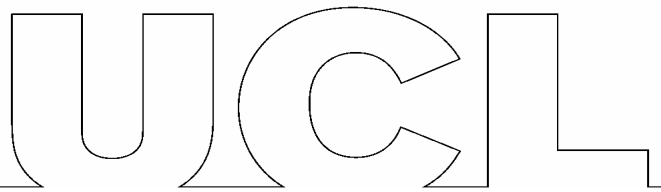


CENTRE FOR THE STUDY OF ECONOMIC AND  
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**POLICIES FOR PROMOTING TECHNOLOGICAL CATCHING UP:  
TOWARDS POST-WASHINGTON APPROACH**

Slavo Radosevic

University College London,  
School of Slavonic and East European Studies,  
s.radosevic@ucl.ac.uk

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Centre for the Study of Economic and Social Change in Europe  
UCL School of Slavonic and East European Studies  
Gower Street, London, WC1E 6BT  
Tel: +44 (0)20 7679 8519  
Fax: +44 (0)20 7679 8777  
Email: [csesce@ssees.ucl.ac.uk](mailto:csesce@ssees.ucl.ac.uk)

# **POLICIES FOR PROMOTING TECHNOLOGICAL CATCHING UP: TOWARDS POST-WASHINGTON APPROACH <sup>1</sup>**

**Prof. Slavo Radosevic<sup>2</sup>**  
s.radosevic@ucl.ac.uk

## **Abstract**

This paper analyses the evolution of policies for technology catch-up through three periods: import-substitution, (augmented) Washington consensus and post-Washington period. We analyse the dominant policy models and practices in each of these periods as co-evolving with the dominant academic ideas, and changing the conditions for catching-up. We develop several dimensions or building blocks that characterise the policies for technology catch-up. These dimensions are used to characterise each of the three policy periods with the objective of outlining the generic features of an emerging post-Washington approach to technology catch-up policies in relation to past approaches.

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<sup>1</sup> This paper is written in honour of the late Sanjya Lall. I am very grateful to Yevgeny Kuznetsov for the continuous and friendly exchange of views and ideas developed in this paper, which had made it difficult at times to distinguish the true origin of some of these ideas. Nevertheless, all errors remain entirely my responsibility.

<sup>2</sup> University College London, School of Slavonic and East European Studies and Visiting Fellow at SPRU University of Sussex

Sanjaya Lall was a distinguished scholar of industrialization and development economics with a keen interest in both conceptual and practical policy issues. In many of his papers he analyses the effects of different policies on technology catch up by the developing world (see, for example, Lall et al., 1994; Lall, 1994, 1995, 1996; Lall, and Teubal, 1998). In this paper I develop some of the ideas and viewpoints that most intrigued Sanjaya Lall. Unfortunately, this paper cannot benefit from his insightful and constructive comments, a task that is left to the interested reader.

## **1. INTRODUCTION**

We are currently in a period in which, as Rodrik (2004b) points out, ‘development’ is working while ‘development policy’ is not. The 1990s favoured developing countries’ growth (see World Bank, 2005). However, those countries that followed the conventional wisdom about what constitutes good economic reform (Latin America, eastern Europe and Sub-Saharan Africa) have performed relatively poorly compared to countries that followed alternative policy paths (China and Vietnam) (Rodrik, 2004a, 2006b). The current situation calls for a re-examination of the past policy approaches within their historical perspectives, and a conceptualization of emerging approaches.

The objective of this paper is to trace how the thinking on policies for technology catch up has evolved, with the ultimate aim of outlining, in common generic terms, the differences between the three periods identified by import substitutions strategies, an (augmented) Washington consensus and the emerging post-Washington approach.

The phrase ‘policies for technology catch up’ covers a broad area of innovation policy closely linked to other components of industrial policy (competition, trade). In its widest meaning, industrial policy is considered as the overall ensemble of policies that directly and indirectly affect industrial performance through their impact on microeconomic variables (Jorde and Teece, 1992). Innovation policy, also considered in its broad meaning, is the overall ensemble of policy instruments that explicitly or implicitly affect the innovation process. Innovation policy proper has become a dominant component of industrial as well as development policy, in developed and semi-industrialized economies.

In this paper, first, we describe in Section 2 the key features of policies for technology catching up within the import substitution, (augmented) Washington Consensus and post-Washington periods. Section 3 develops several dimensions or building blocks, which are essential for differentiating the three generations of technology catch up policy. We conclude with a characterization of the three policy periods based on these dimensions. The aim is to identify the generic features of an emerging post-Washington approach to technology catch-up policy in relation to past approaches.

## **2. THREE GENERATIONS OF POLICIES PROMOTING TECHNOLOGY CATCH-UP**

In this section we briefly review technology catch up policy through the periods of import substitution, (augmented) Washington consensus and post-Washington period.

### 2.1. IMPORT SUBSTITUTION STRATEGIES<sup>3</sup>

The technology policies of the 1950s/1960s and early 1970s were part of the mainstream developmentalist position of that period, which centred on strategies of import substitution. Industrialization based on import substitution was practised in the majority of developing countries - although for very differing lengths of time – and was implemented in most articulate form in the countries of Latin America and India. It was also practised in the countries of East Asia, but for shorter periods before they embarked on a path of export substitution strategy. Generally, the policy focus of the time was on technology transfer and the imperfections in the process. The thrust of literature and policy prescriptions, was towards access to technology and issues surrounding how to achieve it under fair conditions. These concerns followed from the structuralist approach, the dominant intellectual paradigm in the economics of developing countries at that time.

There were six basic assumptions underlying the mainstream consensus in that period (see Radosevic, 1999).

1. An unrestricted flow of knowledge leads to high and rising costs for the transfer of technology.
2. The unrestricted import of technology inhibits the development of local technological capacity and the learning process.
3. Technology can be developed equally well in a protected environment.
4. The mechanisms for technology transfer do matter and equity control and ownership have important roles to play.
5. The business of pricing technology determines the international distribution of 'gains from technological advance'. The bargaining gains have important long term implications.
6. The main problem in technology transfer is not availability of or access to technology; it is price and the terms of transfer.

Technology transfer policies in that period had two basic objectives: first, to reduce the costs of transfer, and, second, to maximize the learning effects of technology import. What appeared in policy implementation as a major problem was that these objectives contradicted each other, and their balancing was by no means automatic.

This duality of goals led to several problems (ibid, 1999).

1. The control of costs tells us very little about the interaction between technology transfer and technology capability accumulation. There is no clear relationship between transfer regulations and the development of domestic capabilities.
2. The assumption that restricted import may permit local development of technological capacity is correct. However, the context in which protection can be productive is more complex as the examples of export-led economies show. The import substitution type of protection leads to wasted or irrelevant technological effort.

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<sup>3</sup> This section draws on Radosevic (1999) Ch. 3, which also contains extensive references.

