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New Challenges for Industrial Policy

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Abstract

This paper calls for a fresh look at industrial policies in the light of recent trends and developments in the global economy. In particular, five new challenges and their implications for industrial policies are discussed. These have been neglected in the debate on industrial policy and include (i) the increasing globalization of the world economy, most pertinently the rise of global production sharing, (ii) the recent crises in food, fuel and financial markets, (iii) climate change, (iv) the rise of China and India, and (v) the rise of the ‘entrepreneurial economy’. Directions for further research are outlined. This paper is a follow-up to the earlier WIDER Working Paper entitled ‘Industrial Policy: Old and New Issues’.

Keywords: industrial policy, structural transformation, development, financial crisis, climate change

JEL classification: O14, L50, L52, O25, L60, L16, L26, F13, H87

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Acronyms given at the end of the paper.

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1 Introduction

What many poor countries, especially fragile states and the least developed countries, have in common is the failure to industrialize. Fast-tracking their industrialization over the coming decades is necessary in light of the human costs of underdevelopment and the need to adapt to climate change. Today, industrial policy (IP), with proper content and application, may offer the possibility for industrially lagging countries (ILCs) to leapfrog development (Gerschenkron 1952; Lin and Chang 2009). Without industrial policies such fast-tracked industrialization may not occur.

The definition and instruments of IP are discussed in an earlier paper (see Naudé 2010a). As was pointed out, there is no consensus on the definition of IP beyond the fact that it is a guide to government intervention (or ‘non-neutrality’) in the economy. A typical definition is given by Pack (2000: 48) describing IP as ‘actions designed to target specific sectors to increase their productivity and their relative importance within the manufacturing sector’.

Others define IP as a guide to government intervention to selectively promote certain manufacturing sectors (akin to ‘picking winners’) with the aim of encouraging a country to ‘defy’ its comparative advantage and develop its ‘latent’ comparative advantage (e.g., Amsden 1989; Chang 2002; Lin and Chang 2009). Others prefer IP to be not ‘selective’ but ‘functional’ or broad based, promoting the ‘competitiveness’ of the entire manufacturing sector (see Lall 2004). More recently IP has also been described as a process, involving ‘dialogue’ between the state and the private sector to generate information to identify and remove binding constraints on development (Rodrik 2007: 35).

Most of the ‘old’ debates on IP have been concerned with the above issues; in essence, its nature and motivation. Today, this discussion seems to have been overtaken by ‘new’ issues, arising from the observation that all successful industrial countries have over time intervened in their industrial development through industrial policies (Chang 2009; Perez and Primi 2009). Therefore, it is the ‘how’ of IP—the question of getting it right rather than deciding whether or not to engage in IP—where some consensus seems to be evolving.

However, for the industrially lagging countries (ILCs), duplicating the past policies of the currently industrialized countries may not be useful. Indeed, the content of IP does matter (Naudé 2010a) because the environment of these countries is radically different from what existed during the earlier generations of the industrializing countries. The situation confronting today’s ILCs differs from that of the past in the nature of the challenges policymakers now face.

In this paper five new trends and challenges and their implications for IP are discussed. These trends and challenges have been neglected in the recent literature on IP (Naudé 2010a), and include: (i) the increasing globalization of the world economy, particularly the rise of global production sharing, (ii) the dilemma posed by the recent crises in food, fuel and financial markets, (iii) the climate change, (iv) the rise of China and India, and (v) the rise of the ‘entrepreneurial economy’.

The remainder of the paper discusses each of these concerns in the following four sections. Section 6 concludes and summarizes the directions for future research.

2 Globalization and global production sharing

Globalization entails ‘a significant reduction in time scale in the movement of goods, capital and knowledge ... as a result of technological advances and increasing interdependence and connectivity of world markets’ (Fofack 2009: 3). Thus, globalization could be understood as greater integration of world markets resulting from both technological progress and policies (Crafts 2004). Dollar and Kraay (2004) observe that globalizing countries have tended to outperform non-globalizers in terms of economic growth since the 1980s, and Crafts (2004) reports that world income inequality peaked in the 1970s and has since started to decline, albeit slowly.

However, the ‘unbundling’ of production processes (global production sharing) and the greater mobility of firms and labour have led to increased spatial concentration of industry, which implies greater national as well as international inequality in the spread of industry. Some regions have benefited more than others (Mayer 2004; Ulltveit-Moe 2008). What determines who benefits or who does not? To answer this, it is necessary to understand the spatial patterns of industrial location in an open economy. Here, according to the new economic geography (NEG), the concentration of industry reflects the tensions between agglomeration externalities, on the one hand, and production costs on the other. As explained by Mayer (2004: 6):

Initially, the industrialized countries have higher wages than the developing countries but the positive pecuniary externalities created by linkages among industrial firms compensate for the higher wage costs. The spread of industry is triggered by an exogenous increase in world demand for manufactures ... which opens up a larger wage gap between the industrialized and other countries. At some point the wage gap becomes too large to be compensated by the benefits coming from linkages in the industrialized country, and industrial firms start to relocate to low-wage economies.

Which country do the relocating firms choose? Here, NEG models suggest that small initial differences among the developing countries can tip the scale: differences, for instance, in good transport links, ease of access to imported intermediates, and ease of exporting. This can explain why African countries ‘missed the globalization boat’ vis-a-vis East Asia, because, as Collier and Venables (2007) suggest, their domestic environment was very hostile in the 1960s and 1970s for the advanced-country industries wishing to relocate. It also suggests that industries relocate to those developing countries where some level of industrial activity is already in existence, which facilitates the benefits of agglomeration (Mayer 2004). While trade liberalization and the promotion of a conducive investment business climate (two elements of the Washington consensus) may address the disadvantages of a hostile domestic environment, the requirement of pre-existing industries or opportunities for reaping pecuniary externalities may not materialize without a greater interventionist role by the government.

In this regard, for the poorest countries highly dependent on commodity trade, a reconsideration of trade policies could be the starting point. However, globalization has changed the policy environment substantially since the first industrial relocation process towards East Asia in the 1950s and 1960s. Hence, it is instructive to consider how two aspects of globalization impact on a country’s potential discretion in trade policies: (i)

the new governing mechanisms for international trade and investment, and (ii) the rise of global value chains and networks (ul-Haque 2007).

2.1 Trade policy beyond the Washington consensus

Trade remains an important channel for ILCs to harness the gains from globalization and to drive domestic structural change. Most ILCs are dependent on primary commodity exports, and are specialized in a relatively small range of exports. Diversifying their exports is vital not only for stabilizing export earnings, but also for stimulating export-led growth and economic structural change, by allowing the country to benefit from growth in different sectors of the world economy (Hausmann, Hwang and Rodrik 2007; Alexander and Warwick 2007).

DeRosa (1991) notes that export diversity may not materialize without government targeting and/or protection of certain sectors. Herein, Cimoli et al. (2006: 9) reiterate that infant industry protection remains potentially important, as ‘successful catch-up in industries where international trade is considerable requires some kind of infant industry protection or other modes of support’. As put by Weiss (2009: 7), ‘free trade has been a policy of the economically strong, adopted when their economies were competitive enough’. Altenburg (2009: 17) concurs, stating that trade liberalization in developing countries should proceed at a pace slow enough to allow technological learning and capability formation to take place rather than lead to the untimely exit of firms from the market. Shafaeddin (2006) also warns against premature liberalization.¹ Pack and Saggi (2006) recommend that ILCs establish national trading companies (NTCs) to help them access global production and buyer networks; Rodrik (2007) stresses the importance of exchange rate policies in contributing to the profitability of export industries.

Imbs and Wacziarg (2003) point out that export diversification will benefit from a growing domestic demand. But once this has been achieved, and the country’s export basket and production structure start to diversify, diversification itself has positive spillover effects that benefit the country’s financial development (Saint-Paul 1992; Ramacharan 2006). This, in turn, as shown by Chang (1991), may promote greater specialization of exports, because then the developed financial markets can provide insurance against risk. This is also consistent with the inverse U-shape relation often observed between per capita GDP and the share of manufacturing in the economy.

What are the implications for IP? First, it should be clear that there is a role for export promotion and import protection. Import protection, especially in the poorest countries, as well as a greater measure of state involvement in enterprises, may be needed in order that learning-by-doing take places and dynamic economies can be reaped.

