy relates to climate change. In a world facing the spectre of climate change, low-carbon industrialization and green growth paths have become imperatives. The industrial sector is responsible for around 30 per cent of global final energy demand and around 40 per cent of all energy-related emissions, with iron and steel, cement, chemicals and petrochemicals, pulp and paper and aluminium production being the most carbon intensive (IEA 2009). Naudé and Alcorta (2010: 1) stress that achieving low-carbon industrialization “is going to require selective government intervention ... neutrality towards all products and processes cannot be maintained. It has got to be driven by governments as coordination, subsidization, protection, information and large scale investments are at the core of the responses towards limiting the human impact on climate change”. The rationale for industrial policy is similar to that of the past—the need to stimulate a high volume of investments with

positive externalities—but the environmental challenge is unprecedented. Promoting low-carbon industrialization and obtaining its accompanying developmental benefits may itself improve the ability of currently poor countries to adapt to climate change as it would raise per capita incomes and improve the knowledge base of the economy. According to Schelling “the best defense against climate change is economic development” (Schelling 2009: 16).

Achieving low-carbon industrialization has a number of interrelated implications for industrial policy. The first is that it requires global policy cooperation. The second is that it will require innovation in and transfer of environmentally more sustainable technologies on an unprecedented scale. The latter may result in substantial entrepreneurial opportunities in low-carbon industrialization for developing countries. Many observers are already studying China’s growing investments in low-carbon technologies as a way to reduce both energy costs, pollution and provide new sources of growth and employment at the same time.

In meeting the challenges sketched above, the new pathways to industrialization in the twenty-first century will have to be based on new emerging paradigms for industrialization and industrial policy. Some principles for the design of new policies can now be identified.

Though there is a clear case for industrial policy interventions, the dangers of rent-seeking, corruption, imperfect and asymmetric information, and productive inefficiency, associated with industrial policy interventions are real threats that have to be taken into account. The long-term focus of future industrial policies is clearly on strategic integration into global trade, rather than a return to inward-looking policies aimed at self-sufficiency. We need to avoid beggar-thy-neighbour industrial policies and a resurgence of protectionism at a global level which may hamper the growth of international trade, which is so crucial for catch up. We need to take the lessons of past negative experiences into account and to seek ways in which such threats can be overcome, or at least reduced, through strengthening the basic institutions, including transparency, political freedoms, and strengthening administrative capabilities. On the other hand, one should also realize that having no comprehensive industrial policy is not a guarantee that rent-seeking and corruption will be avoided. Indeed it has even been argued that in countries with weak institutions the *absence* of a coherent policy (implying incoherent protection) can be risky. Bayliss and Cramer (2001: 61) state that “Naïve privatization analysis and program design may well encourage incoherent protection. Without a policy framework or rationale for selecting

the beneficiaries of protection ... it is more likely that weak developing country states will cave in haphazardly to pressure”.

Avoiding rent-seeking, therefore, depends clearly on the political context, as Robinson (2009) and Hodler (2009) also emphasize. More specifically, using a recent theoretical model that allows for both market and government failure, Hodler (2009) illustrates that a politically motivated government can increase welfare through industrial policy, but *only* if it has a small budget (i.e. the benefit from public support is low for entrepreneurs or firms with unprofitable projects). His model illustrates that government failures can be overcome, and confirms that in many East Asian NIEs, the government is able to exit sooner rather than later from the support of unproductive projects and sunset industries. The importance of political will in exiting from unproductive projects is emphasized by Pack (2000), as well as Ulltveit-Moe (2008), who terms this as the ‘live and let die principle’.

Similarly the dangers of asymmetric information (a problem not just confined to industrial policy) can be overcome. Designing and using industrial policy as a learning process, as suggested by Rodrik (2007a, 2007b), offers opportunities to learn for both governments and their private sectors. The increased recognition of the importance of entrepreneurship for growth, innovation and structural change requires that policies should provide sufficient scope for entrepreneurial behaviour. Understanding entrepreneurship and small businesses, and the relationship between business formation and business growth, including industrial dynamics has also progressed, to the point where policy makers have a better understanding of the informational requirements for selective industrial support. Bos and Stam (2011), for instance, find that if sufficient data are available about young high-growth firms (‘gazelles’), they may provide useful policy information on future industrial strengths and thus facilitate policies focusing on promising activities.