3. The empirical evidence on the costs of ‘packaged’ technology was at the time quite narrow and was based on a few countries and a few sectors.
4. The issue of control cannot be reduced to equity control and ownership problems. The emphasis on equity control only led to restrictions on foreign direct investment (FDI) and a reduction in technology inflows from arm’s length licences.
5. The emphasis on short run financial issues associated with transfer in policy practice virtually ignored the problems associated with the accumulation of technological capability, which very much occupied policy analysts and scholars.

There is agreement in the literature that the direct objectives of policies in the 1960s and 1970s were achieved. Differences arise only over the extent of their effects. The effects of the 1960s and 1970s policies on local technology capability building are often difficult to discern. The literature points to this complexity and adopts a note of pessimism regarding our ability to draw clear cut conclusions. Indian technology transfer policy is often cited as an example of strategies that produced high social costs. It is realistic to conclude that the effects of the 1960s’ and 1970s’ policies were highly dependent on the ability of government agencies to implement them. Normative policies made little difference to final outcomes, but the variations in their effectiveness mattered greatly.

Thus, technology policies from the 1960s and early 1970s should be understood in the context of import substitution regimes, with which they have had a high level of fit. The main problems stemmed from their conflicting objectives, which were a high degree of balance between maximizing technological inflows for subsequent domestic technological development and keeping transfer costs under control. There is general agreement that these policies improved the terms of transfer. However there is much less agreement over their costs. With the benefit of hindsight it is obvious that these policies created considerable industrial and technological capacities which otherwise would have been impossible. And in this respect it is difficult to raise objections to them in those cases where countries managed to minimize their costs or where implementation capabilities were high. However, the problem of (in)appropriateness became especially relevant when external conditions began to change, rendering these policies increasingly inadequate for the new conditions, and obsolete.

As Ramos (2000) argues the strategies of the time ran into increasing problems with the move from consumer goods to intermediate goods and then on to capital goods due to:

- the increasing limitations of domestic markets, which were too small to produce minimum sufficient scales of production;
- insufficient competitive pressure to induce productivity increases;
- the tendency to overdiversify production rather than to specialize;<sup>4</sup>
- the ‘deadweight’ costs of administering all of these programmes.

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<sup>4</sup> This view contradicts Imbs and Wacziarg’s (2003) evidence that industry specialization (concentration) is U shaped, i.e. at certain levels of income economic development actually requires diversification. See footnote 12.

These weaknesses were not immediately reflected in the macroeconomic performances of many countries because of foreign debt-financed capital formation in many Latin American and other developing countries and in some east European economies (Poland, Romania, and Yugoslavia). The collapse of capital inflows put an end to growth and led to radical changes in the political economy of highly indebted developing countries.

The dominant academic policy intervention model at the time was the neo-classical market failure argument, which ironically provided justification both for government intervention as well as withdrawal. One current view was that industrial policies to correct market failures or imperfections were justified only in relation to such matters as externalities, public goods, uncertainty and insufficient or biased information (Bator, 1958). Based on the model of substantive rationality, of agents behaving in a maximizing manner, fixed industrial structures, and knowledge available as a free good, it was logical that government was seen as an omnipotent actor that could decide where markets would fail. Hence, the difference between these competing perspectives was in their assessment of whether government possessed the knowledge required to intervene. The policy practices of developed countries with national champions and heavy military funding of research and development (R&D) linked to commercial uses, differed very little from those in developing countries (Hayward, 1995). The biggest differences probably lay in the implementation capacities of the various governments and their capability to coordinate these policies with private/public sector objectives. It may be no surprise that, in time, these political–economy viewpoints, which criticized the market failure approach for too readily assuming that the state would act like Plato’s Philosopher King (Chang, 1993),<sup>5</sup> gained currency. It is also no surprise that Krueger’s (1990) paper on government failures in development, was one of the most influential papers that led to changes in policy.

## **2.2. WASHINGTON CONSENSUS ERA**

By the mid-1980s a radical shift in mainstream policy thinking was taking place. Industrial targeting, subsidized credit for specific subsectors and detailed technology transfer regulations were no longer seen as a recipe for development. Instead, the International Monetary Fund (IMF), the World Bank, and the US Treasury policies for developing countries were practising something that some time later was formulated by John Williamson as the ‘Washington Consensus’ (Williamson, 1990, 1999, 2004).<sup>6</sup> The Washington Consensus describes a set of interrelated policies for macroeconomic stabilization and trade liberalization in state-directed economies, largely based on the experience of Latin America in the 1980s (Table 1).

### **Table 1: The Washington Consensus**

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<sup>5</sup> See Chang (1993) for an overview of the different theories of state intervention including a critique of the view that the state is a benevolent actor.

<sup>6</sup> As Noman (2005: 6) points out ‘Ironically, this was happening at around the same time as the full measure of the success of the East Asian developmental states was becoming apparent. But its lessons appear to have somehow gotten lost in the disillusionment with governments as correctors of market failures not just in developing countries but also in the rich countries as reflected in the rise of Thatcherism and Reaganomics’.

1. Fiscal discipline
2. Reordering of public expenditures priorities (from indiscriminate subsidies to basic health and education, to pro-poor subsidies)
3. Tax reform (broad tax base and moderate marginal tax rate)
4. Liberalization of interest rates
5. Competitive exchange rates
6. Trade liberalization
7. Liberalization of FDI (a comprehensive capital account liberalization was not included)
8. Privatization
9. Deregulation (easing barriers to entry and exit)
10. Property rights (enabling the informal sector to gain property at acceptable costs)

Source: Williamson, 1990

As Stiglitz (2004: 3) rightly points out ‘the Washington Consensus represented, in part, a reaction to the failures of the state in attempting to correct those of the market’. It is probably true that this was an overreaction and led to ‘too much and too narrow a focus on price stability, and inadequate attention to the case for interventions in markets, including via trade policy’ (ibid, p. 2). Stiglitz insists that this was different from trying to make a serious intellectual case against disciplined macroeconomic policies, the use of markets and trade liberalization.<sup>7</sup>

As the economic events of the 1990s demonstrate, Washington Consensus-based policies failed to deliver what they promised. As this was becoming obvious even during the early 1990s the original Washington Consensus policies were revised by an expansion into the so-called ‘second-generation’ reforms, which were heavily institutional in nature. Williamson’s original Washington Consensus completely neglected institutions.<sup>8</sup> However, their importance received prominent as a result of the better understanding of the east Asian miracle (World Bank, 1993), the failures of structural adjustment programmes to deliver growth, and the inability of the countries of eastern Europe to recover as had been expected. These failures promoted modifications in the design of the reform programmes advocated by the IMF and World Bank, the most important of which involved the IMF abandoning its unqualified advocacy of liberalization of foreign capital inflows.

Table 2 presents a range of issues that fall within the ‘Augmented Washington Consensus’ (Rodrik, 2006) or the ‘Washington Consensus Plus’ to adopt Stiglitz’s (2004) label.