Second, the reliance on import protection may have to be modified over time once an economy develops and circumstances change. This implies that IPs need to be flexible (see also Ulltveit-Moe 2008), and premature trade and financial liberalization to be avoided. Here, India provides a good example of the flexibility to switch between policies based predominantly on infant industry protection with high import tariffs, and

¹ The USA has been highlighted as an example of the harmful effects of premature trade liberalization when the country opened up its trade between 1847 and 1861, with negative consequences for industrialization (Shafaeddin 2006).

those with a trade liberalization focus.² Prior to 1991, India had had high tariffs for more than sixty years. This, for India, was the era of its industrial catch-up, and as Kaplinsky documents (1997: 683), its manufacturing growth over the period surpassed the performance of other developing regions beyond East Asia. In 1991, the country adopted a ‘new’ IP that supported a substantial opening up of the economy (see Kaplinsky 1997) by removing most non-tariff barriers on imports, reducing tariff levels overall as well as dispersing tariff rates, and cancelling export restrictions. This succeeded in accelerating India’s total factor productivity (TFP) growth in manufacturing in the subsequent period (Milner, Vencappa and Wright 2007).

Third, there is a case for government intervention in stimulating exports beyond mere trade liberalization (see also Figueiredo 2008). This could take the form of subsidizing exports (indirectly through exchange rate undervaluation), marketing the country’s exports (e.g., through export promotion agencies or national trading companies), assisting firms in foreign market research, foresight exercises, and certifying product quality. The limitations imposed by the current global trade architecture on the use of these measures are discussed below.

In the context of globalization and trade liberalization, it is also necessary to consider both firm entry and exit. The benefit of exports and of open markets can be harvested only if it is possible for new firms to be established to take advantage of the new opportunities, and to enter export markets. Open markets associated with globalization can raise overall firm productivity only if inefficient firms are forced to exit (Harrison and Rodriguez-Clare 2009).

Thus, trade liberalization in itself is not likely to carry much benefit (only the relatively small static benefits of allocative efficiency) if barriers to entry exist in the domestic economy (see also Deraniyagala 2001). Overcoming these barriers in most of the ILCs requires not only ‘soft industrial policy’ (such as appropriate regulation, investment in skills, good governance and a conducive ‘investment climate’) (Harrison and Rodriguez-Clare 2009), but also more pro-active government prodding.

Finally, encouraging export growth is not enough in itself. While export-promoting measures, if correctly implemented and managed, may contribute to export growth, it is still not known whether and how they contribute to greater export diversification. As Harrison and Rodriguez-Clare (2009: 41) suggest, further empirical research is needed to establish if—and how—IPs could improve the diversification of a country’s exports.

2.2 The question of policy space

Two aspects closely associated with the globalization process developing over the past two decades have been the new governing mechanisms for international trade and investment, and the rise of global value chains and networks (ul-Haque 2007). Both have been argued to reduce the policy space of ILCs in trade and investment policy, and

² Another good example of the shift in IP is from Europe. As documented by Ulltveit-Moe (2008), IP shifted in Europe at the end of the 1970s towards privatization, deregulation and supporting innovation (R&D) in order to facilitate further adjustment of their industries after having collected the benefits of protection, state subsidies and state-owned enterprises for more than two decades after the war.

to create new barriers for developing-country firms (Chang 2009; Cimoli et al. 2006; Dosi 2009; Perez and Primi 2009; Rodrik 2004).

Governance mechanisms for international trade and investment refer to the World Trade Organization (WTO) and related multilateral³ and bilateral agreements. These may restrict the ‘policy space’ of governments to follow IPs.

Rodrik (2004) summarizes the restrictions on developing-country policy space imposed by the WTO, international financial codes and standards, regional trade agreements, and the IMF. For instance, the WTO prohibits adopting export subsidies or linking incentives to export performance, using local-content-rules in government procurement or FDI, for utilizing quantitative restrictions or measures that discriminate against investors by origin. The organization also promotes the reduction and harmonization of tariffs (Altenburg 2009; ul-Haque 2007). But many of these measures—if not most—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 ILCs.

These WTO rules have also meant alternative forms of IP, such as the use of anti-dumping actions and others (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 IP instruments of the advanced countries to protect and support their own industries to the detriment of the development of industries in ILCs. For instance, in the USA bilateral agreements increased from 3 to 29 (Ludema 2007) between 2001-06. As Bhagwati (2005, as quoted in Ludema 2007: 1220) comments, ‘the various lobbies in the United States have now shifted from multilateral trade negotiations to bilateral free trade agreements (FTAs) because they expect a much richer harvest for their own agendas’.

The implications for the IPs of the ILCs are, then, finding options on how to minimize the restrictions from multilateral agreements, and how to avoid being caught up unduly in bilateral arrangements.

With regard to the former, Chang (2009; 2002), Rodrik (2004) and others point out that the ILCs are exempt from some stipulations (such as export subsidization) and that many of the WTO remedies are ‘actionable’. Consequently, many of the poorest countries may (and will) be able to adopt these without danger of the richer countries

³ 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 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.

taking action. Poorer countries may also be better able to ‘camouflage’ WTO-inconsistent policies (Lall 2004). Furthermore, the richer countries may use different protection instruments with the WTO where their interest may be threatened, such as anti-dumping measures. Consequently, the worst-affected could be the middle-income countries that are unable escape restrictions but lack the resources and knowledge to apply for new forms of protection.

Globalization also impacts on a country’s policy space through the global supply chains, now controlled by large multinational production enterprises and buyer-lead networks organized by retail firms (Park and Saggi 2006). In this ‘vertical specialization’ or ‘unbundling’, trade in intermediate goods in particular has become more important, contributing significantly to growth in world trade (Ricotta 2009; Yi 2003). Leading global firms establish private standards which firms in the ILCs will need to apply as the minimum requirement for product quality if these countries wish to break into these supply chains (Altenburg 2009).

As a result of these supply chains and the accompanying market concentration, the labour-cost advantage of the ILCs may no longer be relevant (ul-Haque 2007). Also, as Hart (2001: 3-4) comments, ‘if supply chains are becoming more global, then efforts to promote industries by insisting that supply chains be national are unlikely to succeed’. This means, as Collier and Venables (2007) stress, that in designing an appropriate import tariff structure, it is now becoming more difficult to make a distinction between final and intermediate goods, as many of the so-called final goods are, in fact, further inputs in the global chain.

The evolution of global supply chains has also been accompanied by greater international mobility of labour, particularly of talent (Ulltveit-Moe 2008), having ramifications for government policy on taxes, immigration, land ownership and remittances, amongst others.

In such an environment, the challenge for IP is to assist potential firms and industries access these producer/buyer networks or supply chains, and to attract and retain talent. This translates not only into challenges, but also opportunities, such as reduction in ICT costs, and the fact that the specialization triggered by the unbundling of production may enable the learning process to become more local and incremental (Collier and Venables 2007).

3 Fuel, food and financial crises (2007-09)

The current global economic crisis (2008-09) is somewhat different than previous setbacks in that it has been characterized by successive waves of external shocks to the developing countries over a short three-year period. These include fuel and food price hikes in addition to the financial crisis originating in the sub-prime mortgage market of the USA. Following the outbreak of the latter and the bursting of the financial price bubble(s), house prices started declining sharply early in 2007. Faced with declining housing prices and a depreciating dollar, speculators shifted to securitized commodity and oil markets late 2007 and early 2008, putting further pressure on the prices of oil and other commodities. The prices of cereals (maize) became more closely linked to oil

prices, as a result of the growing demand for biofuels,⁴ and basic food prices rose sharply during 2008.

Since September 2009 to the time of writing, understandably the economics literature has focused on understanding the causes of the crises, the short-term stabilization and recovery measures required, and the regulatory reform needed in the financial sector. Although many have pointed to the need for a fundamental restructuring of the global economic and financial architecture, longer-term implications for the management of economic policy have been relatively neglected. In particular, one such area that will require more attention in the wake of the fuel-food and financial crises is IP.