A second principle is that heterogeneity in policy approaches is advisable. In a Gerschenkronian world where the conditions for industrialization change, there are no general policy prescriptions irrespective of time and space (Rodrik, 2007b). Among others, industrial policies should be tailored to the administrative capabilities of different countries, with the more selective policies requiring the highest levels of capabilities.

The example of the USA offers perhaps ironically a valuable lesson for latecomer industrializing countries on the importance of heterogeneity at sub-national level. Ketels (2007) describes the USA as having very successful industries and industrial development policies, but without an overarching national industrial policy framework. Instead, the USA's industrial development and support occurs on sub-national, regional, and local level through state and local authority initiatives which are primarily aimed at facilitating the business environment. As a result the USA's regions "are more specialized in particular clusters than their peers in Europe" (Ketels 2007:163). Ketels (2007) ascribes this to the fact that sub-national level policies in the USA come into being as a result of a strong process of local consultation between the private sector and local and state governments which create good environments for industrial clusters to emerge and develop, and provide an environment "in which innovation and entrepreneurship policies can be more effective" (ibid.: 163). The decentralization of industrial policy, to sub-national and local levels, is thus not only necessary to overcome informational problems and limit the benefits of rent-seeking associated with national overarching policies, it is required to reap the benefits of knowledge-driven growth (Nijkamp 2011). As has been pointed out by some observers, while the WTO restricts the policy space of developing countries at the national level, they may have more policy space at the sub-national level, particularly in environmental and energy sectors (e.g. for green growth or low-carbon industrialization). An interesting example of heterogeneity at regional level is also provided by the Chinese experience, which allows for extensive policy experimentation in Chinese regions (Xu, 2011).

The third principle is that of policy flexibility over time. Countries need to be flexible in adapting their industrial policies as conditions change. For the poorest countries for instance, a period of import protection may at first be justified in order that learning by doing takes place and dynamic economies can be reaped. However, as the different experiences of countries in Sub-Saharan Africa and Latin America and Asia has shown the reliance on import protection needs to be modified over time—in a way that avoids inefficiency and economic stagnation on the one hand, and premature or too rapid trade and financial liberalization on the other. Both Europe and India provide interesting examples of flexibility. At the end of the 1970s, industrial policy in Europe shifted towards privatization, deregulation, and the support of innovation (R&D) in order to facilitate further adjustment of industries after having reaped the benefits of state subsidies and state-owned enterprises for more than two decades after the war (Ulltveit-

Moe 2008). In India, prior to 1991, the country's industrial policy involved high tariffs for more than 40 years. This was the era in which the foundations for India's industrial catch-up were laid and industrial capabilities were developed. Although the growth of manufacturing was slower than in East Asia, India performed better than many other developing regions (Kaplinsky 1997). In 1991, the country adopted a 'new' industrial policy that supported a substantial opening-up of the economy by removing most non-tariff barriers on imports, reducing tariff levels overall, as well as reducing the dispersal of tariff rates, abolishing investment licenses, and lifting restrictions on FDI (see Kaplinsky 1997; Mani 2011). This succeeded in accelerating India's total factor productivity growth in manufacturing in the subsequent period (Milner, Vencapa, and Wright 2007).

## **5. Why and How to Build Manufacturing Capability in the twenty-first Century**

Sections 2 and 3 of this paper provided an overview of the patterns of manufacturing development across the world since the Industrial Revolution. Section 4 outlined the various approaches and paradigms that characterized various countries' initiatives to promote manufacturing and identified a number of new challenges that policy makers need to take into account currently and in the future. In the remainder of this paper we ask *whether* a case still exist for promoting manufacturing (section 5.1) and *how* policy makers can best promote manufacturing in light of the new challenges and emerging paradigms outlined in section 4 (section 5.2). We draw extensively on the findings of the UNU-WIDER/UNU-MERIT project.