### **Table 2: Augmented Washington Consensus**

The Original Washington Consensus items, plus:
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<sup>7</sup> In that vein Stiglitz (2004: 4) distinguishes between ‘the oversimplified rendition of what it was that the international financial institutions and the U.S. Treasury recommended, especially during the period of the eighties and early nineties, before they became such a subject of vilification in both the North and the South’ and ‘the more subtle work of John Williamson, who actually coined the term’.

<sup>8</sup> Wendy Carlin points out that the famous statement of 1990s Washington Consensus contains only 72 words or 2% of the total word count devoted to property rights. On the other hand, 68% of the text is devoted to macroeconomic stabilization. Carlin, W. Institutions and Economic Reforms, Seminar at SSEES – UCL, February 2006,

11. Corporate governance
12. Anti-corruption
13. Flexible labour markets
14. World Trade Organization agreements
15. Financial codes and standards
16. 'Prudent' capital-account opening
17. Non-intermediate exchange rate regimes
18. Independent central banks/inflation targeting
19. Social safety nets
20. Targeted poverty reduction

Source: Rodrik (2006)

As Rodrik (2006: 10) points out: 'the precise enumeration of these requisite institutional reforms depends on who is talking and when, and often the list seems to extend to whatever it is that the reformers may not have had a chance to do'. Stiglitz (2004: 9) sees waves of versions of 'the Washington consensus plus' which emerge when old versions 'failed to do the trick, a new layer of reforms was added'. The augmented Washington perspective assumes that an efficient market economy requires, as a minimum, an institutional system that effectively enforces property rights and the exchange of property titles. In its minimalist form this view favours strong enforcement of property rights and privatization.<sup>9</sup> In its activist form it favours policies that support entrepreneurship by pointing to market failures in financial and entrepreneurial skills markets. This latter view would justify support for small and medium sized enterprises (SMEs) and the venture capital (VC) industry, as well as a wide range of measures that improve the business environment.

The focus on institutions which lay at the core of the Augmented Washington Consensus received a boost from several related developments within academic research. The first area of advancement was within the so called new institutional economics (Coase, North, Oliver Williamson). Within this perspective markets are not necessarily the most efficient form of organization, i.e. there is not an a priori preference for markets over hierarchy (Williamson, 2007).<sup>10</sup> The second area of advancement was the empirical literature on economic growth, which shows that institutions were the single most important determinant of why some countries grew rich and others remained poor (Acemoglu et al., 2001; Easterly and Levine, 2003). The strong emphasis on institutions underlying the Augmented Washington Consensus led to a new mantra - 'getting institutions right' (Rodrik, 2006). However, as pointed out by Nelson (2006), economists use the term institutions as a 'place holder' just as earlier they used 'total factor productivity'. Nelson's argument is that 'in order to understand how institutions affect growth we need to get into the details of how institutions affect behaviour. Broad definitions of what institutions are and general statements about what they do cannot carry us very far' (ibid, p. 6).

### **Innovation policy compatible with the Washington consensus**

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<sup>9</sup> Hernando de Soto's (2000) ideas on the importance of individual property titles for poor people were extremely influential in policies promoting individual entrepreneurship and are highly compatible with the Augmented Washington Consensus.

<sup>10</sup> See Chang (1993) for an application of the transaction costs approach to analysing industrial policy.

Innovation policies were rather secondary in the early years of the Washington consensus in developing countries. However, they developed quite strongly in the OECD countries to become a mainstream policy driven largely by a better understanding of the complexities of the relationship between science, technology and the economy. Programmes such as the OECD (1990) Technology/Economy Programme (TEP) were quite instrumental in this respect. The intellectual origin of these policies emerged from new growth theory and innovation studies.

New growth theory endorses public support for R&D as well as neutral (horizontal) industrial policy. The policy focus is on the background conditions for competition, on improvements to the investment climate and a reduction in market failures and distortions. We could characterize it as a general micro policy which tries to identify impediments in environment for growth. Although the idea of competitiveness may seem, at first glance, highly interventionist (cf. strategic trade policy), its application as general micro competitiveness policy is actually benign and quite compatible with Washington consensus. For example, the Porterian based idea of micro competitiveness is largely compatible with the Washington views. The competitiveness approach has been adopted by developing countries and they have gradually become a part of large scale exercises such as the World Economic Forum competitiveness reports and the World Bank's *Doing Business*.

### **Assessing the outcome of the Washington Consensus**

The key processes that led to the diminished relevance of Washington Consensus based policies lie in the features of growth and catching up during the 1990s. They are exemplified in the *mea culpa* World Bank (2005) study *Economic Growth in the 1990s: Learning from a Decade of Reform*, Washington, April 2005. This study points to 'five disappointments' which could not have occurred according to the Washington Consensus. These are (World Bank, 2005):

1. Output losses during Transition in the Former Soviet Union and Eastern Europe
2. The East Asian financial crisis
3. The collapse of the Convertibility Regime in Argentina
4. Lack of rapid growth, particularly in Latin America
5. Continued stagnation in Sub-Saharan Africa.

Also, among four pleasant surprises, one—sustained rapid growth in China, India and Vietnam—should not have happened, as all these countries pursued more interventionist policies than those of the Washington Consensus and liberalized in a gradual and heterodox manner. The World Bank study provides extensive evidence to demonstrate that institutional improvements in the direction of the Augmented Washington Consensus did not necessary lead to growth and technology catch up.<sup>11</sup>

The World Bank (2005) study offers some explanations about what was wrong with the policy advice at the time. First, policies were not concerned with the dynamic forces that lay behind the growth process and instead were focused on reaping

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<sup>11</sup> E.g., the World Bank (2005) analysis shows that in terms of institutions and policy in 1999 nearly every country in Latin America was better than Chile in 1985. Yet, GDP per capita growth did not reflect these improvements in policy.

efficiency gains from eliminating deadweight-loss triangles (Rodrik, 2006). Second, the objectives of economic reform—namely market oriented incentives, macroeconomic stability, and outward orientation—were treated as outcomes that had to be addressed directly rather than indirectly. Third, different country contexts were treated in uniform ways through standardized adjustment packages. Fourth, there was the illusion that in a rules-based system government discretion can be bypassed.

There is a large heterodox literature which also points to the problems in the Augmented Washington Consensus ideas, and explain the growth that occurred in developing countries. For example, Katz (2006) shows that Latin American success stories emerged not as a result of macro successes, but as a result of the public sector's playing an active role in this process.

The situation is one in which there is no one dominant policy agenda regarding technology catch up. As old recipes were not working an interesting period of search for new solutions was embarked upon.

