Chapter 3 Theoretical perspectives on industrial policy

The debate on industrial policy has arguably been the most ideological one in the history of economics. The best proof of the ideological nature of the industrial policy debate is shown by the debate on the 'economic miracles' in the East Asian countries, like Japan, (South) Korea, and Taiwan. It is hard to believe it today, but until the 1980s, many mainstream economists were denying the existence – not to speak of the efficacy – of industrial policy in those countries. Why did these economists do that, when a quick look through financial newspapers and magazines – not to speak a short visit to those countries – would have revealed how extensive and intrusive their industrial policies are? They did so because their view was based on the ideological conviction that a successful economy cannot possibly be based on interventionist policies (see Chang, 1994 a, Ch. 3, for a review of this earlier literature on East Asian industrial policy).[13]

Having said that, differences in opinion on the desirability of industrial policy is not simply ideological. There are differences owning to genuine differences in theoretical perspectives. Therefore, it is important to review the key theoretical arguments for and against industrial policy in the debate and the differing assessments of their empirical importance.

3.1. DEFINITION OF INDUSTRIAL POLICY: GENERAL VS. SELECTIVE INDUSTRIAL POLICY

One thing that has made the industrial policy debate particularly contentious is that there hasn't even been an agreement on what an industrial policy is. The most straightforward definition would be any policy that affects the evolution of industry; especially of the manufacturing sector ('industry' includes not just manufacturing but also sectors like mining and electricity). But most people engaged in the debate tend to define industrial policy as what is known as 'selective industrial policy' or 'targeting', which is the definition we adopt in this report. This is a policy that deliberately favours particular industries – or even firms – over others, against market signals, usually to enhance efficiency and to promote productivity growth for the targeted industries as well as for the whole economy, but also to manage the industries' decline smoothly (see Chang, 1994 a, Ch. 3, and Chang, 2011, for some discussions on the definition of industrial policy).

These days, contrary to the heyday of market fundamentalism in the 1980s and the 1990s, few people would deny that there are instances where state intervention in industrial development is justified. However, the mainstream view these days insists that industrial policy should be of 'general' (or 'functional' or 'horizontal'), rather than 'selective' ('sectoral'

13 For example, as late as in 1988, Bela Balassa, the eminent neoclassical trade economist was arguing that "apart from the promotion of shipbuilding and steel, [the role of the state in Korea] has been to create a modern infrastructure, to provide a stable incentive system, and to ensure that government bureaucracy will help rather than hinder exports" (Balassa, 1988, p. S286).

or 'vertical'), kind. They argue that the state should concentrate on providing things like education, R&D, and infrastructure that benefit all industries equally (but are likely to be under-provided by the market), rather than trying to 'pick winners' by favouring particular industries or even firms (more on this later).

The first problem with this view is that the distinction between selective and general industrial policies cannot take us very far. In a world with scarce resources, every policy, however 'general' it may look, has discriminatory effects that amount to targeting. This point is easier to see in relation to R&D – a government giving out R&D subsidies implicitly favour the more R&D-intensive high-tech sectors. However, the point also applies to infrastructure and education, especially at the higher ends of them. We do not build some abstract infrastructure but either a road between the horticultural export region and an airport or a railway between a copper-smelting factory and a seaport. Building the railway, instead of the road, means that the government is favouring the copper industry. Likewise, we do not educate some generic engineers but either chemical engineers or electronics engineers. Therefore, a government providing more funding to electronics engineering departments than to chemical engineering departments is in effect selecting the electronics industry over the chemical industry. The only policies that may be called truly 'general' are policies regarding basic education and health, calling which industrial policies is really stretching the concept beyond reason.

Viewed from this perspective , there is selectivity and targeting involved in virtually every industrial policy measure, even though it may be commonly defined as a 'general' measure. To put it dramatically, to target or not to target, that is not the question. The real question is how precisely to target what.

If some degree of targeting is unavoidable, it may worth asking whether a policy that is less targeted is better? This cannot be the case, as the more targeted a policy is, the easier the monitoring of the beneficiaries becomes. This, in turn, means that policy 'leakages' (say, due to sub-optimal efforts at productivity increase made by the beneficiaries of the policy, or due to corruption) are going to be less, making the policy more cost-effective. Indeed, mainstream economists recommend more precise targeting in social policy for this reason (on targeting in social policy, see Mkandawire 2005). Of course, targeting has its costs. For example, too precise a targeting may, in a world with fundamental uncertainty, be bad because it 'puts all eggs in one basket'. Or it may make lobbying easier, thereby allowing firms to continue to receive state supports despite failing to deliver the expected results. Or if a policy is too precisely targeted, it will make the beneficiaries too easy to identify, making it difficult for the government to maintain the necessary myth that its policies are impartial. And so on.

Thus seen, targeting – like any other type of human action – has both costs and benefits and whether the likely net benefit of a less targeted policy will be higher depends on a host of factors: the nature of technology[14], the administrative capabilities of the state[15], the organization of the industry concerned[16], and the political economy of the country[17]. If we can make any generalizable statement about targeting at all, it will be that the relationship between the degree of targeting and policy success is likely to be non-linear – some degree of targeting is inevitable, while some more of it may be desirable, but too much of it may not be good. Given all of this, we should drop the pretence that it is possible 'not to target' and try to attain the best possible degree of targeting, which may differ across industries and countries.

3.2. WHY MANUFACTURING?

Before we discuss whether the government should try to 'artificially' develop selected industries through industrial policy, we need to discuss whether the subjects of 'industrial' policy should be manufacturing industries.

In theory, a country's economic development can be based on any industry – manufacturing, services, or agriculture (and other natural resource industries), as we pointed out in the section above (section 3.1). And indeed in practice, there are many examples of successful industrial policies targeted at agriculture (e.g. Danish agriculture in the late 19th and the early 20th century, as discussed in Chang, 2009; agro-industry in Brazil and Chile, as we discuss in Chapter 4) or at services (e.g. financial services in Britain or Dubai, logistics in Singapore; tourism in Rwanda, as we discuss in Chapter 4). Furthermore, there is a growing opinion that services are becoming more important than manufacturing and therefore countries should – and can – develop on the basis of services.

So, before we move on to the discussion of theories of industrial policy in the next section; in this section, we discuss what the justifications are for the focus on manufacturing in development strategy, whether this focus is still justified (if it ever was), and, more specifically, whether Africa can – and indeed should – pursue a different development strategy from the one pursued by today's rich countries in the past, focusing more on services.

14 Developing an industry with a more complex – and thus more difficult-to-learn technology – technology may require more custom-made policy supports than developing an industry with a simple technology.

15 A state with weak administrative capabilities may be better off with implementing narrowly-focused policies targeted at a few industries, rather than general policies that require a lot of on-the-ground monitoring (e.g. subsidized loan programmes for a large number of small and medium-sized enterprises).

16 A strong industry association will make a more targeted industrial policy more cost-effective, as it can monitor policy compliance better and thus reduce leakages.

17 A country with a lot of high-level corruption but little low-level corruption may be better off with generalized policies, as it will reduce the risk of hijacking of industrial policy programmes by powerful lobby groups. In contrast, a country with the opposite combination of corruption may be better off with more targeted programmes managed at the top, as it will make leakage at the ground level through corruption less likely.