If we consider IP to constitute government intervention aimed at steering the structural transformation of the economy, then the triple crises have underscored the necessity of structural transformation on a massive scale. This is felt on two levels. First, there is the need for (accelerated) structural transformation within countries. Here in particular, it is clear that domestic resilience is essential (for instance, through diversification and food security strategies) in order to reduce the risk of being negatively affected by external shocks or to be susceptible to the moral hazard associated with over-large and inadequately regulated financial firms (Naudé, Santos-Paulino and McGillivray 2009).

Second, there is also a need for global structural transformation. Here, global imbalances obviously will have to be addressed: developing countries to consume and invest more to drive industrialization, and the advanced economies less, so as to reverse current global trading balances. But the crises have also illustrated that structural transformation is unlikely to take place if it is left to market forces only. Indeed, the crises—and the massive market failures associated with the financial slump in particular—have dealt a crippling blow to free market fundamentalism and are paving the way for softening the neoliberal critique of government intervention and regulation.

Given the twofold need for structural transformation, what are the main areas of interest from an IP perspective that are emerging from the triple crises? There are two overlapping areas: one relates to the food and fuel crises and is concerned with the agrifood-industry-energy nexus and its implications for food security in developing countries. The second relates to the financial crisis and its consequences through the recovery measures of the advanced economies (the USA in particular). This will have implications for ideology, will have a demonstration effect, will impact on the global spread of manufacturing, and will affect global savings-imbalances.

These two overlapping areas are briefly discussed and directions for further research noted in the following.

3.1 Agrifood industrialization, energy and food security

At the developing-country level, there are, first, the challenges posed by the food and fuel crises which, given the co-movements in food and fuel prices, are somewhat interrelated. Addressing these challenges will require industrial policies to take into account *inter alia* the following:

⁴ The cultivation of a hectare of maize in the US requires 40 litres of petrol and 75 litres of diesel (Monbiot 2009).

- How to promote progressively larger investments in less fuel-intensive agriculture. This would require greater efforts at stimulating innovation in less fuel- and energy-intensive farming and food processing (Wallgren and Höjer 2009);
- How to create a more predictable agricultural policy environment for farmers and traders. This is especially relevant in southern Africa, where there have been no less than four food crises since 2000. Here, Tschirley and Jayne (2010) argue that government intervention in food markets has been counterproductive and has created uncertainty, which discourages private traders from importing sufficient food at critical times;
- How to identify a role for IP in food price stabilization, given the need for government policies to address both food price stabilization as well as the consequences of price instability (Galtier 2009). Market instruments (such as market integration, insurance and future markets) are also important tools in the quest for food price stability, but cannot be relied on by themselves. Government intervention, however, should not work against these, but in a complementary fashion (Galtier 2009);
- How to reduce the high transport costs in Africa (Carmody 2009; Naudé 2009; Naudé and Matthee 2007), that contribute to higher food prices in much of Africa (Tschirley and Jayne 2000);
- How to stimulate, in particular, the development of the entire agrifood industry in ILCs through appropriate public investment in wholesale markets, processing and retailing (see Reardon et al. 2009);⁵
- How to persevere with the above initiatives, given that it may take considerable time for a strong agrifood industry to emerge in ILCs (Ulltveit-Moe 2008);
- How to best deal with agricultural subsidies in advanced countries, as for instance, the reintroduction of countercyclical subsidies to agriculture by the USA in 2002 (Ludema 2007); and
- How to coordinate the transfer of technology and finance to increase access to cheaper and cleaner energy for agrifood industry development in ILCs (Schelling 2009).

3.2 The financial crisis

With respect to the financial crisis, four potential implications for IP can be discerned. The first is likely to be a softening of the ideological resistance to IP, both through the manifest failure of market fundamentalism as well as through the very visible IP approach used by the USA (and other advanced countries) to facilitate recovery. Second, the IP used by the USA for recovery will have implications for ILCs, as well as for policies dealing with the climate change challenge (see below). Third, the move towards more explicit IP in the US may have a demonstration effect and, fourth, resolution of the longer-term global imbalances, one of the underlying causes of the

⁵ Reardon and his co-authors (2009) describe the impact of globalization on the agrifood industry as ‘dramatic’, and elaborate on the structural changes in the industry in terms wholesale markets, processing and retailing. Many of the challenges of participating in global value chains discussed in the previous section are particularly relevant in the case of the agrifood industry.

financial crisis, may give a further impetus to IP. These four implications are briefly discussed next.

First, the financial crisis dealt a blow to the ideological resistance to IP. It was the inappropriate ‘industrial policies’, which favoured the rise of the financial sector in the USA (and which could be traced back to the deregulation of the 1980s and 1990s) that contributed to massive market failure (Ely 2009; Leonard 2009; Stiglitz 2009). Erosion of the ideological resistance is also evident from the growing debate in the US’s popular media, where one discussant asked, ‘Dude where is my industrial policy’, and another remarked that the US’s lack of an industrial policy boils down to a *de facto* industrial policy of ‘send[ing] manufacturing plants to other countries that do have proactive industrial policies’. Furthermore, given its neoliberal stance, the World Bank generally has been opposed to industrial policies, but modified its position by hosting a workshop on industrial policy in the last quarter of 2009.

Second, the USA is resorting to very explicit industrial policies to assist its recovery. These include measures such as direct subsidies to ailing firms (with some, but not all, bank and automobile manufacturing firms being bailed out),⁶ import protection (e.g., tariffs on tire imports from China), and domestic content measures (the ‘buy American’ clause in the Recovery Act). These will have diverse implications for the developing countries, in addition to directly reducing their exports to the USA. For instance, the bailout of banks *too large to fail* has been compared to ‘financial protectionism’⁷ and the flight-to-safety effect has now made it more expensive for developing countries to obtain finance for industrial and infrastructure projects. The bailout of car manufacturers may postpone the demise of an industry that has been described as being ‘based on a nineteenth century combustion engine and the eternal promise of cheap oil’ (Galbraith 2009). It may also limit investment into sectors with more potential for future growth, and those particularly needed by developing countries—such in energy and IT—for catching-up and mitigating the impact of climate change.

Third, there is likely to be a demonstration effect, which may strengthen the case for ILCs to be granted more policy space in multilateral agreements. In this respect, many are appalled by the double standards of the USA in being apparently opposed to IP, but practicing it covertly before the crisis and overtly thereafter. In particular, the double standards are most obvious with respect to the bailout of the automobile manufacturers.⁸ The demonstration effect will have an impact on industrial development through the return to discretionary fiscal policies and a reduction in the degree to which inflation targeting will be pursued. The financial crisis has led to the return of discretionary fiscal policy, as most countries (where possible) introduced some form of countercyclical policy. Indeed, the IMF called for a global fiscal stimulus of 2 per cent of global GDP.

⁶ For instance, Lehman Brothers was allowed to failed but Goldman Sachs received bailout money; AIG was bailed out but not ‘monoline’ bond insurers (which in aggregate were just as large).

⁷ The effect of the selective industrial policies applied to the US banking sector made the banks that were the biggest prior to the crisis—and which needed the largest bailout amounts—even bigger. The Bank of America, J. P. Morgan Chase and Wells Fargo experienced an asset growth of 138 per cent, 51 per cent and 43 per cent between June 2007 and March 2009 (Cho 2009).

⁸ According to Naím (2009), ‘When the South Korean government bailed out Hyundai Electronics Industries in 2001, the US Senate passed a resolution urging the Bush administration “to assure that the unlawful bailout by the Republic of Korea is stopped”’.

Aghion (2009) suggests that such countercyclical policy could, in itself, amount to a form of industrial policy since it does not impact equally on all sectors of the economy. The sectors that are more dependent on external finance, tend to benefit proportionately more from countercyclical policies.

Fourth, over the longer term, resolution of the global imbalances in saving and consumption, which was a central cause of the crisis, may have both stimulating as well as inhibiting consequences for industrialization in ILCs.

Stimulation may come from the fact that reform of the global financial architecture to allow developing countries to run balance-of-payments deficits with less risk will have a positive impact on their industrialization. This is because ‘it is a fundamental tendency of late industrializing countries to run chronic trade deficits’ (Fischer 2009: 862). In such an environment, Fischer (2009) sees a greater role for aid to be effective, in that it will contribute to fund balance-of-payments deficits in late industrializing countries. He cites South Korea as an example: early industrialization was assisted by aid inflows that alleviated the constraints of its high trade deficits during the 1960s.