### **2.3. POST-WASHINGTON APPROACH AND POLICIES FOR TECHNOLOGY CATCH-UP**

This section's title suggests that there is a kind of Post-Washington consensus. However, Stiglitz (2004) argues that if there is a consensus it relates only to agreement that the Washington consensus did not provide the answer (ibid). However, the objective of this paper is to demonstrate that, at least in terms of policies for technology catch up, there is an emerging alternative approach.

#### **2.3.1. Major features of the post-Washington Consensus policies for technology catch-up**

When comparing to the Washington Consensus there seem to be several emerging features of policy thinking, which may form the core of a post-Washington consensus. There are three features that seem to be very important for post-Washington thinking regarding policies for technology catch-up:

##### ***Mezzo level of analysis and policy: a systems of innovation perspective***

The Washington Consensus distinguishes clearly between macroeconomic policies and micro policies. In the Augmented Washington Consensus version in particular, there is recognition of the importance of micro based policies for competitiveness, which addresses the issues of the institutional foundations and micro environments of enterprises. In the post-Washington era the strong distinction between the macro–micro breaks down, and the mezzo level becomes core focus for technology catch-up policy.

The now extensive literature on national, and especially regional and sectoral innovation systems, could be considered as the predecessor to this policy thinking. From this perspective the key problems in developing countries could be defined as their innovation systems, which as Katz (2006: 66) describes are 'highly fragmented and uncoordinated pieces of social machinery, whose various parts must function in a

more coordinated manner in order to expand productivity growth and increase the rate of innovation’.

### ***Industrial upgrading and structural change at the core of growth policies***

Industrial upgrading and structural change have been at the core of development thinking during the import substitution strategies period. In the Washington Consensus period structural change was seen as an automatic outcome of stable macroeconomics and a good business environment. This line of thinking was boosted by several quite new empirical facts which fit nicely with the evolutionary and structuralist perspectives on economic change. We select a few of the most radical in terms of the previous mainstream understanding of growth:

1. *Economic development requires diversification, not specialization*: enhancing an economy’s productive capabilities over an increasing range of manufactured goods is an integral part of economic development.<sup>12</sup>

2. *Most growth accelerations are neither preceded by nor accompanied by major changes in economic policies, institutional arrangements, political circumstances, or external conditions* (Hausmann et al., 2005)

3. *Countries that promote exports of more ‘sophisticated’ goods grow faster*. The evidence suggests strongly that industrial upgrading is a leading indicator of economic performance (Rodrik, 2006c)

6. *There is ‘unconditional’ convergence at the level of individual products* (Hwang, 2006).<sup>13</sup> This is quite surprising given the absence of convergence on the macro level. However, while convergence at the level of individual products is automatic, getting these new industries off the ground is not (Rodrik, 2006b: 12): economic diversification is not automatic and is a process of failures and blockages.

So, unlike the Washington Consensus, new research suggests that the structure of export and structural change (specialization vs diversification) matters. This has obvious implications for catching up policies and cannot be accommodated within the micro-macro based sectoral and technology neutral logic of the Washington consensus.

### ***Uncertainty and its policy implications***

Washington Consensus policies assume that there is full knowledge about what hinders growth and catch up. Hence, such advice usually produces what Rodrik and Stiglitz call a ‘laundry list’ of requests for what would be needed to get growth going. In contrast to this there stands the idea of growth as a self discovery process (see Hausmann and Rodrik, 2003), by which they mean a process of finding out the cost structure of an economy for the production of new goods and a demonstration of its

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<sup>12</sup> Imbs and Wacziarg (2003) discovered that as incomes increase, economies become less concentrated and more diversified. This process continues until countries reach roughly the income level of Ireland. It is only at relatively high levels of income that further growth is associated with increased specialization. If, therefore, sectoral concentration is graphed against income per capita, one obtains a U-shaped curve. What is going on here is not just a structural transformation from agriculture to industry, it is also a process of diversification and expansion of the range of activities within manufacturing.

<sup>13</sup> When a country starts to produce a particular good, the productivity with which that good is produced—measured by either labour productivity or unit prices (an indicator of product quality)—converges unconditionally to the frontier for that good, regardless of any of the characteristics of the country in question. Moreover, the rate of convergence is quite rapid. See Hwang (2006).

feasibility, which then serves as the lever for economic convergence, pulling resources in from lower productivity activities. Growth and technology catch up in particular are uncertainty driven and policy must take this into account. Due to endemic uncertainty and inability of both public and private actors to predict outcomes, the policy focus shifts to search, which should be done in collaboration. This idea was taken up by World Bank New Industrial Policy group (Kuznetsov and Sabel, 2006; Sabel, 2005). The main conceptual solution for authors in this line of thinking is the establishment of ‘search networks’ whose function is to identify successive constraints, and then people or institutions that might help to mitigate (in part) the difficulties associated with these constraints.

### **2.3.2. Evolutionary economics and post-Washington policies for technology catch-up**

We pointed out earlier that new institutional economics and new growth theory constituted an important intellectual basis for the Augmented Washington Consensus. Today’s policies for technology catch-up are implicitly based on neo-Schumpeterian (evolutionary) economics and an understanding of the economy as a process driven by ‘creative destruction’.

Evolutionary economics provides a variety of models encompassing increasing returns to scale, network effects, technological spillovers, thick-market externalities, and learning-by-doing externalities. The implication of these developments is that country specialization matters (Hausmann et al., 2006), and that growth is a highly non-linear process contingent on simultaneous presence of several factors.<sup>14</sup>

Evolutionary theory provides an implicit base for the framework concepts of innovation systems and clusters around which today’s innovation and growth paradigm has developed (Verspagen, 2005). Innovation is conceptualized as the result of complex and interactive learning processes through which firms tap into complementary knowledge from other organizations and institutions (Fagerberg, 2005).

Features of innovation process that are consistent with the evolutionary view are that (Navarro, 2003):

- innovation is not only driven by a small set of high-technology industries;
- non-technological innovation is important;
- technological co-operation and collaboration among firms is essential;
- innovative firms draw largely on the science system and the science base;
- innovation processes are uncertain and non-linear;
- innovation processes are cumulative in nature;
- innovation occurs in firms of all sizes.

The emerging mainstream approach in innovation policy is the systems of innovation approach, which is based on an understanding that innovation is an interactive phenomenon. This does not mean that macroeconomic and institutional frameworks

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<sup>14</sup> The idea of a complementarity or simultaneous presence of several factors, which in mutual interaction create positive or negative growth circles, is developed in the context of central and eastern Europe (CEE) by von Tunzelmann (2004). Von Tunzelmann and Wang (2006) also develop this approach in the area of production theory through a so called ‘interactive dynamic capabilities’ approach. For an application of this approach in the area of structural reforms in CEE countries see de Macedo and Martins (2006).

are not important. However, ‘systemic imperfections’ or ‘system failures’, and various forms of ‘network failures’ are seen as pervasive policy problems.