3.2.1. Manufacturing as the engine of economic development

Throughout the history of capitalism, the manufacturing sector has been the engine of economic development. Very few countries have developed their economies without developing a strong manufacturing base – so much so that the term 'industrialised country' and 'developed country' are often used interchangeably. There are good reasons why this should be the case, but two of them stand out (see Chang et al., 2013, and Chang, 2014, for further details).

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First of all, thanks to the fact that it lends itself much more easily to mechanisation and chemical processing than do other types of economic activities, the manufacturing sector has faster productivity growth than agriculture or services. Productivity increases in agriculture are highly constrained by nature in terms of time, space, soil, and climate. By their very nature, many service activities are inherently impervious to productivity increases. In some cases, the very increase in productivity will destroy the product itself – if a string quartet trots through a 27-minute piece in nine minutes, we won't say that its productivity has trebled. For some other services, the apparently higher productivity may be due to the de-basement of the product. A lot of the increases in retail service productivity in countries like the US and the UK have been achieved by lowering the quality of the retail service itself – fewer shop assistants, longer drives to the supermarket, lengthier waits for deliveries, etc. The 2008 global financial crisis has also revealed that much of the recent productivity growth in finance had been achieved through the de-basement of the products – that is, the creation of overly complex, riskier, and even fraudulent products.

Second, the manufacturing sector acts as the 'learning centre' of the economy in the sense that it plays the leading role in diffusing technological progress. Because of its ability to produce productive inputs into other sectors, what happens in the manufacturing sector has been extremely important for productivity growth in other sectors. The manufacturing sector has produced a range of productive inputs for agriculture (e.g. chemicals, fertilisers, pesticides, and agricultural machinery) and services (e.g. transport equipment, computer technology, and mechanised warehouses) that have raised productivity in those sectors. The technological diffusion to other sectors also takes form through organizational innovations originating from the manufacturing sector. For example, these days, many fast food restaurants use 'factory' techniques, turning cooking into an assembly job and sometimes even delivering food on conveyor belts. For another example, large retail chains – be they supermarkets, clothes shop chains, or on-line retailers – apply modern inventory management techniques developed in the manufacturing sector. Even in the agricultural sector, productivity has been raised in some countries through the application of manufacturing-style organisational knowledge, like computer-controlled feeding or temperature control (Dutch agriculture is the prime example here).

3.2.2. Have we entered a post-industrial age? Manufacturing vs. services

The services sector has come to dominate the economic structure of many economies in the latter half of the 20th century and even more so in the 21st century, both in terms of output and employment. There is a growing belief that we have now entered a 'post-industrial age' and therefore services should be the engine of economic development. This is especially apparent in the advanced economies, but also in many African countries, the growth of services (especially tourism and telecommunications), rather than manufacturing, has become a core strategy to diversify away from dependence of primary commodities (see ACET, 2014 and ECA, 2015). There are good reasons to take the rise of the service sector seriously.

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Given massive increases in firm size, it is now more profitable to procure some services from specialist providers rather than produce them within a manufacturing firm (the latter largely being the case in the past). Telecommunications finance, and business services are now organised in a way that resembles the manufacturing sector, as scale economies and technological advance are more easily incorporated into these services to increase efficiency. In some digitalised services, in especially advanced economies, marginal costs of providing an additional unit of service have come close to zero, making scale economies even more prevalent than in the manufacturing sector.

Moreover, the revolutions in ICT and transport technology have made more services tradable, making it easier to expand output. India is often provided as an example of an economy that has achieved success through exporting services like software, accountancy and the reading of medical scanning images. Another example is Rwanda, a country that in the last 10 years has increased its foreign exchange earnings considerably through the expansion of tourism, such as gorilla viewing.

Thus seen, there are good reasons why services should play a more important role in the formulation of a country's development strategy today, compared to, say, just 30 or even 20, years ago. However, there are also good reasons to be sceptical of the discourse of 'post-industrial age'.

First, the decline in the importance of manufacturing is partly an illusion. Much of the apparent fall in the manufacturing sector's share of GDP in advanced economies is due to the decline in the prices of manufactured goods, relative to the prices of services. This is thanks to faster productivity growth in their production. Just think how computers and mobile phones have

become cheaper (holding the quality constant), compared with the costs of haircuts or eating out. When this relative price effect is taken into account and the shares of different sectors are recalculated in constant prices (that is, applying the prices of the starting year to the quantities produced in the subsequent year), as opposed to current prices, the share of manufacturing has not fallen very much in most rich countries (Chang, 2014, p. 265). In some of them, like the US, Switzerland, Finland, and Sweden, when calculated in constant prices, it has actually risen.[18]

Second, the growth of the services sector is also a bit of an illusion. A lot of services that are now supplied by independent companies at home or abroad used to be provided in-house in manufacturing firms (for example, catering, security guards, some design and engineering activities).

Third, many services that have grown rapidly in the last few decades are heavily dependent on manufacturing firms as customers. These include banking, communications, insurance, and even more importantly producer services, such as transport, design, retail, engineering, and management consulting. These services cannot prosper without a strong manufacturing sector. To an extent, a country can specialise in exporting these high-value producer services, but, given the benefits of co-location of manufacturing firms and services that supply to them, those countries that lose their manufacturing bases are eventually likely to lose those service providers too.

Fourth, low tradability characterises most services because they require consumers and producers to be in the same location, like cleaning, grooming, public utilities, or education. No one has yet invented ways to provide haircut or house cleaning long-distance. This means that countries that rely on their services sector for economic growth will eventually struggle with trade balance constraints. Services have in fact been stuck at around 20 per cent of international trade since the 1990s. Between 2004 and 2011, even in India, which is supposed to be a model of 'service-based economic development', trade surplus in services covered only 17 per cent of its trade deficit in goods (Chang, 2014). Sooner or later, India will have to face this trade balance issue.

3.2.3. Manufacturing and the African countries

The beneficial traits that manufacturing has for economic development discussed so far apply to both high and low income countries. But for African countries, which are often characterised by dependence on primary commodities there are additional advantages of diversifying their economies towards manufacturing.

First, as the Prebisch-Singer hypothesis postulates, the terms of trade (TOT) for primary commodities will deteriorate over time, making the prospect of economic development based on primary commodities dim in the long run (Spraos, 1983, provides a comprehensive review of the subject). There are a number of reasons for this. First is the Engel's Law, or low income-elasticity of demand for agricultural products – as incomes grow worldwide, the relative demands for those products fall. Second is the fact that countries specialising in

18 In the US and Switzerland, its share has risen by around 5 per cent in the last couple of decades. In Finland and Sweden, the share has actually risen by as much as 50 per cent over the last few decades.

manufactured products have the ability to come up with synthetic substitutes for primary commodities – as it happened with products like guano, saltpetre, and natural dyes, the invention of synthetic substitutes reduce demands for primary commodities and thus drive their prices down. Third is the fact that, unlike the manufacturing industries, primary commodity industries are characterised by competitive markets. This means that primary commodity producers (mostly based in developing countries) have to pass on all the surpluses generated by productivity growth to consumers, while manufacturing producers (mostly based in rich countries) can appropriate such surpluses more easily by charging customers higher prices because most of them operate in oligopolistic markets.

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Second, the manufacturing sector tends to be strongest driver for paid employment, especially in developing countries (ILO, 2014). As we have mentioned earlier, the majority of Africa's working force are stuck in vulnerable jobs – non-contractual arrangements in the informal sector, mostly in farming. Most manufacturing jobs (at least those in exporting firms) in developing countries are offered through formal channels and provide a much steadier stream of income. They are also subject to a country's labour laws and minimum wage legislation.