The more ambiguous effect of resolving the global savings-and-trade imbalances will be the impact on firm- and industry-level strategies in the USA, following the decline in American consumption and growing consumption in developing economies. Karabell (2009: 24) anticipates that in order to prosper, US firms will become less attached to their homebase, and more aggressive global players.

Finally, the financial crisis has highlighted the dangers of banks that are ‘too big to fail’. Similarly, the question has been asked to what extent could the size and concentration of multinational enterprises (MNEs) in industrial production pose global risks. In this regard, Singh (2002) proposes the establishment of an ‘international competition authority’ (ICA). One of the major areas of future research needs to be on the global coordination of IP, an issue given even greater urgency by the climate change challenge.

4 The climate change challenge

Climate change has become one of the defining difficulties of the early twenty-first century and is perhaps the most important challenge facing industrial policy (Altenburg 2009). As the UN’s Climate Panel’s fourth report (IPCC) recently indicates, the world’s climate is heating up, with possible catastrophic consequences, particularly and disproportionately for the world’s developing countries (Dervis 2008). The IPCC report also suggests that part of this global warming is due to substantial emissions of greenhouse gases (GHG) caused by human economic activity. Almost 50 billion tons of GHGs are emitted annually, and the recommendation that these be reduced to a level that will limit global warming to no more than 2 degrees Celsius. According to the Stern report (Stern 2006), the cost of achieving this is estimated to be around 1 per cent of the global GDP, although this has recently been revised upwardly to between 2 and 5 per cent (Webster 2009). The implications are, first, that industrialization and industrial catch-up by ILCs will be confronted increasingly by resource constraints and climate change impacts, and second, that without the possibility of creating viable pathways for low-carbon industrialization, little progress can be made towards a global agreement to reduce GHGs and vice versa. The difficulty is finding (i) better, low-carbon production technologies, and (ii) sharing and transferring these effectively. Both must contend with

the apparent need not to impose undue restrictions on the prospects of the poorest countries for development and industrial catch-up,⁹ and at the same time not cause politically unacceptable job losses in advanced economies.¹⁰

Regardless of whether or not countries can eventually reach a meaningful agreement on curbing GHG emissions, selective industrial policies will increasingly take centre stage in the efforts of governments to grapple with the environmental constraints that give rise to higher commodity and energy prices, growing inequality, and sluggish growth in advanced economies. Even developing countries, which may not have been responsible for the current carbon levels in the atmosphere, and which may not have to face similar carbon prices in the future, will increasingly come under pressure from increased international environmental standards and taxes (Altenburg 2009). Given the problems inherent in industrial policy as discussed in Naudé (2010a), caution is warranted. The nature of climate change and the resolutions required contain all the elements of market and coordination failure, and the danger of government failure, a central issue in the debate on industrial policy. Not only can inappropriate IP fail to stem GHG emissions, it may worsen the problem.

Hence, a new dialogue on industrial policy in the context of climate change is overdue. What should the focus of such a debate be and where is further research now especially needed?¹¹ The overall issues at stake for IP are summarized in Table 1, where a number of new cross-cutting challenges for IP can be identified throughout all of the areas of concern.

The first obstacle is posed by the technological innovation required to reduce GHG emissions, for instance, in carbon capture and storage (CCS) technologies and in alternative energy sources such as solar, wind and hydro power (see also Pendleton 2009). The major factor contributing to human GHG emissions is the burning of fossil fuels for energy, underscoring the need for technological innovation to find alternative uses of energy in production (Wallgren and Höjer 2009). As energy is vital for manufacturing, policies addressing the energy efficiency of this industry will play an important role in reducing greenhouse gas emissions. Herein, reducing oil dependency (already mentioned earlier as imperative in agriculture and food processing for food security) poses a particularly difficult challenge, given that oil has been described as the ‘lifblood of industrial civilization’ (Matutinovic 2009: 4251).

⁹ As Pendleton (2009) points out, developing countries have a need for ‘cheap energy rather than clean energy’. With emission levels in developing countries (outside China) many times lower than those of the advanced economies, with most of the current stock of carbon in the atmosphere due to the advanced economies’ growth over the past 150 years, and with the availability of relative plentiful reserves of coal, most developing countries’ position is that they can forego increasing their carbon emission through using coal energy, only if adequately compensated for by advanced economies.

¹⁰ Mattoo et al. (2009) report that if the USA were reduce its GHG emissions from the 2005 levels by 17 per cent by 2020 (its proposal to the COP-15), its industrial output could decline by around 4 per cent.

¹¹ It should be mentioned that there is growing interest in economics on understanding and directing household/consumer behaviour. Hence there may be a role for government moral persuasion, and/or taxes on the consumption of certain products could also be used to affect changes in consumer behaviour—such as buying less energy-intensive products, using less packaging (Wallgren and Höjer 2009)—but a discussion of these issues falls outside the scope of the present paper.

Table 1
Industrial policy dimensions of sustainable resource use

Areas of concern	Possible role for industrial policies
Energy production contributes significantly to carbon dioxide emissions (Most energy production is in state-owned or controlled companies).	Selective intervention to reduce the carbon footprint of energy production, e.g., taxation of carbon-intensive energies, R&D on new forms of energy, subsidization of clean energy. Competition policy, regulation and market entry/exit policies for energy provision.
Food production impacts negatively on water resources, ecosystems, biodiversity and contributes to GHG emissions	Selective interventions to increase agricultural productivity through innovation (R&D), price controls, taxes, subsidies and regulations. Policies and regulations for appropriate biofuel production.
Industrial production pollutes and contributes to environmental degradation and GHG emissions.	Selective interventions to tax pollution, reduction of carbon-intensive production methods, increase recycling. Reduce interventions that explicitly or implicitly subsidize carbon-intensive industries. Subsidization of carbon capture and storage (CCS). Coordination of global markets for tradable permits for greenhouse gas emissions. 'Green job retraining', manufacturing 'extension' services (advice centres), national co-ordination of policies.
Transport of the increasing volumes of traded goods associated with globally distributed production and consumption networks contributes significantly to GHG emissions.	Selective interventions to tax the carbon content of trade goods; subsidization of research into cleaner energy sources for transport; development and manufacturing of hybrid engines.

Source: Compilation by author.

An important question of central concern to IP, is how this technological innovation will be brought about? On the one hand, there are those, who perhaps support the neoliberal view on IP, and would prefer allowing market mechanisms to reduce GHG emissions. They see the pricing of carbon, through proposed cap-and-trade programmes, as sufficient to provide the incentives for new technological innovation (e.g., World Bank 2009). On the other hand, there is a growing discomfort with this position, with many scholars and policymakers now doubtful that market mechanisms will be up to the task. David et al. (2009) argue that due to the public-good nature of carbon emissions, the market will fail to price carbon accurately, and that governments lack knowledge as to where to set emission caps. They may, in fact, have an incentive to set the caps too high. David and his colleagues also warn of the potential risk that tradable emissions are abused by speculators, a relevant point in light of the financial crisis.

David et al. (2009) propose large-scale, diversified, and publicly subsidized R&D into new technologies, and the postponement of investments in current, limited technologies (to prevent 'lock-in') until more appropriate and efficient systems can be adopted. With appropriate CSS technologies, for instance, developing countries could continue to use their coal deposits to foster industrial development, and thus avoid the huge adjustment costs which may otherwise be imminent (Schelling 2009).

A second challenge lies in increasing the efficiency of energy markets. Again, this cannot be done through a *laissez-faire* approach only, simply, because as Matutinovic (2009: 4255) comments, ‘energy markets are *sui generis*, dominated by state-owned monopolists’. By implication, industrial policies of the past, which treated energy as an important source of rents and as a strategic industry, have resulted in the energy intensity of current production. Correcting this would, in most countries, mean a *change* in the *de facto* industrial policy stance with respect to energy markets. In this regard, Altenburg (2009: 16) calls for an ‘ecological industrial policy’ (EIP) which could utilize instruments such as the removal of all subsidies on fossil fuels, taxes on environmental pollution and use of carbon; emission trading schemes; R&D for technologies; creation of venture capital funds for ‘green’ projects; appropriate public procurement favouring low-carbon and energy efficient suppliers, and the support of eco-labelling. As EIP is only in its infancy in (some) advanced economies, its application in ILCs is an important topic for further research.