### ***5.1 Why manufacturing remains important***

As we illustrated in section 1, manufacturing has historically been the driver of economic growth, structural change, and catch-up. In recent decades, from 1950 to 2005, the pattern of industrialization has closely reflected changes in global patterns of development. Thus over this period the share of manufacturing in GDP in the rising economies of Asia has doubled, while the share has been stagnant in Latin America and Sub-Saharan Africa (SSA). In the advanced economies productivity in manufacturing has continued to be high, but the share of manufacturing in value added declined dramatically in the long-run. Services have become by far the largest sector, which means that their weight in explaining growth has increased.

These global patterns of change suggest that manufacturing continues to be a potential engine for growth and catch-up—even for the poorest countries. [Page](#), in a background paper for the WIDER/MERIT/UNIDO project emphasized that in the case of SSA, African countries should continue to strive for manufacturing growth—indeed without manufacturing growth the region will face limited growth prospects and will remain vulnerable to external shocks, adverse changes in terms of trade, and the challenges of avoiding the ‘natural resource curse’ when commodity prices boom (Page, 2011).

Manufacturing brings with it special opportunities for reaping economies of scale, engaging in technological progress and learning, profiting from spillovers to other sectors and providing job opportunities for variously skilled levels of labour. It is important to emphasize, however, that this does not mean that other sectors such as agriculture and services are not important in development. There are a great variety of inter-sectoral linkages between agriculture and manufacturing and between services and manufacturing which should not be neglected in the long-run development strategy. In many advanced and developing countries agricultural productivity growth has exceeded productivity growth in manufacturing (see Table 3). Without a dynamic and healthy agricultural sector the prospects for industrial development in many countries—most notably African countries- may remain limited.

In this light, premature deindustrialization is a potential threat to development, especially in Latin America and Africa. [Tregenna](#) (2011) makes an important distinction between different types of deindustrialization focusing on the difference between declines in manufacturing employment due to increasing productivity of manufacturing and declines due to declining levels and GDP shares of manufacturing output. If productivity improvements are the main cause of declines in the employment shares, this decline should not be considered as deindustrialization and need not have a negative impact on growth prospects of a country. Deindustrialization becomes a major problem in a developing country if there is a sustained decline in both the share of manufacturing in total employment and the share of manufacturing in GDP. If that occurs at lower levels of income, we have premature industrialization.

Between 1985 and 2005 several developing countries experienced premature deindustrialization. In Africa especially deindustrialization has been a disappointing feature of the post-independence record. The problem—missing out on the benefits of a growing manufacturing

sector—is compounded by the fact that reindustrialization may be more difficult to achieve than getting industrialization going in the first place. Hence there is a need for industrial policy to promote manufacturing in industrially lagging countries.

It should be noted that the recent empirical evidence on the role of manufacturing is somewhat mixed. On historical grounds, it seems that the importance of the manufacturing sector as the driver of catch-up in the post-war period is overwhelming, and as we just concluded, manufacturing remains a key sector in development. But one should beware of industrial bias and a disregard of the role of other sectors in economic development. There are indications that the service sector may be becoming more important over time as a driver of growth in developing countries. The share of the service sectors is increasing and some countries, such as India, owe parts of their recent growth acceleration to dynamic service sectors such as software. This strengthens the case for industrial policies that are broader in scope than manufacturing alone, and requires more research to deepen our understanding of the relationship between manufacturing and services, particularly in the structural transformation process of industrially lagging countries.

## **5.2 Policy Implications**

- **The difficulty of drawing policy lessons**

The comparative experiences of various countries with manufacturing development suggests that that (i) industrialization is not an automatic process—history, policies, and luck matter; and (ii) that different types of industrial policies are necessary in different contexts and different times. Drawing ‘lessons’ from country experiences may therefore be difficult, as we already mentioned ([Hobday, 2011](#)). Though one can undoubtedly learn from studying past experiences, one cannot simply replicate policies pursued by other countries in different times and conditions.