Third, diversifying towards more manufacturing will reduce the macroeconomic risks associated with dependence on primary commodities. At least since the 1970s, prices of primary commodities have been much more volatile than manufactured goods[19]. This makes macroeconomic management and stabilisation policies a more difficult task, especially for countries whose export revenues are highly dependent on primary commodities. Moreover, the relative ease of collecting tax revenues from international trade combined with the fact that alternative tax handles are lacking in African countries, means that African fiscal revenues are highly vulnerable to fluctuations in prices of their exports.

19 The price volatility of commodities can in part be explained by their sensitivity to global supply and demand changes. The end of international commodity agreements in the 1980s, which aimed to stabilise commodity prices through supply management schemes and marketing boards, has also had an impact. Nissanke (2010) point out that after the global downturn in equity markets in 2002, futures and derivatives markets have expanded to target commodities as part of their portfolio diversification strategy. Therefore, the presence of traders with little interest in physical commodity trading, so-called noise traders, have increased. These traders are known to make asset prices more volatile than what pure 'market fundamentals' would imply.

3.3. TWO CONTENDING VISIONS OF INDUSTRIAL POLICY IN ECONOMIC DEVELOPMENT: COMPARATIVE ADVANTAGE AND INFANT INDUSTRY PROMOTION

As we shall see in section 3.4, there are many arguments for and against industrial policy. However, in relation to industrial policy in developing countries, the fundamental division is between two different visions of economic development, namely, the theory of comparative advantage and the theory of infant industry promotion. Therefore, before we discuss more detailed arguments in section 3.3, we need to understand how these two visions differ but, contrary to the common perception, also overlap in some important ways. This is the task we turn to in this section.

3.3.1. The theory of comparative advantage

The notion of comparative advantage is often misunderstood. Even many professional economists say things like "such and such poor country does not have comparative advantage in anything", even though this is a logical impossibility. All countries, however inefficient it may be by international standards, have to have comparative advantage in something. Having comparative advantage in something does not mean that the country is better at it than other countries are; it simply means that of all the possible activities it could be conducting, the country is the best at that activity. In other words, a country has comparative advantage in an activity in which it is the least bad at – or the most good at, if you are a country near the top of the international economic hierarchy.

The beauty of the concept is that, even if a country is the most (least) efficient in producing everything, it will still benefit from trading with other countries, because specialising in the products in which it is the most good at (or the least bad at) allows it to maximise its output and, through international trade, consumption. It follows that any industrial policy that tries to promote industries in which the country does not have comparative advantage is harmful.

The notion of comparative advantage was first systematically developed by the Classical economist, David Ricardo. However, the Classical version of the theory of comparative advantage is very different from the modern neoclassical version, known as the HOS (Heckscher-Ohlin-Samuelson) version. In the Classical version, the source for comparative advantage lies in the differences in technologies – or their productive capabilities, to use a more modern terminology.[20] In contrast, in the Neoclassical

20 In the Classical version, which is based on the Labour Theory of Value, this difference is shown by the different numbers of labour hours that different countries need in order to produce the same product.

(HOS) version (which we will focus on in the rest of the section, as it is the dominant version of the theory of comparative advantage today); productive capabilities do not even feature.

In the HOS version, it is assumed that there is one best practice technology (defined in terms of the combination of capital and labour used) for each product and, more importantly, that any country can use that technology – in other words, all countries are assumed to have the same productive capabilities. The source of comparative advantage in the HOS version is in the differences in the endowments of the factors of production across countries (capital and labour – sometimes land, as a proxy for natural resources, is added). So, in this version, if a country like Ethiopia is not producing things like Lexus, it is not because it cannot but because it shouldn't – the technology used for producing Lexus is highly capital-intensive while Ethiopia has (in relative terms) a lot of labour and very little capital, which means that Ethiopia does not have comparative advantage in Lexus and therefore would be worse off specialising in it, even though it may be perfectly capable of producing it.

This flies in the face of economic realities. As the infant industry argument, which we will shortly review, emphasises, what really makes poor countries poor is their poor productive capabilities. Indeed, even in the industries in which they are supposed to have comparative advantage (such as garment, textile, and shoes); producers in poor countries struggle to establish themselves because they lack the necessary technological and organisational capabilities to organise the production and sell the products (especially in export markets) in an effective way.

Thus seen, the main challenge for developing countries is to find a way to deliberately change those capabilities – through an appropriate combination of private sector efforts (to increase productive capabilities through investments in physical equipment, worker training, the development of management skills, R&D, and so on) and public policy intervention (especially industrial policy but also more 'horizontal' investments to improve physical infrastructure, economic institutions, education, basic R&D, and so on).

One way of seeing the importance of deliberate state action in shaping a country's trade pattern and the subsequent pattern of economic development is to recall that many of the supposedly natural comparative advantages possessed by developing countries are anything but 'natural'. Kenya has comparative advantage in the 'natural' resource called tea only because the British stole tea plants from China and set up tea plantations in its colonies. Ghana and Cote d'Ivoire have 'natural' comparative advantages in cocoa, a plant from Mexico, only because the British and the French respectively decided to grow the cacao plant in their West African colonies. The same can be said of Malaysian rubber (the British smuggled it out of Brazil), Indonesian coffee (the Dutch brought it over from Africa), and Argentinian beef and leather (the Spanish brought the cattle over from Europe). In other words, many countries' 'natural' comparative advantages are the products of somebody else's industrial policy!

Given all of this, it is not unreasonable to say that the Neoclassical (HOS) version of the theory of comparative advantage assumes away the main challenge of economic development – namely, the difficulty of increasing productive capabilities. Or to put it slightly differently,

the problem with the HOS version is not so much that it is wrong within its confines but it is the wrong theory to analyse economic development with.

Having spelt out its limitations, we emphasise that the theory of comparative advantage should be taken seriously.

First of all, even when a country is using industrial policy in order to promote industries against its comparative advantage, the theory can still be a useful guide for industrial policy-makers in figuring out what the possible gains of their policy will be and how much risk is being taken. Generally speaking, if the new industry's technological requirements (if you use the Classical version) and factor requirements (if you use the Neoclassical version) are very different from those used for the industries in which the country currently has comparative advantage, the gains from succeeding will be large but also the costs of failure will be large too.[21] Thus seen, the theory of comparative advantage is like a compass – it is useful in being able to tell you where you are at the moment, but it does not tell you where to go or how to get there.

Second, even when a country tries to develop a number of comparative-advantage-defying industries, the bulk of its export earnings and jobs have to come from comparative-advantage-conforming industries, so industrial policy-makers need to take those industries seriously. For most countries, export earnings will provide the bulk of the foreign exchanges with which to buy advanced technologies (either through the importation of machines or through the purchase of technology licensing). Indeed, in the 1970s and the 1980s, even while it was busy developing industries like steel, automobile, shipbuilding, or semiconductors, the South Korean government made sure that it encouraged comparative-advantage-conforming industries like textile, garment, and shoes. Moreover, the Korea government had to (as developing countries of today, like Vietnam and Ethiopia are doing) use industrial policy to keep these industries internationally competitive. It provided these industries with export subsidies, export marketing supports (through the state agency, KOTRA), subsidies for physical investments aimed at technological upgrading, and incentives for FDI in the EPZs designated for those industries[22].