A third difficulty emanates from the implications of climate change for industrial development in developing countries. This challenge should take into consideration the costs and disadvantages, as well as possible opportunities. It should also contribute to a better understanding of the dynamics between development and environmental impact, based on the premise that ‘the best defence against climate change is economic development’ (Schelling 2009.16).

With respect to the opportunities concerned, Weiss (2009) believes that if carbon taxes and regulations in leading industrial nations become inhibitive, certain carbon-intensive heavy industries, such as steel, paper and pulp, metals, petrochemicals and cement, may relocate to developing countries with lower carbon prices and fewer constraints. This, however, may not generate much opportunity to the developing countries, as the advanced countries have already indicated that they will impose import taxes on goods from countries with lower carbon prices. Mattoo et al. (2009) use a CGE model to estimate that an across-the-board import tariff based on the carbon content of imports in the USA would correspond to that country imposing a 20 per cent import tariff on China and India. Thus, carbon-based import tariffs would in the post-agreement era dilute any potential temporary benefit for the developing countries. Hence Mattoo et al. (2009) suggest that developing countries should pressure the WTO for a ban on carbon-based import taxes. In the absence of this, perhaps a better opportunity for developing countries would be in supplying the rising global demand for low carbon, alternative energy sources and technologies; this is what China seems to be aiming for (Pendleton 2009).

Finally, getting IP capacity right could be essential for the successful conclusion of an effective global agreement on GHG reduction. A perspective that emerges from Naudé (2010a) is that successful industrial policies require proper *content*, i.e., policies should address the relevant constraints to industrial change, and *implementation*. Both depend on a particular institutional setting to ensure that governments have the information and the capability, that political interference is limited, and that incentives properly aligned. The problem is that many countries lack the adequate institutional setting, and may get both the content and implementation wrong. Moreover, the particular challenges that environmental sustainability introduces for industrialization would require an unprecedented degree of global coordination. These factors could understandably jeopardize any attempt at reaching a goal. Indeed, the difficulties outlined here may contribute to the reluctance of many of the poorest countries to agree to goals in the first

place. Hence, advancing our understanding of the process of industrial policy formation, its success and failure, and how the international community can assist the poorer countries to craft and implement IP remains a major challenge for researchers and policymakers.

5 The rise of the ‘Asian driver’ economies

China and India have been described as the ‘Asian driver’ (AD) economies (Kaplinsky and Morris 2008). After decades of high growth, these countries will soon be amongst the world’s five largest economies (Wilson and Purushothaman 2003). China is expected to overtake the USA as the world’s foremost economy by 2041 while India is expected to move to 3rd place by 2050 (Wilson and Purushothaman 2003). This rise, which has been accompanied by an increase in their shares of global manufacturing, introduces both opportunities as well as challenges for ILCs.¹²

Consider, first, the opportunities. Opportunities for the development of manufacturing will exist to the extent to which India’s and China’s growth creates a market for the export of manufactured goods from ILCs; that their production of the intermediate inputs used in manufacturing will result in the availability of cheaper inputs; and that their direct investment, and accompanying transfers of knowhow in ILCs will increase. It is also hoped that as the ADs economies mature and their labour costs start to rise, new niche markets in low-cost labour manufacturing might open up for the ILCs. In theory, all of these beneficial impacts are possible. But what does the empirical evidence to date suggest?

The evidence seems to support the possibility that the growth of China and India has benefited ILCs in Latin America and Africa. Perry (2006) and Bizquez-Lidoy, Rodriquez and Santiso (2006) find that in the case of Latin America, increasing trade with China and India led to higher commodity prices, the availability of cheaper inputs and rising capital inflows. Jenkins et al. (2008) report that between 1999 and 2005 China’s imports from Latin America increased ‘sevenfold’. Similar benefits are evident in the case of Africa, at least in terms of exports. African exports to China and India have been accelerating in recent years, growing annually between 1999 and 2004 by 48 and 14 per cent, respectively, i.e., almost twice as fast as the continent’s exports to the rest of the world. In total, 27 per cent of Africa’s exports are now destined for Asia (compared to 14 per cent in 2000), which is almost as much as to its traditional markets in the EU (Broadman 2007: 11, 2).

Another possible significant trend is the rise in FDI from China and India, which exceeded US\$70 billion in 2006 (Ulltveit-Moe 2008). These could bring resources, knowhow and spillover effects to African and Latin American markets. Currently not much empirical research exists on the scope, impact and success or failure of this FDI to

¹² Despite the rise of the AD economies, one should not perhaps overestimate their global influence. For example, as Dyer (2009) shows, the Chinese economy, although in the ascendancy and no doubt an important global player, is still only about 20 per cent of the size of the US or European economies. It is still a very poor country (not yet within the top 100 countries in terms of per capita incomes), and faces significant domestic economic and political issues.

contribute to industrialization in these countries, although there is some concern, as most of this FDI tends to flow into resource extraction.

Finally, as China and India develop and their wage levels start to rise, it may encourage low-cost labour-intensive manufacturing to shift to ILCs. This possibility follows from the ‘flying geese paradigm’ extending to the current ILCs (see Akamatsu 1962). Whether this is a valid expectation may depend on the extent to which the newly industrialized economies (NIEs) and China’s comparative advantage moves away from labour-intensive to more capital-intensive manufacturing, and how wages rise. It may also depend on whether global industrial coordination will allow ILCs the policy space by opening up the markets of the advanced economies and NIEs to their exports. Here Collier and Venables’s (2007) argument for trade preferences to be extended to ILCs deserves consideration.

While the AD economies may hold opportunities for ILCs, the experiences discussed above are not very conclusive and point, moreover, to the many challenges needing to be overcome. Furthermore, the threat of the rising AD economies has been seen in the literature and popular press as overshadowing possible advantages for industrialization in ILCs (see, e.g., Jenkins et al. 2008; Kaplinsky and Morris 2008; Carmody 2009). The apprehension over the industrialization of the ILCs stems from the fact that the AD economies, particularly China, have grown to dominate global markets for low and medium labour cost manufactured goods. Thus, ILCs may need IP to deal with the competition not only from advanced countries, but also—and perhaps even more importantly—from the ADs (ul-Haque 2007). These are seen to constitute a direct risk to economic activities in ILCs (impacting on the nature of their relationship with the AD economies), as well as an indirect threat to their foreign markets (as the AD economies and the ILCs may compete for the same markets and sources of FDI) (Jenkins et al. 2008).

According to one prevalent view, the interest of the AD economies in ILCs is largely restricted to natural commodities. As Carmody (2009: 1198) observes, the relationship between the ADs and SSA is becoming ‘reminiscent of the colonial era’—with SSA largely exporting raw materials to India and China while importing manufactured goods.¹³ This view is supported by Kaplinsky and Morris (2008) who note that Africa exports mostly commodities, not manufacturing, to China. The share of oil and gas in Africa’s exports grew from 31 per cent to 47 per cent between 1995 and 2005, while manufacturing remained static. In Latin America, 75 per cent of exports to China are primary products such as soya, iron ore, copper, pulp, fish meal and leather (Jenkins et al. 2008).

The AD economies are currently interested in largely unprocessed commodities from Africa and Latin America, raising their prices in the process, and at the same time exporting labour-intensive manufactured goods at declining prices to ILCs. The relevant fear, now, is that (i) the AD economies’ trade with ILCs will tip their terms of trade against manufacturing (Jenkins et al. 2008) and (ii) that local manufacturing will not be

¹³ The concerns about the potential negative impact of China’s current pattern of engagement with Africa is something the country’s leadership seems to be aware of, judging by press reports on the growing interest expressed by the Chinese government in establishing manufacturing plants in SSA (Anon 2009).

able to compete with imports from China. Faced with Chinese competition, the question now is whether ILCs can follow the strategy of advanced countries, namely to ‘upgrade’ their production basket and move to more complex production. Alvarez and Claro (2009: 570), studying the impact of Chinese imports into Chile, are pessimistic and conclude that ‘the ability of firms to escape China’s import competition is limited’.