### **2.3.3. World Bank New Industrial Policy as first post-Washington policy formulation**

The World Bank’s New Industrial Policy is an analytical and research attempt by the World Bank Institute group to formulate policies for technology catch up which take into account of the latest understanding of the nature of knowledge, technology and growth. In essence, it is a translating of Rodrik’s (see works cited in this paper and Rodrik, 2004a), Evans’s (1995) and Chang’s (1993) ideas into policy practice. The key features of this approach are that:<sup>1516</sup>

- industrial policy is a process for fostering restructuring and technological dynamism. It offers solutions that go beyond the traditional focus on background conditions and improvements in the investment climate;
- from an innovation perspective, it is important to understand the policy implications of a ‘binding constraints’ view of economic growth;<sup>17</sup>
- policy should rely on the ‘islands of excellence’ that exist in (almost) every country to reform less successful areas;
- unlike the old ‘picking winners’ industrial policy, the key assumption in the new industrial policy is that no one, government included, can have a panoramic view of the economy. All views are necessarily partial;
- mechanism for creating new opportunities are search networks - private-public partnerships and programmes that should bring together better performing segments of the public sector and better performing segments of the productive sector in an attempt to relax and unblock binding constraints;
- the focus of policy is on missing connections, which, when established, should have synergistic and increasing effects.<sup>18</sup>

## **3. KEY DIMENSIONS (BUILDING BLOCKS) OF POLICIES FOR TECHNOLOGY CATCH-UP**

In this section we outline the key dimensions or building blocks that underpin different policies for technology catch-up. These dimensions originate in historical analyses of innovation policy and are essential analytical categories for current thinking about policy options.

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<sup>15</sup><http://go.worldbank.org/BVKEUGB840>

<sup>16</sup> Yevgeny Kuznetsov, Email communication to author, 17 Dec. 2006

<sup>17</sup> The ‘binding constraints’ view of growth an idea of Rodrik’s, which was fully taken on board in the World Bank (2005) study. This is a targeted approach which requires an in-depth understanding of country specificities, rather than the application of best practice solutions.

<sup>18</sup> In that respect, new industrial policy is quite similar to the so called second generation innovation policies (see EU, 2002).

### 3.1. MACRO VS MICRO ASPECTS OF POLICIES FOR TECHNOLOGY CATCH-UP

The Washington Consensus focused on the importance of macroeconomic stability for growth, along with of openness to trade, privatization, deregulation and liberalization. Thus, the implicit assumption was that given a favourable macroeconomic framework growth should automatically follow. However, the failure of macro reform policies and an understanding that their greatest weakness is the absence of a micro basis, led to the Augmented Washington Consensus.

The micro-economic equivalent of this approach could be seen as the Porterian view of microeconomic competitiveness, which is largely compatible with the Augmented Washington Consensus. This approach assumes that 'Wealth is actually created in the microeconomic foundations of the economy, rooted in the company operating practices and strategies as well as in the quality of the inputs, infrastructure, institutions, and array of regulatory and other policies that constitute the business environment in which a nations' firms compete' (Porter, 2002: 1).

This view is exemplified in the World Economic Forum<sup>19</sup> annual competitiveness and World Bank *Doing Business*<sup>20</sup> reports. These two approaches have become probably the most influential current frameworks for thinking about growth in a large number of bureaucracies in the semi-developed economies.

Based on large quantities of 'soft' and 'hard' data these reports examine the quality of the business environment in its numerous dimensions (competition, judiciary, clusters, education, finance, corruption, sophistication of enterprises, etc.). An important part of this research programme addresses issues related to the quality of national institutions and is highly compatible with the ideas of the Augmented Washington Consensus. The underlying concept is that 'binding constraints' for growth is better understood if we consider not only macro but also the micro impediments to business. In similar vein, the World Bank has undertaken monitoring in *Doing Business* primarily of issues of the efficiency of market mechanisms, i.e. of establishing and closing enterprises.

Both of these perspectives assume that the link between the macro and micro (business environments) is not problematic, i.e. a good micro environment will automatically lead to good macro environment, and vice versa. In this respect, both approaches ignore so called 'fallacy of composition' i.e. they disregard the fact that microeconomic decisions do not necessarily add up, or that individual behaviour does not necessarily produce identical aggregate outcomes.

From an alternative perspective, the long-term performance of any given economy could be described 'as the outcome of the interaction between the macro and the micro and the co-evolution of economic, institutional and technological forces that converge in the process of economic development' (Katz, 2006: 58). Advances in evolutionary economics, in particular the emergence of Nelson and Winter's (1982) model of evolutionary economic change, which is based on the heterogeneity of micro

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<sup>19</sup> <http://www.weforum.org/en/index.htm>

<sup>20</sup> <http://www.doingbusiness.org/>

agents, have probably played an important intellectual role in the thinking about micro–macro links.

Macro-to-micro interactions and the creation of new institutions and capabilities are, within an evolutionary–structural perspective, crucial to understanding what economic development is about.<sup>21</sup> A micro-macro interaction is a very important missing piece in the growth puzzle and its explanations, due probably primarily to the methodological complexities in linking these two levels, for which evolutionary economics is probably the best suited to address.<sup>22</sup>

A policy dimension of this macro–micro problem is the relationship between macroeconomic and industrial (innovation) policies. For example, there is a strong need to ensure a relatively stable and competitive exchange rate, which would balance the needs of a robust industrial policy targeted at new exportables, and an exchange-rate that promotes the production of tradeables across the board (Rodrik, 2006b). Macroeconomic policy may conflict with a development strategy based on industrial policy. But also, industrial policy can affect macroeconomic objectives: for example, through increases in productivity (Wilson and Furtado, 2006). The MACROTEC project<sup>23</sup> showed that causation ran from the macro-economy to technology, and was at least as evident as the ‘orthodox’ link between technology and growth. This project provided some indications of the ‘transmission mechanisms’ operating at the micro, meso and macro levels (skill changes, new firm formation and industrial structure, public/private RTD interaction, trade and FDI flows ) and how these demand changes may feed through to expand technological achievements. From this combination of empirical research and analytical reformulation, von Tunzelmann (2004a, 2004b) developed the idea of new ‘Schumpeterian macro policy’.

### 3.2. ‘GENERIC’ VS ‘SPECIFIC’ CONSTRAINTS TO CATCH UP AND POLICY ISSUES

Strong correlations between the composite indexes for business competitiveness, and GDP levels suggest that they are pointing to the causes of the problem (see for example, Porter, 2004). Yet, this is not necessarily so. It is true that richer countries have a better business environment, but this may be merely a symptom, not the cause of economic development. As pointed out by Carlin and Seabright (2007) the key to overcoming the reverse causality problem is to find a variable that *predicts* today’s levels of income, but that has no direct effect on them. Unfortunately, good instrumental variables are not readily available. We encounter similar problems when the macro factors of growth are used to proxy the determinants of growth. As the World Bank (2005: 50) study rightly points out, growth regressions are not really about growth; they are about the *level* of output.