21 This statement is in line with – but goes much further than – the modified neoclassical theory of comparative advantage, developed by Lin (2012) and others. They have suggested that developing countries should not follow their current comparative advantages but should anticipate their future comparative advantage by deliberately developing industries that have comparative advantages in other countries that are more – but not a lot more – developed themselves (Lin's practical guideline is countries with 2-4 times the per capita income). Of course, once you accept that countries can, and should, deviate from their *current* comparative advantage, the decision becomes risk-taking along a continuum: logically, there is no industry that a country cannot promote against its current comparative advantage – it is only that the further away from a country's current comparative advantage an industry is, the riskier it becomes to promote it but the bigger the reward will be.

22 For example, foreign investors in these industries were given tax exemptions and allowed to have 100 per cent ownership, which was banned outside the Export Processing Zones. The already-weak labour law was suspended in the EPZs.

3.3.2. The theory of infant industry promotion

The theory of infant industry promotion offers a very different vision of economic development from the one offered by the theory of comparative advantage. In this theory, the poverty of productive capabilities is seen as the main cause of underdevelopment and the development of such capabilities as the essence of economic development.

Many people may find it surprising that the theory of infant industry promotion is even older than the Classical version of the theory of comparative advantage – not to speak of the neoclassical version; it was articulated in the late 18th century, whereas Ricardo's theory was developed in the early 19th century. They would find it even more surprising that the theory was articulated by none other than the very first finance minister of the current champion of free trade, namely the US.

Alexander Hamilton, the first Treasury Secretary of the US (or what would be called the finance minister in other countries) submitted his Report on Manufactures, to the US Congress in 1791. In this Report, Hamilton argued that the government of a backward economy (like the US in the late 18th century) needs to protect and nurture its 'industries in their infancy' (his expression) through policy measures until they grow up and can compete with superior producers from abroad – in the same way in which we protect and nurture our children before they can grow up and compete with adults in the labour market (see Chang, 2007 b, Ch. 3, titled, 'My six year old son should get a job', for a user-friendly extension of this central idea).

Hamilton suggested a range of policies for the purpose of promoting infant industry. Some of them would have been called selective industrial policy these days – provision of tariff protection and subsidies for strategic industries. Other policies, such as infrastructural development and the promotion of the patent system (to encourage technological progress), would have been called general industrial policy. Hamilton also advocated institutional developments – especially of the banking system and the government bond market.

Re-cast in modern terminologies, the key insight behind the theory of infant industry is that, in a free-trade environment, producers in backward economies cannot enter higher-value-added industries because they have inferior productive capabilities to those possessed by their counterparts from more advanced economies. In other words, the theory abandons the very assumption that makes the neoclassical version of the theory of comparative advantage inadequate for the analysis of economic development, that is, the assumption that countries differ only in their factor endowments but not in their productive capabilities. In assuming that different countries have different productive capabilities, the theory of infant industry is in the same camp with the Classical theory of comparative advantage. However, it differs from the Classical theory in arguing that these productive capabilities can be – and should be – enhanced over time through deliberate policy intervention.

In modern terms, the idea is that the protection from superior competitors provides the domestic producers with bigger markets, which has two benefits. First of all, in the short run, having a larger market allows the infant producers to achieve scale economies more easily and thus reduce their unit cost, making them more cost-efficient and internationally competitive. Second, and in the longer run, having a larger market and thus greater

production experiences lead to acceleration in productivity growth. This in turn has two channels. The first is what Arrow (1962) called 'learning by doing', that is, the increase in productivity through accumulation of production experiences. The second is through greater physical investments (which raises productivity), induced by the prospect of larger markets, as emphasised by Kaldor (1966).

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A more sophisticated version of the infant industry argument, informed by modern economics of technology, will also emphasise that government support for infant industries is not enough to produce substantial increases in productive capabilities by the firms in the protected industries. The point is that protection, subsidies, and other help from the government only create the space in which the firms can 'grow up'. The growing-up process requires that, having been given the space, the infant industries need to invest in enhancing their productive capabilities – through investments in equipment, worker training, management skills, and R&D, among other things.

This implies that the state needs to make it sure that these investments happen by putting in place an incentive system that forces and encourages these capability-enhancing investments by the firms receiving the protection. This may be done by imposing particular conditions regarding physical investments, worker training, or R&D on the recipient firms or may be done by simply stopping or reducing supports for industries that are not 'delivering' productivity growth (thereby leaving the firms to decide how to achieve it).

The validity of the theory of infant industry promotion is borne out by history. As we will discuss in greater detail in chapter 4, almost all of today's rich countries used the theory of infant industry promotion to develop their economies. They refused to accept that they should stick to their comparative advantage and actively promoted industries in which they had no business of specialising (according to the theory of comparative advantage). It is not an exaggeration to say that, unbeknownst to most people, the theory of infant industry promotion is the economic theory that has done the most to change the world.

3.3.3. Concluding remarks

In this section, we have shown that there are two contending visions of economic development, represented by the theory of comparative advantage (which is currently the dominant vision) and the theory of infant industry promotion. We have argued that the theory of comparative advantage, especially the currently dominant neoclassical (HOS) version, has limited usefulness as a framework for understanding economic development. We have pointed out that the theory of infant industry promotion, enriched by more modern economic theories of technological progress and learning, should be the guiding framework for understanding economic development – as indeed proven by the central role that the theory played in the development of most of today's rich countries in the last couple of centuries (as we shall see in greater detail in chapter 4).

However, this doesn't mean that industrial policy-makers in developing countries can comfortably ignore the theory of comparative advantage. The theory of comparative advantage can be a useful guide to knowing how much risk a country is taking in promoting particular infant industries. Moreover – although this is not an aspect that the advocates of the theory of comparative advantage highlight – even while they are raising their infant industries, countries need to rely on their comparative-advantage-conforming industries in order to generate export earnings and create employment, without which access to advanced technologies would be limited.

Thus seen, while it has critical limitations as a perspective to understand economic development, the theory of comparative advantage can be a useful complement to the theory of infant industry promotion, which captures the essence of economic development far more accurately – namely, the challenge of developing productive capabilities.

3.4. ARGUMENTS FOR INDUSTRIAL POLICY

Having examined the 'big picture' theories of industrial policy in the developing country context, let us examine more specific arguments for industrial policy in developing country context, grouped according to three themes – interdependence, capabilities, and risk/uncertainty.

3.4.1. Interdependence arguments

(a) Demand complementarities

The most well-known of what we call the interdependence arguments for industrial policy are those based on the idea of demand complementarities (Toner, 1999; Andreoni and Scazzieri, 2014). It has two varieties.

The first is the balanced growth model, which is also known as the big push argument (Rosenstein-Rodan, 1943; Nurkse, 1952). This argument stems from the rather obvious observation that industries buy and sell from each other (say, the car industry buying inputs from the steel, the glass, or the tire industry and selling its cars to workers from those industries). This means that their returns depend on all the complementary industries being set up at the same time. This requires a coordination of investment between the related industries. In theory, such coordination can be achieved through private contracting, but this is difficult to arrange – to use modern terminologies, the transaction costs of coordinating investments through private contracting is likely to be prohibitive due to the difficulty of making credible commitments. Therefore, the government can make such coordination possible by imposing a plan from the above.