In addition to these direct impacts on ILCs, there are also ‘indirect’ effects, as the AD economies are likely to continue to pose a threat to ILCs’ exports in foreign markets. SSA, in particular, may be at risk of losing markets to China after its accession to the WTO and the end of the Multifibre Agreement (MFA). More than 50 per cent of all of SSA’s manufactured exports are in clothing and textiles, in which China (and other Asian countries) now enjoy global dominance (Kaplinsky and Morris 2008). For Latin America, similar concerns are documented; Brazil has lost markets to China in the low-technology labour-intensive segments as well as in higher-technology fields (Jenkins et al. 2008). Although more empirical evidence on the extent of this threat with respect to SSA and Latin America is still needed, there is some indication of China having displaced exports from other Asian countries (Eichengreen, Rhee and Tong 2004).

With regard to the benefits from the expanding FDI by the AD economies, so far most have been in mining, infrastructure and energy (particularly oil and natural gas), enforcing the above-mentioned centre-periphery arrangement (Jenkins et al. 2008). Furthermore, in countries where investment in manufacturing does take place, it seems to result in a crowding-out of domestic firms. For instance, Carmody (2009) finds a ‘competitive displacement’ of manufacturing in Zambia by Chinese firms, as Zambian firms are only one-quarter as productive as their Chinese counterparts.

Finally, there is an optimistic view that the development of the AD economies may create product and market space for ILCs, but a more negative interpretation cautions against this optimism. For example, Park and Saggi (2006: 25) point to the fact that the AD countries still have ‘hundreds of millions of workers largely in the rural sector, who remain poor and will keep a lid on real wages faced by industrialists over the next decades’.

In order for SSA and Latin America to withstand the AD threat and to utilize the opportunities would necessitate the existence of an effective IP that takes advantage of their closer proximity to the US to improve on the ILCs’ speed to market (Jenkins et al. 2008). It would also require international support, for instance, through the granting of trade preferences to African manufacturers, following the examples of how the MFA supported Mauritius’s industrialization or the USA’s African Growth and Opportunity Act (AGOA) helped the clothing and textile manufacturers in Lesotho, Swaziland and Kenya (Collier and Venables 2007). Such trade preferences should not impose too stringent rules of origin (ROO) and, according to Collier and Venables (2007), would imply a certain minimum level of local competence in terms of skills and infrastructure—areas which may imply a facilitating role for governments.

With regard to IPs for individual countries, Kaplinsky and Morris (2008) underscore the need for such policies, and point to Lesotho as a country where progress is being made. According to these authors (*ibid.*: 68), Lesotho is:

the most innovative, energetic and successful in applying effective industrial support among the SSA countries. This includes creating the

Lesotho National Development Corporation to manage and facilitate the industrial estates, an inter-ministerial task to eliminate bureaucratic blockages, tax incentives, specialized training programmes, government lobbying potential buyers, actively lobbying South Africa to fight for the extension of the Duty Credit Certificate Scheme for exporters, and setting up a Trade and Investment Facilitation center to act as a one-stop-shop.

6 The role of the entrepreneur

Entrepreneurs play an important part in economic growth and development. This has been a key insight since the contributions of Schumpeter (1912) and others (see Naudé 2008, 2010b). There is substantial agreement that recovery after the triple crises and the challenge of climate change will require entrepreneurial innovation.¹⁴

Gries and Naudé (2010) set out a model to illustrate the role of entrepreneurial innovation in the re-allocation of resources from the traditional (agricultural) sector to the modern (manufacturing) sector. Here entrepreneurs have an essential role: first, in the creation of new firms outside the household, which offer new products and introduce new processes and which provide information as a ‘lead’ activity. And, second, in the expansion of firms (and wage employment) by making use of scale economies. Larger firms tend to specialize, and the clustering of specialized firms can give rise to the localization of economies, further encouraging innovation and specialization. Finally, entrepreneurs raise the returns to human and physical capital, thus providing incentives for further investment and education.

The point to emphasize is that entrepreneurs might not provide these functions automatically, as they are constrained by market failures. Recognizing this, Rodrik (2007: 7) discusses a number of such entrepreneurship-inhibiting market failures in financial, labour and product and knowledge markets, remarking that in developing countries ‘the deck is stacked against entrepreneurs who contemplate diversifying into non-traditional areas’.

Consider, first, the creation of new firms and market failures due to the information they generate. Early or lead entrants into a market or production process reduce the uncertainty for followers by providing information as to its profitability (Hoff 1997). This is described as a ‘cost-discovery’ function by Hausmann and Rodrik (2003).¹⁵ Industrial policy that facilitates this cost-discovery function of entrepreneurs needs to be flexible and to encourage experimentation. According to Aghion (2009: 15), the entrepreneurially-consistent IP should be able to facilitate experimental state intervention but must be able to ‘stop the intervention if it turns out not to be efficient’. This is where many consider that IP in Africa failed, in that by eschewing an approach

¹⁴ As put by *The Economist* (14 March 2009: 3), ‘The lights may have gone out on Wall Street, but Silicon Valley continues to burn bright’.

¹⁵ The current European industrial policy (EC 2005; 2007) recognizes the role of lead entrants. For example, it has adopted a ‘lead market initiative’ which consists of ‘legal and regulatory frameworks, fostering of open-innovation mechanisms, standards, public procurement practices, intellectual property protection, or the availability of venture capital’ with the aim to ‘lift obstacles that hinder the development of new markets’ (EC 2007: 7-8).

consistent with entrepreneurship, it had few mechanisms to get rid of inefficient, protected firms. Firm entry is important to assume new opportunities, to provide higher returns to human capital, and to signal what an economy may be good at producing, but once a firm has failed, exit is essential. According to Campbell (2009:1), citing the case of Pakistan, IP can fail when government lacks the strength ‘to cut support to unsuccessful companies and industries’ that are politically well-connected.

Second, market failures often prevent firms from growing. An empirical regularity associated with the failure of industrialization in much of SSA is the failure of small firms to grow. In contrast, growth in firm size as a country industrializes is a ‘stylized fact’ of economic development. This, however, depends crucially on entrepreneurship—specifically entrepreneurial talent or ability as illustrated by Murphy, Schleifer and Vishny (1991). Market failures result in a mis-allocation of entrepreneurial talent.

The role of entrepreneurial ability in the industrial success of the NIEs is emphasized by Nelson and Pack (1999). They offer a dual economy model to explain the structural transformation of economies (such as Korea and Taiwan) from being characterized by a ‘craft’ sector to a ‘modern’ economy. They assign a key role to the ‘effectiveness of entrepreneurship’ (or entrepreneurial ability), which they see as a vital determinant of the rate of assimilation of technology (1999: 420). These researchers stress the imitative role of entrepreneurship as well as its risk-taking role, given that the adoption of (mostly) foreign technology by entrepreneurs in these countries entails significant uncertainty (1999: 418).

Market failures inhibit the third role of entrepreneurship, i.e., creating incentives for further investments in human capital formation. Since the process of industrial catching up requires a higher level of skilled labour, entrepreneurs create an increased demand for educated labour. This leads to an overall improvement in human capital in a country, facilitating, in turn, the imitation and adoption of foreign technology.¹⁶ Nelson and Pack’s model (1999) implies that a ‘rapid’ expansion of skilled labour can be absorbed only if entrepreneurial ability is high, and that without entrepreneurial ability, the returns to physical and human capital are small (Nelson and Pack 1999: 423). Entrepreneurial ability, therefore, has positive externalities, which could justify its support within IPs.

Despite the threefold importance of the role of individual entrepreneurs, many earlier IPs largely failed to explicitly incorporate the entrepreneur. This is especially true in SSA, where most IPs have been unsuccessful. In SSA, market and government failures resulted in a much larger mis-allocation of entrepreneurial ability to unproductive, and even destructive activities (see e.g., Baumol 1990; Baumol, Litan and Schramm 2007).