Business environment variables are generic, i.e. applicable across all sectors or types of firms, and thus reveal aspects of growth that are averages and which represent

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<sup>21</sup> See Katz (2006) for an application of this thinking in the Latin American context.

<sup>22</sup> For examples of this modelling in the case of Sweden, see Eliason (1991).

<sup>23</sup> Integration of Macroeconomic and S&T Policies for Growth, Employment and Technology (MACROTEC), Project coordinator: Prof. G. N. von Tunzelmann, Project financed within the Key Action Improving the Socio-economic Knowledge Base, July 2003. See [http://www.sussex.ac.uk/Units/spru/macrotec/final\\_report.pdf](http://www.sussex.ac.uk/Units/spru/macrotec/final_report.pdf).

general factors. However, from a policy perspective it is essential to recognize that growth constraints are never general and generic, they are most often specific. Hence, both the World Economic Forum and World Bank types of exercises, which identify micro obstacles to growth, can be criticized as focusing on generic solutions to broad classes of problems - not necessarily the obstacles that arise, and not necessarily a means of identifying critical improvements for growth. Policies within this approach are horizontal, i.e. applicable to all sectors and firms. These policies were very much in vogue in the period of the Augmented Washington Consensus, but it seems they have their limits and are no longer seen as the only solution. For example, tensions between traditional vertical and now mainstream horizontal industrial policy, can be identified in the new EU Industrial Policy (October 2005). This document reinforces the old commitment to 'the *horizontal* nature of industrial policy' and avoidance of 'a return to selective interventionist policies' but also recognizes that 'for industrial policy to be effective, account needs to be taken of the *specific* context of individual sectors' (EC, 2005: 3, emphasis added).

The McKinsey (1999) study on Russia serves as a good example here. This study found that general factors, such as macroeconomic instability, poor corporate governance, labour market rigidities and poor infrastructure as explanations of Russia's productivity lags in 1990s are much less important than *sector level market distortions*, which in creating a non-level playing field, allowed low productivity companies in Russia to become more profitable (on a cash flow basis) than their highly productivity competitors.

The McKinsey study points out that these market distortions are *sector specific and take many different forms*, such as when cheap energy is provided to non-viable steel plants and wholesale markets are subjected to eight times fewer tax liabilities than supermarkets (McKinsey, 1999, Chapter on Synthesis and Implications, p. 14),

At a general level, few economists would disagree that most often governments have to provide specific and complex publicly provided inputs or capabilities rather than providing only a few broad macro measures (Hausman and Rodrik, 2006). In line with this argument, Nelson (2006: 5) points out that 'it is a mistake to search for a small set of institutions that are necessary and sufficient for economic productivity and progress. Many different institutions are needed, and the institutions that are effective are very context dependent'.

Specific obstacles are what the literature terms 'ultimate' as opposed to 'immediate' sources of economic growth. Generic factors are frequently immediate rather than ultimate sources of growth. This thinking has been fully taken into account in the World Bank (2005) study whose messages largely resonate with the New Industrial Policy approach. For example, the study points out that economic policies and policy advice must be country-specific and institution-sensitive if they are to be effective. The central message is that there is no unique universal set of rules and that we need to get away from formulae and the search for elusive 'best practices', and rely on deeper economic analysis to identify the binding constraints to growth.

### **3.3. INDUSTRIAL POLICY AS PROCESS VS INDUSTRIAL POLICY AS AN OUTCOME**

A conventional, but today probably irrelevant view of industrial policy is that of an effort by the government to select particular sectors and subsidize them through a range of instruments (directed credit, subsidies, tax incentives and so on). Industrial policy is seen as a ‘picking the winners’ issue, in which the key is an outcome i.e. a good or bad choice. As governments are notoriously bad at making these decisions it is best to avoid government failures even at the price of market failures. This view of industrial policy originates from the import substitution period in developing countries and the period of national champions in developed countries and has become part of the conventional wisdom among economists.

During the Washington Consensus period this view of industrial policy became incompatible with the logic, and the policy focus shifted to the business environment and horizontal (innovation) policy. Industrial policy has become broadly defined as the aggregate of policies that directly and indirectly affect industrial performance through their impact on microeconomic variables (Jorde and Teece, 1992), a shift in focus to micro-environment induced benchmarking of countries based on the ‘best practice’ standards of open and dynamic market economies.

In this new conventional perspective advisory policy activities would start by benchmarking a country’s situation against the ideal model. Such an assessment would point to ‘gaps’, i.e. areas where the country differs from ‘best practice’ examples. On that basis, a list of recommendations (a ‘laundry list’) would be given for those areas requiring priority action. These recommendations would primarily aim to secure adequate institutional endowments, which would be needed for growth to get going. They would be confined to ‘generic’ - either macro or micro - obstacles to growth.

Both conventions have reduced policy to the outcomes of ‘picking the winners’ or to the changes needed to raise a country’s institutions up to ‘best practice’ standards. The focus on outcomes in both approaches is logical given that there is no fundamental uncertainty involved. In the first case, the government does (not) possess necessary information for the right decision - only firms possess it, which explains why governments should (not) refrain from ‘picking the winners’. In the second case, the optimal environment and, thus, policy objectives are known in advance as a result of the benchmarking.

However, once we recognize that the key feature of any decision making regarding technology in the private or the public sector, is uncertainty, the focus on outcomes is misplaced. In a situation where nobody actually knows what the ‘ultimate’ constraints to growth are, it is much more important to consider the process through which an understanding of these constraints emerges. In this latter case, industrial policy is more appropriately conceived as a *process* whereby the state and the private sector jointly arrive at a diagnosis on the sources of blockages in new economic activities and propose solutions to them. In this case, policy implications cannot be derived as an outcome of analysis, as policy itself is process of experimentation and learning.<sup>24</sup>

As Rodrik (2004a: 3) points out ‘the task of industrial policy is as much about eliciting information from the private sector on significant externalities and their remedies as it is about implementing appropriate policies. ... Correspondingly, the analysis of industrial policy needs to focus not on the policy *outcomes*—which are inherently unknowable *ex ante*—but on getting the policy *process* right’.

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<sup>24</sup> See <http://go.worldbank.org/BVKEUGB840>

In the context of the Baltic States in the mid-1990s, essentially the same idea was developed through the concept of strategies policies for growth (see Radosevic, 1997). Our argument here is that:

It is not sectors, but generic technological capabilities and the mechanisms, through which ... capabilities can be acquired that must be targeted. The final design or outcome of such programmes (activities) is not known in advance to the parties involved. There is a strong element of *indeterminacy* in strategic policies, by definition, in contrast to market failure policies which, ideally, should be able to calculate the welfare effects of each intervention. As the outcome is not known in advance - only the strategic objectives - the implementation is more important than the initial design. The policy process becomes a learning activity in itself. (Radosevic, 1997: 192)

A key objective of this process is the identification of constraints and, through that process, the establishment of mechanisms for overcoming them. As the focus is on process the target objectives may be achieved in a variety of ways, which makes these policies strategic.