Using a similar insight, Hirschman (1958) developed the so-called linkages argument, which deliberately promotes industries with particularly strong interdependences (linkages) with other sectors, whether as suppliers of inputs into other industries (forward linkages) or as buyers of outputs of other industries (backward linkages). The linkages argument is also known as the unbalanced growth model, as it argues that the government should focus on promoting a small number of industries with the greatest number of linkages, rather than trying to promote all related industries at the same time, as recommended by the balanced growth – or the big push – model.

(b) Externalities

Another 'interdependence' argument for industrial policy is based on the idea of externalities. Some interdependences exist in the form of externalities, in the sense that the performer of an economic activity does not keep the whole benefits (positive externalities) or does not bear the whole costs (negative externalities) of the activity in question (Scitovsky, 1954, is the classic article).

Activities like R&D or worker training are classic examples of activities that generate positive externalities. For example, technological knowledge that cannot be patented or skills that workers can carry with them when changing employers can be used by other producers that have not invested in R&D or training. Given this, economic agents will under-invest in them from the social point of view. In such a situation, an industrial policy-maker may use subsidies (e.g. R&D subsidies) or regulations (e.g. requiring firms over a certain size to invest in training) to raise investments in such activities so that there would be socially-optimal amount of these activities.

More recently, an argument for industrial policy based on the notion of 'information externality' has been developed (Hausmann and Rodrik, 2003; Rodrik, 2004 and 2008; Lin, 2012). The logic is that insufficient investments are made in new (infant) industries because the potential 'pioneer' firm knows that it is bound to provide a 'free experiment' to potential competitors, which can imitate the pioneer firm without running the risk involved in the 'experiment'. In this case, subsidising the potential pioneers through trade protection, subsidies, and other measures of industrial policy can bring the investments in new industries to the socially optimal level.

(c) Coordination of competing investments

Not well recognized in academic circles but very important in real life is the argument for industrial policy based on interdependences between competing – rather than complementary – activities. Simultaneous investments by competing firms may result in excess capacity in an industry, which may force firms to scrap some of their production capacities or even push some of them into bankruptcy.

In a frictionless world that we see in the text book, this does not matter, as the resources released through capacity reduction or bankruptcy can be quickly re-deployed elsewhere. However, in reality, investments fixed in physical capital equipment (machine) or embodied in workers (in the form of better skills) cannot easily be re-moulded, if at all, so the redundant machines and skills are likely to be thrown to scrap heap, resulting in social waste (see Chang, 1994a, pp. 66-7; Amsden and Singh, 1994).[23]

23 Coordination problems among competing investments may be related not only to investment but also to situations of temporary disinvestment or structural change in the industrial sector, especially in the context of the rich countries. Recession cartels and mechanisms of negotiated exit have been widely used to face periods of economic crisis or accompany structural transformation (Dore, 1986, is the classic study). More generally, support for declining sectors may be seen as an attempt to socialise risk to encourage and sustain the process of structural change and productivity growth, from which economic development derives.

This is why there was so much concern for 'wasteful competition' among industrial policy-makers of countries like Japan and Korea. These policy-makers tried to minimize wasteful competition by staggering new entries and/or additional investments in large-scale capital-intensive industries. This was done either through direct government regulation or by letting private-sector companies organise 'investment cartels'.

3.4.2. Capabilities arguments

The theory of infant industry promotion justifies industrial policy on the ground that developing countries need to enhance their productive capabilities and that the enhancement requires state support. Within this big picture, there are additional capabilities-based arguments that suggest more fine-tuned industrial policy measures, based on the recognition that the process of accumulating productive capabilities is a time-consuming and costly process, which requires more than making infant industries profitable through protection or subsidies (Lall, 1992 and 2001; Chang, 1994a; Lall and Teubal, 1998; Loasby, 1999; Andreoni, 2014).[24]

(a) Regulation of direct technology imports

A developing country can import technology directly, through FDI or technology licensing, or indirectly, through imports of machinery. In cases of direct technology import, there is less incentive than in the case of indirect import to create technological capabilities on the part of both the buyer and the seller.

Since it is costly to develop the capabilities to adapt and improve the imported technologies, the potential buyer of technology usually find it cheaper to import 'easy' (usually obsolete) technologies (which can be used without investing much in technological capabilities) or import up-to-date technologies but become dependent on the seller for their use, adaptation, and improvement. The seller is naturally reluctant to transfer core technologies, for fear of creating a future competitor. The combined result is the importation of low-quality technologies and the under-development of technological capabilities.

In order to counter these from happening during the process of direct technology import, the government of technology-importing countries can use policies to ensure that core technologies are transferred and, more importantly, that the relevant local technological capabilities are created. Many countries – Japan, Korea, Finland, and even FDI-friendly China and Singapore – have done this. The policies included 'carrots' and 'sticks'. The 'carrots' include policies that make the establishment of R&D facilities by TNCs easier (e.g. R&D subsidies, customised provision of necessary skills). The 'sticks' were measures such as requirements for TNCs concerning technology transfer, local sourcing, hiring of local workers (especially in higher-level jobs), and exports (as export markets typically have higher quality requirements).

24 Productive capabilities are personal and collective skills, productive knowledge and experience that are embedded in physical agents and organisations (Andreoni, 2011).

Some governments, such as that of Japan and Korea, also required approval for technology imports when companies (both domestic ones and the subsidiaries of TNCs) were seeking technology licensing, to ensure that overly obsolete technologies are not imported while the licensing fees for up-to-date technologies are not excessive.

(b) Supports for small and medium-sized enterprises (SMEs)

Many support measures for small and medium-sized enterprises (SMEs) are introduced on capability considerations. This is because capability accumulation usually requires some indivisible inputs that small producers cannot provide on their own – R&D, expensive machinery, worker training, or export marketing.

These inputs can be directly provided by the government through public R&D, training of workers in public universities and training institutes, and the provision of 'extension service' (technical advice) for small firms (and small farmers). Governments can also encourage the provision of these inputs by subsidizing R&D, training, or physical investments (say, through credit guarantees) by SMEs themselves. In addition, the government may provide legal and other backings for voluntary cooperative arrangements among SMEs – such as tax advantages for cooperatives of small producers or subsidies for particular joint activities among SMEs (e.g. R&D, processing, export marketing), or, more controversially, the exemption of export cartels by SMEs from anti-trust law (surprisingly many countries, including the US, does this).

3.4.3. Risk and uncertainty

Many justifications for industrial policy are based on the recognition that there are discrepancies in the ability to deal with risk and uncertainty between individual producers (whether they are corporations or individual workers) and the society as a whole, represented by the government.

(a) The 'deepest pocket' argument

The most frequently heard risk-based justification of industrial policy is that the government has the 'deepest pocket' – or the greatest ability to bear risk – in the economy. In most economies, the government is the richest single entity. It also has the ability to 'print money' – unless it is part of a currency union (e.g. CFA countries) or has voluntarily abandoned its national currency (some Latin American countries that have 'dollarized' their economies). Therefore, the government has the best ability to take on investment projects that involve high risk but can potentially bring very high returns in the future.

Even in the economically most advanced countries, high-risk projects have been directly and indirectly subsidized by the government – starting from the woollen textile industry in 18th century Britain, through to heavy and chemical industries in 19th century US, Germany, and Sweden, down to the computer, semiconductor, aircraft, pharmaceutical, and many other industries in the post-WWII period (more on this in Chapter 4).