This is an important point to reinforce at the outset of this sub-section as a number of papers in the WIDER/MERIT/UNIDO project on industrialization challenged the ‘received wisdom’ of industrialization. For instance, Asian development took off in the 1950s and 1960s ‘largely in the dark through trial and error learning’ ([Hobday, 2011](#)) and not through careful and artful prospective central planning; China’s famous rise as a manufacturing giant involved a key role

for the state, which long predates the communist period, as shown by [Wu](#) (2011). But post-war development has involved high costs of ‘disastrous policy mistakes’ ([Wu](#), 2011). In Indonesia, seen by many as a miracle economy that confounded expectations in the 1960s when it was an ‘economic basket case’, industrial success was less due to selective and sectoral policies than a ‘broad set of orthodox policies’ ([Aswicahyono](#) et al, 2011). For Latin America, [Peres](#) (2011) pointed out that industrial policy has been making a comeback despite the apparent shortcomings of ISI policies in the 1960s and 1970s and the general rejection of industrial policy during the 1980s and 1990s. This comeback has occurred in ‘open economies with orthodox macro-economic policies—contrary to the previous conventional wisdom that they were incompatible’.

In the current debates about industrial policy one can distinguish two polar positions. The first position is the neo-liberal position which continues to focus on the shortcomings and inefficiencies of the inward-looking orthodox industrial policies in the developing world in the period 1950 to 1980. This approach is generally critical of industrial policy. At the other extreme stand the neo-structuralists who argue for a revival of industrial policies including the option of protection for infant industries in industrially lagging countries. The neo-structuralists point to the pervasiveness of selective industrial policies and government interventions in the successful Asian development experiences. They emphasize the disappointing experiences of Latin America and Africa in the period of structural adjustment, liberalization, and deregulation.

We believe that both of these positions are wrong, and that the most appropriate policy with respect to industrial policy today is somewhere in the middle of these two polar opposites. A more pragmatic, middle-ground position towards industrial policy requires that we should take into account the lessons to be learned from recent experiences, but without forgetting the critical lessons of the post-war period of 1950 to 1980. There can be no return to policies of the past. Rather policy design should focus on the new challenges and new circumstances, as was discussed in section 4.

Hobday (2011) emphasizes the difficulty of drawing general lessons from the Asian experience, because of the great variety of conditions and challenges facing different countries. Nevertheless one should not be despondent about the possibilities for industrially lagging countries to catch up through manufacturing growth. Industrialization remains a possibility for these countries despite the rise of Asia as a manufacturing giant. As Hobday (2011) suggested, industrially lagging

countries should complement rather than try to imitate the Asian economies. This could mean that South-South trade could play a more dominant role in future industrialization than it had in the past – at least for African and Latin American countries, and that such South-South led industrialization may need close scrutiny by researchers and policy makers in future. Furthermore, policies to facilitate South-South led industrialization need to be combined with strategies prioritizing sound macro-economic management and improvements in governance—also in Africa, where Page (2011) has argued in particular for business climate reforms to underpin industrialization.

- **The need to find policy space**

One of the challenges discussed by [Peres](#) is the loss of policy space due to globalization and the current architecture of international institutions. We have learned from past experiences that there are few examples of successful industrialization which did not involve a phase of protection of new industrial activities. Whatever the inefficiencies of import substituting industrialization policies, especially when continued for too long, it seems that they indeed contributed to capability building in economies such as Korea, India, Indonesia, and China, which enabled (existing or new) firms to compete in later more liberal policy environments when policy turned outwards. One response to current policy constraints is to engage in more regional and decentralized policy initiatives. Another possible response is to revisit the notion of non-reciprocity which under the General Agreement on Tariffs and Trade allowed poor countries latitude for protection, while reducing barriers to trade in the global economy. This might be relevant for the poorest developing countries embarking on structural change in the face of Chinese and advanced economy competition. The notion of non-reciprocity emphasizes the important point that we want to avoid creating obstacles to the growth of world trade—one of the obvious dangers of resurgent protectionism—while creating opportunities for poor developing countries to embark on structural change and entry into global trade.