### **3. 4. INSTITUTIONAL CONTEXT OF INDUSTRIAL POLICY**

The establishment of goals is the most controversial aspect of industrial policy and is a favourite target of its critics. When industrial policy is approached as a process what matters much more is the establishment of 'search networks' i.e. cooperative public and private sectors efforts to anticipate technological change and its effects rather than a priori defined targets (Sabel, 2005; Wilson and Furtado, 2006; Kuznetsov and Sabel, 2006). Hence, as argued elsewhere (Radosevic, 1997: 176) 'more important than any individual intervention is the building-up of an institutionally rich system of government - business relations, and of self-organizing mechanisms within business and industry. In such an environment there are greater possibilities for correcting both government and market failures'. Very often this undeveloped grey area between business and government is a much bigger bottleneck to industrial policy than the administrative capacities of governments.

The importance or even primacy of the institutional basis of industrial policy over specific interventions, rests on Peter Evans's (1995) idea of 'embedded autonomy'. Evans points to a paradox between autonomy and embeddedness which the state must resolve. State autonomy is necessary, but not sufficient. It needs to be complemented by an intimate understanding of specific industry situations, which is possible only through close links with business. Successful developmental states have managed to establish close ties and networks with the agents of modernization while at the same time retaining their autonomy, i.e. the capacity to avoid state capture. Our exploration of this issue in the context of the Baltic States (Radosevic, 1997) confirms Evans's (1995) proposition that the obstacles to an effective role for the state are rooted not so much in the propensity of states to intervene, as in the difficulty of constructing strategies of involvement commensurate with their limited capacity to intervene.

In the case of innovation, there are two forms of the public-private institutional arrangements that may induce ‘embedded autonomy’. First, they may aim only at the establishment of an Innovation Council whose aim is to coordinate innovation as an inter-departmental affair. The Trendchart database (<http://www.proinno-europe.eu/>) provides detailed evidence for 39 countries on how widespread is this coordinating mechanism. For ‘embedded autonomy’ to work the degree of interaction between governments and markets required is much deeper and more complex than could be achieved by Innovation Councils, i.e. bodies that may simply represent a recognition of the status quo of disconnected innovation constituencies.

Second, they may consist of the non-government business related infrastructure (business civil society), which is essential for shaping and implementing strategic policies. As argued elsewhere (Radosevic, 1997) ‘these ‘grey zone’ institutions are crucial for articulating business needs and raising the level of strategic awareness in enterprises. They are irreplaceable information structures that bridge between government, which is often not sufficiently knowledgeable about industry problems, and individual enterprises. They reduce strategic uncertainty and contribute to the formation of common expectations (Radosevic, 1997: 186)’. They seem to be the only way to gradually reduce information asymmetries between industry and government by basically building an intermediate layer which can translate and link broader societal objectives with particular business interests. In the context of China, Rodrik (2006c: 25) points out that ‘designing the appropriate institutional structure to foster such an experimental, carrot-and-stick approach to industrial policy is an important challenge facing Chinese policy makers’.

A post-socialist transformation offers excellent example of the relevance of embedded autonomy in promoting structural change. McDermott (2004) provides an account of an autonomous state (cf. Czech R.) that cuts itself off from potential rent-seekers by curtailing any delegation of power and public–private deliberations. This has generated high ‘transaction costs’ for its firms, which has undermined the reorganization process and forced the State to intervene. McDermott (2004) demonstrates that the creation of public–private institutions that induce risk sharing and mutual monitoring are vital to economic development.

So, how to create an environment that maximizes the informational benefits, and limits the rent-seeking costs? How to make the relationship with lobby groups legitimate in the face of society as a whole? Hausmann and Rodrik (2006) argue that it is important to adopt three principles: open architecture, selforganization and transparency. Chang (1993) also offers an extensive discussion on these issues based on the Korean experience. Also, an issue that has not been tackled systemically by research is the one that Evans (1995) points to: whether the realization of an ‘embedded autonomy’ is more difficult in a globalized context and, if it is, in what respects is it different from the past?

### **3. 5. ‘OPENNESS’ VS ‘AUTONOMY’: INDUSTRY/INNOVATION POLICY AND THE ISSUE OF ‘BORDERS’**

There is a conventional view that there are many more restrictions today on pursuing industrial policy than in the past (Radosevic, 1999; Wilson and Furtado, 2006). Multilateral and regional trade and economic integration agreements, favourable

treatment of FDI which are not subject to national rules; internationally binding intellectual property rights rules; and greater pressure on wages due to international competition, are some of factors that constrain industrial policy. An opposite argument is that in a globalized context industrial policy has simply moved to the area of FDI (Rodrik, 2006: 29).

The main problem may be not the World Trade Organization rules, but how the domestic environment and its actors interact with FDI and the world economy (see Amsden et al., 2000). Examples of successful catching up countries show that they have created synergies by coupling local technology efforts with the activities of foreign firms. In a globalized context, the novelties of this interaction are blurring the boundaries between the domestic and foreign economic spaces. The effects of IPR on technology transfer, the effects of foreign competitors or foreign access to national R&D programmes are examples where the issue of boundaries is quite complex. A number of different equity and non-equity linkages encompassing marketing, finance, production and other business activities and sectors, has significantly blurred the boundary between the domestic and foreign determinants of technology transfer. What seems to be clear is that the possibilities for influencing technology transfer at the 'borders' have been reduced and the policy emphasis is shifting towards domestic regulations to make use of increasing production, market and other linkages (Radosevic, 1999).

An important source of international frictions today continues to be the asymmetries in the degree of penetration into the industrial and technology bases of other countries. The often quoted example of Japan, whose large and stable trade surplus was seen as being the result of an institutionally very specific (cf. *keiretsu*) context which limits inward investments, is a case in point. However, recent history also suggests that this continues to be an important policy issue. In several semi-industrialized countries financial-industrial groups have undermined foreign investment through close linkages with the local political elites and by actively shaping the business environment and making it non-transparent (Guillen, 2000; Kock and Guillen, 2001). Business groups have locked out foreign capital or have improved their bargaining terms with foreign capital. A key bargaining strength for domestic players when negotiating their participation in a joint venture with an international company, is their 'local knowledge', which provides them with access to valuable resources and reduces the risks of operating in an uncertain investment environment (Lankes and Venables, 1996; Kock and Guillen, 2001). 'Thick' local networks, which can 'lock out' investors ensure advantages for local players as foreign investors need locals to enter (Lankes and Venables, 1996). So, openness vs autonomy as a policy dilemma has not disappeared in the current globalized context. It has been transformed from an issue at 'the border' to a domestic issue and an issue of how to maximize the benefits of FDI.