Especially when it comes to backward economies entering industries that require large capital outlays and a large amount of technological and organizational learning, the risk is incalculable and thus turns into uncertainty. In such cases, establishing state-owned enterprises (SOEs) may be the only solution. Korea's steel-maker (POSCO), established in the late 1960s when the country's income was only 4 per cent of the US income, and Brazil's aircraft manufacturer (EMBRAER), established in the late 1950s when the country's income was only 8 per cent of the US income, are the supreme examples of this kind.

(b) Under-writing downside risk

Sometimes firms and industries have to go through major re-structuring due to factors beyond their controls, such as a major macroeconomic shock, sudden trade liberalization, dramatic technological changes, or a sudden emergence of strong international competitors. The scale of money involved in such restructuring may be too large to be bearable by the firms alone and the government may have to get involved. This is not often discussed in the academic literature on industrial policy, but a lot of real-life industrial policy is of this variety – that is, government under-writing of downside risk.

In such a situation, governments have frequently deployed industrial policy measures to restructure major companies. In some cases, it involved nationalization (and usually, although not always, subsequent privatization) of the trouble firm (e.g. nationalization of GM and Chrysler in the US after 2008) or even the entire industry (e.g. the nationalization of the shipbuilding industry in Sweden in the 1970s). It could also take the form of the government propping up the enterprise in trouble by taking a minority equity stake in it. It has also taken the form of state-mediated mergers and take-overs involving troubled firms. In the 1980s, the Japanese government was famous for engineering coordinated capacity scrapping in industries in trouble, such as shipbuilding (see Dore, 1986, for examples). The government can also provide financial help to facilitate private-sector-led restructuring by providing loan guarantees or subsidies intended to help the restructuring process (e.g. public subsidisation of severance payments).

(c) Under-writing workers' risk

In a fast-changing world, workers are exposed to levels of risk that they cannot simply bear on an individual basis – skills suddenly become redundant due to technological changes, jobs suddenly dry up due to financial crises or industrialization at the other end of the globe.

Recognising this, many countries have provided insurance against such risk for workers – unemployment insurance, job search services, subsidised retraining, and even subsidies for re-location in the case of some Scandinavian countries (e.g. government providing bridging loans to workers who have to sell their house to move to their new jobs) (Landesmann, 1992; Chang, 1994b).

These are not industrial policies in the sense we have defined in this report but they help industrial development. This is because these insurance measures promote industrial restructuring by reducing the resistance of workers to redeployment and retrenchment, on the one hand, and facilitating the movement of labour from declining to rising sectors, on the other hand.

3.5. IMPLEMENTATION ISSUES

So far, we have seen that there are a lot of respectable theoretical justifications for industrial policy. The natural question that follows is: if there are so many justifications for industrial policy, why have there been so many failures of industrial policy across time and space (although not as many as the critics of industrial policy usually make it out to be)?

The short answer is that successful policies don't just need theoretical justifications but also good implementation. Indeed, many arguments against industrial policy have been based on the argument that, while it may work in theory, it is very difficult to make it work in practice (World Bank, 1993, is the classic example). The discussion on the implementation issues has evolved a lot since the 1980s (Chang, 2011, OECD, 2013a), so it is worth examining the key arguments.

3.5.1. Policy design: Realism and adaptability

By definition, policies have to be designed well in order to succeed. Of course, a 'well-designed' policy will differ across different policy actors and also depends on who is making the judgment, but we can discuss some general principles. Two aspects – policy realism and policy adjustment – need consideration.

(a) Policy realism

In order to be successfully implemented, policies need to be realistic. Policy targets need to be commensurate with the productive capabilities of the producers – not just their current capabilities but also the likely development trajectory of their future capabilities. If the government is providing industrial policy support in order to develop an industry that is too difficult for the local producers, the risk of failure will be too high. Given the risk, it seems reasonable to say that a country should not try to leap too far from where it currently is (or where its comparative advantage lies). However, this argument has two problems, as we mentioned when we discussed the principle of comparative advantage (see section 3.2.1).

First of all, it is actually difficult to determine how far is too far. The entries of Japan into automobile in the 1950, of Korea into steel in the 1960s, of Brazil into aircraft in the 1960s are some classic examples of countries taking big leaps but succeeding beyond all expectations (Chang in the Lin-Chang debate emphasises this point; see Lin and Chang, 2009).

One reason why it is difficult to predict the success of policy is due to the difficulty of knowing exactly what productive capabilities are actually there – As Hirschman (1958) put it eloquently, economic development "depends not so much on finding optimal combinations for given resources and factors of production as on calling forth and enlisting for development purposes resources and abilities that are hidden, scattered, or badly utilized" (p. 5). Until you find and learn to effectively use those 'hidden, scattered, or badly utilized' resources and abilities, you cannot know what is exactly possible. Another reason is that it is difficult to predict how much investments will be made in capability building – by the promoted infant producers themselves and by the government and other actors (e.g. universities or research institutes jointly funded by the government and the private sector).

...policies have to be designed well in order to succeed. Of course, the difficulty is that what is a 'well-designed' policy will differ across different policy actors and also depends on who is making the judgment, but we can discuss some general principles. Two aspects – policy realism and policy adjustment – need consideration.

The second reason why the 'don't jump too far' argument is problematic is that the fact that something is risky does not mean that it should not be tried. If a country takes no risk and refuses to make any leap from its current comparative advantages, it is likely to be stuck with economic activities that only require low productive capabilities. So, some risk-taking is absolutely necessary in industrial policy, like in any other attempt to change one's current situation (e.g. corporations investing in new technologies, individuals taking out a loan to go to university).

The challenge is to take up a portfolio of projects with different risk profiles; none in some areas, a little in some others, and a lot in a small number of areas. Getting this portfolio right is, of course, not easy, but it can be – and has been – done, as you see in cases like Japan, Korea and Taiwan, in which the government supported through industrial policy some very risky comparative-advantage-defying industries (e.g. steel, automobile) while sticking to – and even further promoting – some safe comparative-advantage-conforming industries (e.g. textile, shoes).

(b) Policy adaptability

Like all other policies, industrial policy needs to be adapted to changing conditions. There are many possible factors whose changes will call for policy adaptation, but let us discuss a few important ones.

First of all, industrial policy needs to be adapted according to whether the target industries are improving their productive capabilities in line with the initial projection. If the improvement is slower than the projection, the government needs to identify the reasons and adjust policies in appropriate ways. For example, it could be that the initial projection was too optimistic, in which case government supports may need to be strengthened or the policy be dropped altogether. Alternatively, the improvement may not be happening because the firms receiving government supports are not making sufficient investments in raising productive capabilities. In this case, extra carrots and sticks (including the expulsion of poorly performing firms from the industry) may need to be introduced to induce further investments.

Second, even if each individual industrial policy is successfully implemented, the focus of overall industrial policy needs to be shifted over time. For example, as the country moves up the technological ladder, the focus of industrial policy needs to shift in order to promote technological innovation, rather than imitation and adaptation. This will require greater investments in skills, R&D capabilities, and management techniques by the firms concerned and also the government. And given that these investments take time to bear fruits, support for such investments need to be introduced in anticipation of the country's foray into new industries.