In contrast, there is considerable evidence to indicate that in countries (the NIEs and China) where IPs have been more successful, better recognition has been given to the nature of entrepreneurs and their relation to the state. For instance, in Singapore and Korea, where the entrepreneurial base was considered to be lacking, IP was initially aimed at complementing and strengthening the domestic scene. This was accomplished by allowing in more foreign entrepreneurship, and by providing greater financial

¹⁶ Keller (2004: 752) points out that for most countries, foreign sources of technology account for 90 per cent or more of local productivity growth.

support to enable entrepreneurs to take on more risk in the duplication and adoption of foreign technology (Nelson and Pack 1999). On the other hand, in Taiwan and Japan, where the entrepreneurial base was fairly strong to begin with, more limitations were placed on foreign entrepreneurs.

China's economic transformation since the late 1970s also shows a measure of recognition towards entrepreneurship. According to Siebert (2007: 899), 'the Chinese now show a larger acceptance of the market economy than the three large continental countries of Europe'. He describes how instead of dismantling or privatizing state-owned enterprises upfront (as was done in Eastern Europe or some African countries), Chinese reforms fostered the emergence of more productive enterprises by maintaining the SOEs and 'simply by letting new economic activities develop outside the government controlled sector' (ibid.: 900). China also allowed the expanding class of private sector entrepreneurs to influence the evolution of the institutional framework shaping its industrial policy, described as 'institutional entrepreneurship'.

Neglect of the entrepreneur in IPs may, partly, be due to the likelihood that the nature of the firm was not adequately understood (Lazonick 2010), that early development economics did not perceive entrepreneurship as a binding constraint on economic development (Naudé 2011) and that the measurement of entrepreneurship was a neglected area.

Understanding the nature of the firm should be seen in conjunction with the recent advances in distinguishing the role of entrepreneurship across various development stages. This recognizes that different types of industries develop or evolve over the course of a country's development path (Lin, in Lin and Chang 2009) and that each type of industry entails a unique type of entrepreneurship. This, in turn, requires different types of support from the government. Hart (2001), for instance, makes a distinction between a 'developmental state' and a 'regulatory state', arguing that a developmental state, which is more hands-on and leading in the industrialization process, is more appropriate once a country's industry starts to benefit from centralization and intervention, i.e., where the firm and the entrepreneur still operate well within the technological frontier. A similar argument is made by Phan, Venkataraman and Velamuri (2008) in a study of entrepreneurship in emerging countries. They conclude (ibid.: 325):

... studies of entrepreneurial regions across the world ... have underscored the critical role of governments at different levels in the emergence of these regions ... the magnitude of government influence, which is significant in the early stages of development, seems to decline in later stages relative to other factors ... The explanations for this vary from the traditional factor substitution wherein government kick-starts the development of a sector, which then becomes attractive for private capital to accumulate, to the post-modern institutionalization, in which the development of such institutions as intellectual property regimes engender capital accumulation.

Thus, they find that in the early stages of development, government intervention is needed to address market failures and to kick-start growth, which they see as a prerequisite for the later evolution of an entrepreneurial economy. The relationship between the private sector and government is summarized in Table 2. More to the point,

Table 2
The entrepreneurship- industrial policy nexus through the stages of a country's development

Stage of development	Private sector mode	Type of state orientation
Factor-driven: Production most intensive in unskilled labour and natural resources	Traditional economy: <ul style="list-style-type: none"> - Dominance of primary sectors - Specialization in cash crops, mineral extraction - Spatially dispersed production - Small entrepreneurial base 	Fragile or facilitating: <ul style="list-style-type: none"> - Establishing authority, capacity and/or legitimacy important to move from fragile to facilitating - No industrialization under fragile state conditions - Facilitating state aims at establishing conducive business environment (property rights, stability, rule of law, accessibility) - Functional and broad-based industrial policies gradually implemented
Efficiency-driven: Production more efficient, and movement towards technology frontier starts	Managerial economy: <ul style="list-style-type: none"> - Manufacturing sector grows - Greater product diversification - Larger firms, SOEs and MNEs dominate - 'Fordist' production by obtaining productivity growth through economies of scale - Growing clustering 	Developmental or facilitating: <ul style="list-style-type: none"> - Developmental state to use active and selective industrial policies to encourage domestic technological capability formation - As the economy develops, this role may change towards facilitating role focusing on industrial policies aimed at high-technological innovation
Innovation-driven: Production of high-tech goods and innovative to expand the technological frontier	Entrepreneurial economy: <ul style="list-style-type: none"> - Rise in services sector - High value added manufacturing activities with greater specialization dominate - High-tech clusters stabilize - Re-emergence of small businesses on both national and international markets 	Facilitating: <ul style="list-style-type: none"> - The state promotes basic framework conditions - Substantial focus on innovation, technology - Market competition, market development through entry of new entrepreneurial firms important

Source: Compiled by author based on the discussions in Altenburg (2009); Ács and Szerb (2009) and Porter (2004).

summarizes some of the emerging perceptions of entrepreneurship and the role of the state during the various phases of a country's development.

The left-hand column refers to three development stages: the factor-driven stage, efficiency-driven stage, and innovation-driven stage as described by Porter (1990; 2004). In the middle column this is set against the dominant private sector mode and on the right-hand column against the type of state orientation most conducive for the development of the private sector mode. This indicates that during the early stage of development, the entrepreneurial base is still small, and that the private sector operates mainly in dispersed, traditional low-productivity activities. During this phase, states are often fragile (see Naudé, Santos-Paulino and McGillivray 2008) and the major development challenge is to move the state from being fragile to becoming facilitating. In other words, the state establishes legitimacy, authority and capacity, and starts to put in place the basic

framework conditions for investment and productivity growth. This will enable core entrepreneurship to emerge, often in accordance with the country's comparative advantage,¹⁷ and will prepare the economy towards an efficiency-driven path.

However, to fully embark on the path of efficiency-driven growth, the state needs to expand its intervention in the economy to 'defy' its comparative advantage through selective industrial policies. This enables the economies of scale to be reaped, which will encourage self-reinforcing agglomerations, facilitate growth in firm size, and induce a greater role for state-owned enterprises (SOEs) and multinational enterprises (MNEs) as the latter take advantage of special economic zones (SEZs) and other incentives. These processes are described in section 3.

At some point, the country's sectoral development will be such that a flexible IP is needed in order to make the transition from being interventionist and selective towards becoming less interventionist and more functional. Many countries embark on trade liberalization during this phase of development. The examples used here include the EU, the USA, and India. China's two-track approach since 1978 can be seen as a variant of this transition, whereby change is gradually introduced by allowing a more liberalized private sector economy to develop without disbanding state-owned enterprises.

Thurik (2009), based on earlier work by Audretsch, Keilbach and Lehmann (2006) and Audretsch, Grilo and Thurik (2007), discusses the transition from a managerial to an entrepreneurial economy (or from the efficiency to the innovation-driven stage) as due to the simultaneous rise in the importance of knowledge and the entrepreneur in production. In Thurik's words (2009: 4):

... the managed economy is the political, social and economic response to an economy dictated by the forces of large-scale production, reflecting the predominance of the production factors of capital and labour as the sources of competitive advantage. By contrast, the model of the entrepreneurial economy is the political, social and economic response to an economy increasingly dominated by knowledge as the production factor, but also by a different, yet complementary factor that had been overlooked: entrepreneurship.

The simultaneous rise in the importance of knowledge and entrepreneurship is no coincidence. As Schumpeter recognized, entrepreneurs are the essential drivers of innovation and the 'filters' through which knowledge externalities spill over. Support for entrepreneurship, therefore, tends to be for the formation, function of regional clusters (because of the localization of spillovers) and their linkages with the rest of the economy, innovation, and venture capital support. In such an environment, an open economy that stimulates creativity and the attraction of the 'brightest and the best' receives priority in IP.

What are the implications for IP? As yet, there is no substantial literature on the relationship between the stages of development, the evolving nature of entrepreneurship and the orientation of the state. There will likely be difficulties for governments and

¹⁷ Indeed, Justin Lin defines a 'facilitating state', as a 'state that facilitates the private sector's ability to exploit the country's areas of comparative advantage' (Lin and Chang 2009: 484).

international development organizations in identifying the stage of development because these stages overlap (as the third column in Table 2 suggests), some countries may leapfrog stages, and because the instruments and measurements to guide IP at each stage are not well understood. With respect to the latter, Ács and Szerb (2009) recently compiled a ‘global entrepreneurship index’ (GEI) which may contribute to linking the intermediate targets for IP with outcomes across different stages. The GEI is untested as yet. Generally, substantial scope for further research in this area remains.