What are the implications of these developments for innovation policy? First, as the opportunities for managing market and technology access at the borders have been reduced, the importance of innovation policy has increased. This is confirmed by the expansion in the institutionalization of this policy in a number of countries where this area was confined mainly to traditional science and technology policy. Second, as the interaction with foreign actors becomes important countries are trying to learn how to achieve innovation policy objectives via FDI policy. In this respect, Rodrik's (2004a)

observation is correct: during the 1990s official attitudes notwithstanding, market-fundamentalist governments were highly focused on providing specific public inputs towards direct foreign investment and export processing zones.

The use of FDI as an instrument of innovation policy leads us to a complex area of the relationship between explicit and implicit innovation policy instruments (FDI, trade, competition). This dimension of innovation policy (cf. explicit vs implicit) is extremely relevant for an understanding of the policies for technology catch up. However, its analysis is beyond the scope of this paper.

#### 4. CONCLUSIONS: A COMPARATIVE OVERVIEW OF THREE GENERATIONS OF POLICIES FOR TECHNOLOGY CATCH UP

Based on the analysis of key features of two earlier generations of technology catch-up policies (import substitutions and the Augmented Washington Consensus) we can outline some generic dimensions of emerging post-Washington policies for technology catch-up (see table 3).

**Table 3: Generic dimensions of three generations of policies for technology catch-up**

Dimension		Import substitution	(Augmented) Washington Consensus	'Post-Washington Policies'
Policy level	- macro		X	
	- mezzo			X
	- micro	X	X	
Nature of constraints	- general		X	
	- scaling up			X
	- specific	X		
Policy focus	- process			X
	- outcome	X	X	
Institutional focus	-administrative capacity	X		
	- business environment		X	
	- search networks			X
Relationship to foreign actors	- openness		X	
	- coupling			X
	- autonomy	X		

Source: author

The three generations of policies differ with respect to their focus on the *policy level*. Import Substitution policies focused on contractual issues and the regulation of technology transfer at the micro level. In contrast, Washington Consensus policies focused exclusively on the macro issues related to macroeconomic stability and on 'getting the incentives right'. The Augmented Washington Consensus added the dimension of 'getting institutions right' as a key focus in its policy for catching up.

Macro/micro institutions, such as flexible labour markets and good corporate governance, etc. are seen as essential ingredients for a favourable business environment as benchmarked in the World Economic Forum *Global Competitiveness* and World Bank *Doing Business* reports. Post-Washington policies go beyond this dichotomy and focus instead on linkages and, thus, are much more concerned with the mezzo level at which these linkages operate.

As pointed in Section 2, the constraints to technology catch up can be perceived as *generic*, i.e. applicable to all types of industries and enterprises, or can be highly *specific*, i.e. applicable to individual cases of technology modernization. Import Substitution policies were focused on very specific constraints to catch-up related to the terms of technology transfer while both the Washington Consensus and the Augmented Washington Consensus were focused on generic constraints, i.e. constraints applicable to a large number of firms and industries. Post-Washington policies focus on how to *scale up* individual success stories and replicate them, to discover islands of growth and try to enlarge them - in other words to expand from the micro to the macro.

The Washington and Augmented Washington Consensus policies assume that policy is an actual activity that can be benchmarked in relation to normative criteria of good policy and thus that deviations from the standard (good practice) can be assessed. Import Substitution policies focused on access to technology and the conditions of its transfer. Both generations of policies have a focus on outcomes (achieving best practice standards or maximizing the benefits of technology imports in terms of price and learning) and ignore the learning that may arise from such policy implementation. Both policies assume that policy makers have a full understanding of the binding constraints and hence the focus is on the *outcome* of these policies. Post-Washington policies, on the other hand, assume that nobody has full understanding of the binding constraints and hence what matters is search or discovery of these constraints and the ways that they might be removed. In this case, it is the *process* by which search could be organized that is important.

This raises as an important dimension of policy: its *institutional context*, i.e. whether there are mechanisms of public-private cooperation that can nurture 'search networks'. In the Washington and Augmented Washington Consensus policies this institutional context is largely neglected as the underlying assumption is that the state should be autonomous and the mechanisms of close public-private cooperation in industrial policy are seen as prone to state capture. The only institutional context that matters is the one that is supportive of competition and thus enables easy entry and exit. A favourable *business environment* is seen as a much more powerful driver of catch up than any specific policy measure.

In import substitution regimes, the demands on administrative capacity are high as the state must be able to handle quite specific industry issues related to technology transfer. Hence, the institutional focus is on the *administrative capacity* of the state to perform such a role. Benefiting from hindsight, the view that this policy was faced with pervasive government failures has become widespread. Although these policies have improved the terms for transfer of technology they have not improved the indirect effects or the learning from imported technologies.

Post-Washington views assume that policies are developed and implemented in a specific institutional context and cannot be understood or criticized outside of that

context. In line with Evans's (1995) idea of embedded autonomy what matters is not a specific policy, but the institutional context in which *search networks* can be nurtured.

Import substitution policies aimed at arm's length relationships with foreign owners of technology and tried to maximize state autonomy in issues of technology development. Complete openness is perceived as harmful, and *autonomy* in technology transfer is seen as essential for technology catch-up. Washington and Augmented Washington Consensus policies focus on establishing an institutional environment of open markets, including free flows of all types of capital inflows. *Openness* accompanied by a favourable business environment is seen as a sufficient and necessary precondition for technology catch-up. The Post-Washington approach aims at a *coupling* between foreign and domestic actors as a way for domestic firms to create synergies and to leverage their capabilities.

In conclusion, emerging post-Washington policies for promoting technology catch-up are focused on mezzo level (linkages and sectors). They are oriented towards the scaling up of individual success stories and on policy as a process, by setting up 'search networks', rather than being oriented to previously defined objectives. These policies take account of the importance of the globalized context and hence recognize the need for a coupling or leveraging of domestic firms with foreign agents and capabilities.

Although presented here in conceptual terms, the Post-Washington approach is already a practical reality in many countries, especially those in the EU. As would be expected the new approach goes beyond the old categories of horizontal and vertical policies,<sup>25</sup> while widespread use of foresight methods makes the 'picking of winners' irrelevant.

This paper has tried to add to our understanding of ongoing policy practices in the context of past and current dominant strategic approaches. It is hoped that the common generic features of policies for technology catching up and analysis of the post-Washington approach in these terms represent a persuasive heuristics within which enlightened policy makers could orient themselves when organizing policy processes along lines of New Industrial Policy.

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<sup>25</sup> E.g., the highly focused horizontal policies such as the EU Technology Platforms make the traditional distinction between vertical, or sector-specific, industrial policies and horizontal, or generic, innovation policies irrelevant (see [http://cordis.europa.eu/technology-platforms/home\\_en.html](http://cordis.europa.eu/technology-platforms/home_en.html)). In many EU countries there are national programmes that are based on similar principles.

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