- **The importance of agriculture-led industrialization**

[Page](#) (2011) discusses the notion of agriculture-led industrialization as an option for Africa. This strategy is a response to the earlier neglect of agriculture in post-war industrialization. Its proponents argue that a dynamic and more commercialized agricultural sector is one of the

preconditions for successful industrialization. Page criticized the notion of agriculture-led industrialization strategy, because globalization means that industry no longer needs a domestic market for its growth. But in countries where a very large part of the labour force is still employed in agriculture, it is important not to neglect this sector, as Page himself emphasized. He also noted that agro-processing offers new opportunities to poor African countries, even though global standards and product quality requirements create new challenges and difficulties. In this regard we want to argue for more research into ways in which small businesses and farmers can be assisted to become part of global value chains – see also below.

- **Rising to the challenge of climate change**

One of the most important new challenges—new in the sense of not being an issue when the existing industrial countries first engaged in industrialization—is posed by climate change. Both mitigation of, and adaptation to climate change, will require greater global coordination of industrial policies as well as more emphasis on innovation within the content of industrial policies. [Gries](#) (2011) argues that the global asymmetries between advanced and developing countries make global policy coordination essential.

Both of these required shifts in industrial policies will have to aim first at reducing waste—both on the output side (through greater recycling) and on the input side (through greater energy efficiency and the use of more sustainable energy sources)—and second on utilizing the opportunities for different patterns of industrialization inherent in ‘green’ or ‘low-carbon’ industrialization. Achieving these difficult objectives may require a different approach to industrial policy than in the past, for instance requiring such policies to be more entrepreneur-focused, rather than state-focused. It will also require much more research than what is available at present to identify opportunities and risks for green industrialization; how to generate the entrepreneurial innovations – both radical and incremental – that may be required to utilize or minimize these; and to understand the when and how of regulation of industry and technology better.

One of the rapidly growing sectors in both advanced and developing countries is the recycling sector. [Medina](#) (2011) finds that there are worldwide some 15 million workers engaged in waste collection. This poses a major policy challenge to improve their livelihoods. It also offers new

economic opportunities but requires much further research on how appropriate mechanisms for support and regulation of the recycling sector can be put in place, especially given that this is sector is the responsibility of the global community.

- **Promoting entrepreneurship and innovation**

The challenges of climate change and accelerating technological advance have brought to the fore the need for promoting innovation. As [Ács and Naudé](#) (2011) argue that industrial policies should support innovative entrepreneurship - but point out that this is still an under-researched and complex challenge. It is, however, a challenge that may be central to the way in which successful industrial policy will be conducted in future. Entrepreneurial innovation is important for the reallocation of resources from the traditional (agricultural) sector to the modern (manufacturing) sector as well as for the continued upgrading of manufacturing activities. As they put it ‘there is substantial agreement that recovery after the 2008 global financial and economic crises and the challenge of climate change will require more, not less, of such entrepreneurial innovation’. This implies industrial policies where the relationship between government and entrepreneurs (the private sector) is important.

According to Hausmann and Rodrik (2003), entrepreneurial entry in developing countries generates information on the possible latent comparative advantage of a country. Thus industrial policy becomes a process of ‘self-discovery’ of what the economy might be good at producing. Because leading/early entrants absorb the costs (but not necessarily the benefits) of early entry, entry itself may be sub-optimal. Policies to promote such ‘self-discovery’ could be support for innovation, including the establishment and promotion of national innovation systems; support for new firm start-ups (e.g., by reducing regulations and requirements and/or providing subsidized credit), and support for the integration of domestic small and medium-sized firms into global value chains. More research is needed in these regards – for instance on establishing national innovation systems given the nature of firms’ positions in global value chains and linking national innovation systems with multinational firms and their outsourcing to indigenous firms.

These considerations imply that one should be careful in arguing for industrial policy to be merely focused on an industrially lagging country’s specialization based on its comparative

advantage. They also imply that unlike in the past where industrial policies were either focused on creation and growth of state-owned firms or large industrial conglomerates, or alternatively consisted merely of broadly functional policies without consideration for firm or entrepreneurial specifics, the requirement now is for industrial policy to be a nuanced partnership between entrepreneurs and the state. The difficulty is that such industrial policies will require heterogeneity on the country, firm, and regional level to be incorporated into policy. It implies that one-size fits-all policies for industrial development are unlikely to work, and require more research on development and the use of better tools for measuring and studying entrepreneurship across various levels of development.