Third, even the best-designed industrial policy can be de-railed by changes in external conditions. For example, an industry may experience difficulties because of the emergence of a large and more efficient competitor (e.g. the recent rapid rise of Chinese firms in many industries). For another example, it may get into trouble because of the rise in key input prices (e.g. aluminium smelting, being an energy-intensive, is very sensitive to changes in energy prices). For yet another example, an export-oriented industry may find it difficult to grow due to a sudden change in consumer taste or a major economic downturn in the main importing countries. Some of these changes may be temporary (e.g. rise in input prices or economic downturn in the importing countries), but some are more permanent and thus necessitate fundamental change in policy. It may have to be accepted that the prospect for future growth has been permanently diminished and future investment plans have to be changed. It may become necessary to re-direct export to another market (with the concomitant adjustments in the specification of the product). And so on.

3.5.2. Political economy

The debate on industrial policy over the last three decades has highlighted that the success of industrial policy depends critically on the country's political economy (Toye, 1987; Chang, 1994 a and 2011; Evans, 1995). We consider three key aspects of it.

(a) Class politics

A successful industrial policy (like any other policy) needs to have the right political base. It is well known that countries with a strong landlord class or a strong financial capitalist class find it difficult to implement good industrial policy, as those classes want policies that may be detrimental to industry, especially the manufacturing sector.

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For example, in the US, for over two decades, Hamilton's infant industry programme could not be implemented due to resistance from the landlord class of the South, which did not want to subsidise inefficient Yankee manufacturers. It was only at the end of the Anglo-American War (1812-6), which made it clear that the US needs to develop manufacturing industries, that the supporters of Hamilton's idea could put it into practice.

For another example, in the last few decades, the strong financial capitalist classes of the UK and Brazil have used their political power to have governments implement macroeconomic and financial-sector policies that lead to overvalued currency, thereby destroying large swathes of their export-oriented manufacturing industries.

All of this, however, is not to be interpreted as meaning that a country's political economy is determined by its history. New political coalitions can be, and have been, built and policies changed.

For example, in 1860, the Northern manufacturing states of the US started establishing a new national hegemony by establishing the Republican Party, which (unlike its predecessor Whig Party) succeeded in drawing in the Western states, traditionally in favour of free trade, by offering them free distribution of public land (embodied in the Homestead Act of 1862). The Northern states completed their acquisition of hegemony by winning the Civil War (1861-1865), in the making of which the disagreement on protectionism was an important factor.

In late 19th century Prussia, Bismarck persuaded the landlord class (the Junkers) to accept high tariff protection and other industrial policy measures for the emerging heavy and chemical industries by providing it with its own protection too – in the so-called 'marriage of iron and rye'.

In the 1930s, the industrial capitalists in a host of Latin American countries broke the grip of the landlord class on economic policy by building a new political coalition the urban working class. On this new political basis, they implemented industrial policies, called the Import-Substituting Industrialisation (ISI) programme. The Cardenas regime in Mexico and the Vargas regime in Brazil are the two most successful examples.

In the 1940s and the 1950s, land reform destroyed the grip that the landlord class had on Korean politics. This created the space for a pro-industrialisation military regime to come to power in the 1960s.

(b) State-capital relationship

It is not just the relationship between different classes that defines a country's political economy surrounding industrial policy. The relationship between the government and the industrial capitalist class is another critical dimension of the political economy of industrial policy.

Following the pioneering work on Japanese industrial policy by Johnson (1982), many researchers on industrial policy in East Asia have emphasised the importance of continuous dialogue and exchange of information between the government and the private sector in making the policy well informed. However, it is also important that the government does not get beholden to particular industrial interests and thus avoid the danger of 'capture'. Peter Evans (1995) has captured this point beautifully in his notion of 'embedded autonomy'.

The notion of embedded autonomy means that, in order to be effective in its intervention, the government needs to have roots in the society ('embeddedness') but also has to have the power to impose its own will on the private sector and the rest of the society, if necessary ('autonomy'). Autonomy without embeddedness can create a state that imposes a vision that is incompatible with underlying social and economic forces and thus is prone to failure, while embeddedness without autonomy will turn the state into a vehicle for furthering the interests of powerful private sector firms – or what Karl Marx called the executive committee of the bourgeoisie. Evans used the case of Japan, Korea, and Taiwan to illustrate this point, but other countries – most notably Singapore, Germany, Italy (local governments), and Finland – also fit the description (see Chang et al., 2013, for further country details).

(c) Ideology

The nature of prevailing ideology about industrial policy matters in the determination of a country's political economy surrounding it.

If the dominant ideology is too rigid, a country is likely to use industrial policy of wrong type in wrong quantity – or refuse to use it even when it is necessary. For example, the adherence to free-market ideology by successive UK governments since that of Margaret Thatcher has made industrial policy a 'taboo' subject and prevented the country from using significant industrial policy even when the economic case was there and there was no significant political resistance from any powerful group. At the other end of the political spectrum, the autarchic communist ideology practised in Mao's China prevented the country from using industrial policies that involve using foreign technologies on a major scale or involving foreign companies.

Most of the successful cases of industrial policy intervention have shown considerable degree of flexibility in ideological terms, with Singapore as the ultimate example of ideological flexibility and pragmatism, mixing some of the most 'free market' measures with some of the most 'socialist' ones – the country may boast free trade and its welcoming attitude towards foreign investors, but 90 per cent of land is publicly owned, 85 per cent of housing is provided by government Housing Development Board, and a staggering 22 per cent of GDP is produced by SOEs (Chang et al., 2013). In contrast, in the Korean case, the effectiveness of industrial policy got compromised when the free-market, anti-industrial-policy ideology became dominant in the 1990s (Chang and Evans, 2005).

Most of the successful cases of industrial policy intervention have shown considerable degree of flexibility

3.5.3. Management of the implementation process

Even with realistic, adaptive policies and the right political-economic conditions, successful industrial policy implementation requires good capabilities to manage the implementation process. Let us discuss two key issues that have emerged from the industrial policy debate of the last three decades – namely, the question of administrative capabilities and the issues related to incentive design (for further details, see Chang, 1994 and 2011).

(a) Administrative capabilities

Needless to say, effective policy implementation requires capable people to do it. At the centre of it are the government officials working in ministries and other public agencies (e.g. public research institutes working with industries, agencies providing extension services to SMEs). But we also need capable people in the private sector agencies that actually implement some of the policy measures (e.g. the employers' association, industry associations, trade unions).

Having said this, one critical point of note is that improving administrative capabilities here do not mean training in economics (and at that narrow neoclassical economics), as many of the 'policy capacity building' programmes run by international organisations, like the World Bank, believe.

People are usually surprised to hear that most industrial policy-makers of the East Asian 'miracle' economies, especially in the early years, were non-economists – lawyers in Japan and, to a lesser extent, Korea, on the one hand, and scientists and engineers in Taiwan and China, on the other hand. They are even more surprised to hear that, especially until the 1970s, what little economics these non-economists knew was mostly of the 'wrong' kinds – Marxist economics, the theory of infant industry promotion, old-style development economics of Rosenstein-Rodan and Hirschman (see Chang, 2010, Ch. 23).

The East Asian examples show that the capabilities that good policy-makers need are not the knowledge of supposedly 'relevant' subject, like economics, but general intelligence, the ability to learn, skills to manage complex projects, and the ability to maintain organisational coherence.