6 Concluding remarks

Table 3 summarizes the key trends and challenges discussed here as well as some selected research questions emanating from these. The cross-cutting issues emerging from the discussion of these new challenges are fourfold:

- the need to understand how the institutional context in each case determines the content and application of IP;
- the need to better understand how aid influences the industrial policy process in the case of the poorest countries;
- the need for global coordination: here mention was made for the need for a globally coordinated industrial policy framework (GCIPF); and
- better measurement of the factors that influence the content and application of IP needs to develop.

A brief word on each of these cross-cutting research needs is in order.

First, the institutional environment for IP requires more research: the question to be tackled concerns the design features of institutions and politics that could minimize information problems, and the risks of rent-seeking. While this has generated recent discussion in the literature (e.g., Rodrik 2007), there is no satisfactory answer for any country wishing to steer its structural change. The quest for an answer will, no doubt, be complicated by the country-specificity, historical contingency and serendipity that colour the development process.

Rodrik (2007: 41) suggests that further research into three institutional features relating to IP formulation may be worthwhile. These are (i) how to ensure ‘embeddedness’ (buy-in) of IPs, (ii) how to match incentives (rents) with penalties (carrots and sticks) and (iii) how to ensure the accountability of governments.

Altenburg (2009) recommends further research into how the context in developing countries dictates that IPs be adapted to local circumstances. He lists five aspects that may be important for a better understanding, namely (i) sophistication of the economy, (ii) endowment of natural resources, (iii) location of the country, (iv) its history and patterns of industry, and (v) the development orientation of political actors.

With regard to the latter aspect, Robinson (2009) emphasizes the need for further study to assist IP designers to understand better the nature of the political equilibrium prevailing in a country at a specific time, and to identify either how to make that equilibrium more amenable to good IP, or to take the existing equilibrium into account and design IP around the constraints. Hodler (2009: 92) recommends further research to

determine the extent to which ethnic homogeneity may reduce the ‘political considerations for public agencies’.

Table 3
Selected research questions on IP and development

Trends and challenge	Research questions
Global production sharing	<ul style="list-style-type: none"> - What kind of political and institutional reforms are prerequisites for IPs? - What are the global (as opposed to national) costs and benefits of industrial policies? - What are the reasons for declining employment intensity of manufacturing? - How can ILCs create more policy space under the WTO? Would this be desirable for all ILCs? - How can IP be better coordinated globally? - Are MNEs too concentrated and too large in global production? Is there a case for an international competition authority? - Can and should the WTO rules differentiate between ILCs and others? - Are bilateral agreements more constraining for industrial development than multilateral agreements? - Which IPs are more conducive to technological catch-up in ILCs? - Has the role of FDI in facilitating industrial catch-up changes in the past decade? - Are Intellectual Property Rights (IPRs) constraining or facilitating industrial catch-up?
Recent crises	<ul style="list-style-type: none"> - What is the importance of the financial sector and its relationship with industrial development for ILCs? - Should IP in ILCs focus on primarily on manufacturing? - What role is there for IPs to foster higher agricultural productivity, agro-processing and agro-business in ILCs? - How does the commodity price cycle stifle the development of manufacturing? - What will be the impact of new IPs in the USA on global manufacturing patterns?
Climate change challenge	<ul style="list-style-type: none"> - Are the requirements for successful IP making commitments to greenhouse gas reductions incredible? - Can environmentally sustainable industry create sufficient ‘green jobs’ to make changes politically sustainable? - What is the relationship between industrialization and energy use? - How will a deal on climate change influence the global distribution of heavy industry? - What will be the impact of climate change on industrial catch-up through FDI? - What niches or space in global production will be yielded to ILCs if advanced economies move into low-carbon manufacturing? - What are the opportunities for ILCs in green manufacturing? How can these best be seized? - How can national interests be balanced with the growing need for globally coordinated IP?
Rise of China and India	<ul style="list-style-type: none"> - Does China, and more generally East Asia's leading position and dominance in labour-intensive production create obstacles for ILCs, or opportunities for leapfrogging? - Is the ‘flying geese paradigm’ relevant for the current ILCs? - How can ILCs find and enter unexploited niche markets in the global manufacturing chain? - Is China and India's manufacturing deepening to the extent that it creates room for ILCs to enter low-skill intensive manufacturing? - Is China's growing role in Africa stimulating or depressing manufacturing growth?
Role of entrepreneurship	<ul style="list-style-type: none"> - How can entrepreneurial rent-seeking and corruption be limited? - Can an entrepreneurship index assist countries to guide and measure the

Source: Author's compilation.

Related to this concern is the role of national leadership and vision in the institutional support structure for good IP, as leadership may be particularly important for forging a national consensus and for driving nation-building. Here, Chang (2009) sees the important research questions as centring around the issue of how leaders can find the right vision, how they can induce bureaucrats to share it, and how the state's objectives can be aligned with those of the rest of society. He is particularly concerned that the challenge facing many of today's ILCs is getting the content and application of IP right in circumstances where the country is 'run by flawed leaders presiding over a politically weak and internally fragmented state' (ibid.: 19).

A second cross-cutting research theme emerging from this paper is the essentiality for a globally coordinated industrial policy framework (GCIPF). This is particularly acute, given (i) the need for coordinating the transfer of technology and compensatory funds from advanced economies to developing economies to ensure the widespread adoption of low carbon and CCS technologies; (ii) the need for differentiation in global agreements to allow different scope and leeway for ILCs, and (iii) the need to reconsider the role of large MNEs through global competition assessments. Moreover, the institutional design of GCIPF is likely to be affected by information and incentive problems similar to those experienced with national IPs during the past 50 years, making a clearer understanding of IPs' institutional dynamics even more important.

The third research theme that is closely related to both the institutional understanding of good IP and its global coordination, is the role of aid in influencing the content and application of industrial policy in the poorest countries. But not much is understood about aid's influence. As Altenburg (2009: 37) points out, IP programmes in many of the poorest countries are 'almost entirely donor-financed'. According to Altenburg, there are four ways in which aid may undermine successful IP, and where further empirical research is needed. Aid may have an impact through (i) donor imposition of conditionality that reflects their ideological biases, (ii) it may contribute to Dutch-disease effects on manufacturing by overvaluing the exchange rate, (iii) that more aid and donor organization activity in a country may attract the most talented human capital and hence reduce the quality of bureaucrats and entrepreneurs, and (iv) that donor fragmentation and resulting inconsistencies with national strategies may raise uncertainty as well as costs involved in industrialization.

Finally, in light of the trends and challenges discussed above, cutting across the attempts to modify IPs is the need for accurate measurement to inform the content and application of IP. The problem is one of intermediate targeting, i.e., if the ultimate target of IP is to structurally improve the economy, what intermediate targets need to be measured? Here, a number of useful development indicators have been introduced over the past few decades, but these call for more research into the relationship of these indicators, on the one hand, with eventual targets, and with policy instruments, on the other. Some of the relevant indicators that countries might consider include, for instance, (the list is not exhaustive) The Ease of Doing Business Index, The Worldwide Governance Index, The Investment Promotion Performance Index, The Logistics Performance Index, The World Competitiveness Index, The Bertelsmann Transformation Index, and The Global Entrepreneurship Index.

In conclusion, it is clear that while IPs are inevitable, given the challenge facing developing and advanced economies, many difficulties and uncertainties remain. A substantial and challenging research agenda is therefore open.

Acronyms

AD	Asian driver (economy)
CCS	carbon capture and storage technologies
EC	European Commission
EIP	ecological industrial policy
FDI	foreign direct investment
FTAs	free trade agreements
GEI	global entrepreneurship index
GHG	greenhouse gases
ICA	international competition authority
ILCs	industrially lagging countries
IP	industrial policy
IPCC	intergovernmental panel on climate change
MNEs	multinational enterprises
NEG	the new economic geography
NIEs	newly industrialized economies
NTCs	national trading companies
ROO	rules of origin
SEZs	special economic zones
SOEs	state-owned enterprises
TRIMS	trade related investment measures
TRIPS	trade related aspects of intellectual property rights
WTO	World Trade Organization

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