- **Discovering and supporting latent comparative advantage**

The focus on entrepreneurship draws our attention to important new elements in the industrial policy debate, namely the orientation towards learning, experimentation, and self-discovery. In the past industrial policy in the developing world was often heavily state-oriented and based on top-down planning. Today industrial policy needs to be much more interactive and experimental. Entrepreneurial effort, innovation and the knowledge sector fulfil pivotal roles. Hence policy should seek to create a learning environment in which capabilities are upgraded and complemented. Policies also need to be more experimental, willing to quickly phase out activities that turn out not to be promising, while expanding support to activities that turn out to be successful.

The renewed debate about latent comparative advantage (see Lin and Monga 2010) fits well within this new approach to policy-making. It criticizes the older emphasis on static comparative advantage. This is replaced by a search for latent comparative advantage: activities in which a country will have a comparative advantage in the future. The state has an important role in identifying and supporting these new activities and sectors, based on comparisons with comparable countries (see [Haraguchi and Rezonja, 2011](#)). We can conclude by emphasizing two important roles for an entrepreneurship-oriented state within the challenges discussed in this book. Both of these are still fundamentally based on classic reasons for state intervention – information deficiencies, externalities, and co-ordination failures in markets.

The first, based on information deficiencies (and partly co-ordination problems and externalities) is the challenge of supporting developing country producers to become part of global value chains. As was mentioned, global value chains have been fragmented – or ‘sliced up’ - in recent years. Providing their entrepreneurs with the competencies to be able to take part in these global value chains and with the information on for instance how to conform to the standards set by leading firms, can help developing country producers to grow and develop through exporting – especially where domestic markets are small. How governments can do this – for instance through multi-stakeholder platforms or other institutional innovations – remains an important area for future research (see also Van Wijk et al., 2010).

There is a strong case for assisting firms to become part of global value chains, or to attract foreign firms that can. A considerable literature documents that export-oriented and foreign owned firms are more productive than others and industrial policies have been found to be useful in this regard (Rose, 2007). Many of the least developed countries do have policy scope under the World Trade Organization (WTO) to promote their exports. Furthermore, extending trade preferences can make an important contribution to stimulate exports from these countries. Trade preferences to African manufacturers, such as the Multifibre Agreement’s (MFA) impact on Mauritius’s industrialization, or the USA’s African Growth and Opportunity Act (AGOA) promotion of clothing and textile manufacturers in Lesotho, Swaziland and Kenya (Collier and Venables 2007) have illustrated their potential role. For such trade preferences to be successful it has been argued that they ought not to impose too stringent rules of origin (ROO) and, according to Collier and Venables (2007), would need local competencies in terms of skills and infrastructure—areas which will require industrial policies to address – and also areas requiring more research.

A second and related area for the state to support latent comparative advantages is in terms of co-ordination. The classic case for coordination failures was made by Rosenstein-Rodan (1943) who argues that industrialization in Eastern Europe after the Second World War would not have occurred automatically, as these countries were caught in a low level equilibrium trap,<sup>18</sup> resulting from coordination failures. The notion of coordination failures is still with us as many believe

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<sup>18</sup> ‘If the industrialization of depressed international areas were to rely entirely on the normal incentive of private entrepreneurs, the process would not only be very much slower, the rate of investment smaller ... the whole economic structure of the region would be different’ (Rosenstein-Rodan 1943: 206-7).

that industrially lagging countries are still caught in a low level equilibrium trap due to coordination failures. Altenburg (2009) observes that coordination is particularly difficult for the latecomers to industrialization. He illustrates these difficulties with a good example

Take the example of a country with promising location and agro-ecological conditions for horticultural exports. Even if the country offers excellent investment climate and investors recognize the potential of the country, they typically start off with lacking irrigation; bad roads; no cool chains facilities in place; no high quality inputs and specialized technical support services available; inefficient ports and airport facilities; high freight rates due to low trade volumes, etc. Developing all the necessary infrastructure facilities and services simultaneously usually far exceeds the possibility of individual investors. Unless a major coordinated effort is organized to develop complimentary assets ... the potential for horticultural exports will remain unexploited (ibid.: 30–31).