Moreover, administrative capabilities are not just those possessed by the individuals working in the government and other related organisations. Organisations themselves possess capabilities in the forms of particular command structure, institutional routines, and organisational 'memories' (e.g. records and processing of past activities). The quality of these capabilities is as important as, if not more so than, capabilities possessed by the individuals who work in them.

Last but not least, it is not only the capabilities of the individual organisations implementing industrial policy but also the interaction between them that is important. The relevant bodies (public and private) need to have good working relationships with each other. They also need some mechanisms to coordinate their actions, whether through some intellectual exercises (e.g. indicative planning, foresight exercise) or through organisational structures that makes coordination easier (e.g. some super-ministry, such as France's Planning Commission or Korea's Economic Planning Board [EPB], coordinating the activities of different ministries through development planning).

The challenge, of course, is that many developing countries lack administrative capabilities at all levels (individuals, organisations, network of organisations). And indeed many critics of industrial policy have warned developing countries not to use it at least partly on the ground that countries with poor administrative capabilities cannot handle 'difficult' policies, like industrial policy (World Bank, 1993, is a classic example).

In the very short run, this may be a valid point, but in the longer run, it is a very misleading argument. It is true that building administrative capabilities takes time and investments. However, they are not as difficult to build up as many critics of industrial policy would like us to believe. Indeed, many countries – including Korea and Taiwan, two of the most prominent success stories of industrial policy in recent history – built up such capabilities over time despite having been initially criticised for having poor-quality public administration (see Chang, 2011). Indeed, given the existence of 'learning by doing' in the acquisition of administrative capabilities (and not just in the acquisition of productive capabilities, as in the original formulation of the notion of 'learning by doing' by Arrow, 1962), a government that never tries to implement industrial policy is unlikely to acquire the administrative capabilities necessary for implementing industrial policy.[25]

25 An interesting consideration in the context of poor developing countries is that they can be locked up in what Pritchett et al. (2012) calls 'capability trap'. This refers to a situation in which a developing country government develops only a narrow set of standard capabilities that are necessary for the continuous attraction of foreign aid, which in the long run undermine its ability to develop policies that are genuinely necessary for the country. OECD (2013a) also discusses this issue.

(b) Incentive design

The possession of good administrative capabilities does not mean that industrial policy implementation will be successful. The incentive system for the recipients of industrial policy supports should be designed well. The most important principle behind such design is rather obvious – the recipients should be rewarded for good performance and punished for bad performance. However, translating that obvious principle into practice is not easy.

The main difficulty is that the recipients of industrial policy support are likely to manipulate the definition and the measurement of performance indicators so that they can exaggerate good performance and underplay bad performance. In order to counter this, a number of measures can be taken.

First, in line with the theory of embedded autonomy, the performance targets for industrial policy should be set in consultation with the business community but not purely on the basis of what businessmen say, as they are likely to over-state the difficulties and under-state their strengths. This means that there have to be independent third-party opinions provided by technical experts, academics, journalists, and the like. The deliberation councils that were used in Japan and, less effectively, in Korea show how this process can be managed (Johnson 1982; Dore 1986; World Bank 1993).

Second, once the targets are set, they should be clearly specified and the reporting requirements on them set. Publicly announcing the targets will make their subsequent manipulation more difficult. However, that will make the revision of targets more difficult, reducing policy adaptability, which we discussed above. There is no easy answer to this dilemma. An increase in policy adaptability can only be bought at the increased risk of policy manipulation, even though the shape of this trade-off differs across time and space.

The possession of good administrative capabilities does not mean that industrial policy implementation will be successful. The incentive system for the recipients of industrial policy supports should be designed well. The most important principle behind such design is rather obvious – the recipients should be rewarded for good performance and punished for bad performance. However, translating that obvious principle into practice is not easy.

Third, more attention should be paid to the trends in performance targets, rather than their absolute levels at any given point of time. When it comes to industrial policy programmes with a long time horizon, it should be expected that the protected industry cannot survive without subsidies or protection for years, if not decades. However, even for those cases, it is important that performances improve over time.

Fourth, whenever possible, export performance should be given a high status as a performance indicator, as it was the case in the East Asian countries. This is because export performance indicators are far less open to manipulation by the recipients of industrial policy supports than are domestic market performance indicators, especially when the firms in question have significant market powers.

3.6. CONCLUSION

In this chapter, we have examined various economic theories related to industrial policy.

First, we discussed the issues surrounding the definition of industrial policy (section 3.1). In particular, against the widespread view that industrial policy should be general (or horizontal), rather than targeted (or selective), we argued that, in a world with scarce resources, all industrial policies involve some degree of targeting and therefore that there is no such thing as truly general industrial policy. We also pointed out that there can be no presumption that a less targeted industrial policy is better.

In the next two sections (sections 3.2 and 3.3), we explored some 'big picture' issues about economic development, providing backgrounds to the theories of industrial policy that we examine later in the chapter. First we discussed why industrial policy needs to focus on manufacturing, especially in developing countries, despite the growing popularity of the discourse of 'post-industrial age'. Then we discussed the two competing visions of industrial policy in economic development in developing countries – namely, the theory of comparative advantage and the theory of infant industry promotion. We argued that the theory of infant industry, complemented by considerations of comparative advantage, offer the best perspective on industrial policy in developing countries.

...The debate on industrial policy has been conducted in theoretically impoverished ways. Advocates of industrial policy have often failed to present the full range of theoretical considerations that are necessary (and were implicitly incorporated in real-world industrial policy practices) while not paying enough attention to the theories of policy implementation.

Then we examined arguments for industrial policy (section 3.4), based on various aspects of: interdependence (demand complementarities, externalities, coordination of competing investments), productive capabilities (challenges posed by direct technology imports, challenges faced by SMEs), and risk/uncertainty (for high-risk project, for downside risk, for workers' risk). We highlighted that there are more justifications of industrial policy than is acknowledged even by some supporters of it – such as the coordination of competing investments and the underwriting of workers' risk.

This discussion was followed by a discussion on implementation issues. We first discussed how realism and adaptability are needed in industrial policy design. Then we discussed how political economy considerations (class politics, state-capital relationship, and ideology) need to be incorporated in the making and the implementation of industrial policy. Finally, we examined issues related to the management of the

implementation process, such as administrative capabilities and incentive design. While many critics of industrial policy refer to the above-mentioned implementation issues as reasons for most developing countries, especially the ones in Africa, not to attempt industrial policy, we argued that the critics often present those issues in partial and misleading ways and that there are many ways in which those issues can be dealt with.

What emerges from the discussion in this Chapter is that the debate on industrial policy has been conducted in theoretically impoverished ways. Advocates of industrial policy have often failed to present the full range of theoretical considerations that are necessary (and were implicitly incorporated in real-world industrial policy practices) while not paying enough attention to the theories of policy implementation. The critics of industrial policy have ignored many of the theoretical arguments for industrial policy and, based on their narrow theoretical perspectives, too readily dismissed even the arguments they acknowledge. They have also exaggerated the implementation issues and presented them in biased ways.

The full range of relevant theories, whether they are ostensibly for or against industrial policy, need to be taken on board and synthesised to offer us a richer and more nuanced perspective. Indeed, as we tried to show in our comparison of the theory of comparative advantage and the theory of infant industry, synthesising theories that are supposedly on the opposite sides can significantly improve our theoretical understanding and policy practice.