Several early development economists also recognized coordination failure as an important obstacle to industrialization, but did not consider a balanced-growth ‘big push’ approach as necessary or feasible. Fleming (1955) and Hirschman (1958), for instance, saw the promotion of key sectors (those with forward and backward linkages) as being sufficient to get industrialization going. In more recent years, these concepts have been formalized within the new economic geography literature (Mayer 2004; see also, e.g., Krugman 1995; Ottaviano and Puga 1998; Deichmann et al. 2008). Here forward and backward linkages in manufacturing lead to increasing returns to scale with positive externalities resulting in higher output growth and higher productivity growth. Common pools of labour in agglomerations stimulate knowledge spillovers. When there are trade costs, firms will locate or cluster in large markets (Mayer 2004) which become self-reinforcing (cumulative causation). Because of this self-reinforcing nature, industrially lagging countries may need to kick-start the process with the government stimulating the agglomeration or cluster of manufacturing activities through policy support. How this can best be done in developing countries where state capacity is lagging remains an important challenge for researchers and policy makers.

More recently, both Rodrik (2004), Ulltveit-Moe (2008) and Lin and Monga (2010) have reemphasized the importance of coordination failure as a hindrance to industrialization. Rodrik

(2004), in particular, argues that coordination failures constitute one of the strongest cases for industrial policy, as coordination failures are more 'rampant' than other types of market failures. He points to the fact that coordination measures are specific to each industry, so that setting up a horticultural industry will require different coordinating activities than establishing, for example, motor vehicle industry. This is a far cry from the original big push notions.

Ulltveit-Moe (2008) also stresses the continued importance of using industrial policy to overcome coordination failures. Her concerns emanate from the significance of agglomerations (clusters) of economic and industrial activity for productivity. Globalization makes the possibility of coordination failure more acute through the fragmentation of value chains, because the latter determines the spatial location of industry (see also Mayer 2004; Forslid and Midelfart 2005). However, Collier and Venables (2007) presume the clustering of economic activity to mean that government coordination of supporting infrastructure and services can be focused in a particular geographic area without being provided across the entire country, thus making it potentially less costly. And as Rodrik (2004) points out, coordination can be achieved without the need for large financial outlays for direct subsidies. Often government information, communication, persuasion, and guarantees can unlock the simultaneously needed entrepreneurial investment.

The roles described for the state in the above imply a partnership with entrepreneurs. Such an industrial policy cannot and should not be done in a top-down fashion. Discovering new possibilities for structural change and export indeed requires the intensive interaction between the state and firms and entrepreneurs, which was one of the characteristics of the East Asian experience. It also involves the support of environments in which learning takes place such as export zones, incubators and science parks, and industrial clusters and agglomerations. Here, industrial policy and innovation policy converges (see also Cimoli et al. 2009) and points to a fruitful area for future research.

## **6. Concluding Remarks**

The development prospects of developing countries in the early twenty-first century depend on a type of manufacturing growth that can deliver high quality employment, which is aligned with

the international division of labour, and which would not take place in autarky. We believe that industrial policy can make valuable contributions to structural change and the development of manufacturing if the lessons of the past and the challenges of the future are sufficiently taken into consideration. Developing countries can benefit from the debates on industrial policy and on the amassed literature on the topic. The debate should focus less on whether or not there should be any industrial policy and more on making existing policy instruments more effective and crafting new policy instruments that take into account entrepreneurship, level of development of a country or region, and the changing relationship between state and private sector. Policy makers and academics need to be aware of the recent trends, challenges, and emerging paradigms in the world economy and to understand how these shape the formulation of new industrial policy instruments and the effective application of existing instruments. While industrial policy is perhaps even more urgent than ever, it may also be more difficult to practically implement than before. These aspects should not be overlooked in the policy dialogue and should increasingly form part of the scholarly agenda.

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