Coordination of innovation policies in the catching-up context: a historical perspective on Estonia and Brazil

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Abstract: This paper highlights some of the crucial weaknesses of innovation-policy-research that limit the relevance of this research for policy-making practices in catching-up countries. The paper proposes a framework that takes a multi-level and dynamic approach towards studying innovation-policy-making processes. This framework is applied herein to examine the evolution of innovation policy and governance trajectories of Estonia and Brazil and how this has affected the capacities for technological accumulation and development. The paper argues that crucial aspects of these contextual trajectories are being overlooked by standard innovation policy and governance analyses. In terms of policy implications, the paper concludes that the increasing influence of external pressures on innovation policy trajectories of catching-up countries is only reinforcing the use of narrow analytical perspectives and threatens to further de-contextualise innovation-policy-making in these countries. The spread of 'participatory' or 'networked' innovation policy models is presented as an example of these tendencies.

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1   Introduction

Academic discourse on managing innovation policies (IP; understood as actions by public organisations that influence the development and diffusion of innovations) in the catching-up context seems to be stuck between a rock and a hard place.[1] On the one hand, classic empirical studies by Evans (1995), Wade (1990), Amsden (1989) and others about the developmental states in East Asia, India and Latin America have shown the importance of at least a close approximation of Weberian civil service headed by some kind of nodal key agency (e.g., MITI in Japan) in charge of coordinating and leading long-term policy efforts towards development. On the other hand, research inspired by public choice and neoclassical theories stresses the importance of avoiding government failures and alleviating key market failures (such as challenges to coordination of investments) and leaving the rest to functioning markets cushioned by working institutions [see, e.g., Rodrik (2007, 2008) as perhaps the best examples]. While the differences are substantial (see further Karo and Kattel, 2010b), both approaches have one common shortcoming: neither deals with the issue of how the respective Weberian or institutional capacities (seen here as state capacities – encompassing policy and administrative capacities – for enhancing innovation in the private sector) are in fact created and sustained.[2] In essence, both approaches have historical answers but not theoretical solutions. Accordingly, both have little to say once historical circumstances change.

Therefore, we argue that most IP debate is stuck in the rhetoric that purports that catching-up countries need to enhance policy and administrative capacity (either in terms of effectiveness or efficiency) or policy coordination capacities without properly understanding the content and inter-linkages of these terms and recommendations. In what follows, we propose to tackle precisely this question of how the state capacities for IP can be understood from an analytical perspective by creating a conceptual framework that makes it possible to look beyond conventional wisdom of IP governance.

The paper is structured as follows. Section 2 highlights our arguments why there is a need for a new conceptual framework. Section 3 proposes a framework that bridges IP and public administration and management (PAM) research through the lens of coordination of public policies. Overall, it will be argued that IP failures and IP capacity problems cannot be fully comprehended without taking into account the PAM perspective on policy-making and implementation. Section 4 applies the framework to two seemingly highly different cases – Estonia (EST) (an Eastern Europe small economy) and Brazil (BRA) (a Latin-America large economy) – to illustrate the utility of the framework for analysing and making sense of the problems of IP capacity development in the catching-up context. Section 5 highlights the key implications for government policy and Section 6 concludes.

2   Empty and overlooked spaces in innovation policy discourse

This section argues that while the IP discourse perceives policy coordination as one of the key challenges of IP development, current theoretical and conceptual approaches to IP lack the ability to fully comprehend the substance and the extent of the defined challenge itself.

2.1 Coordination as the perceived key innovation policy challenge

There seems to be an almost consensual agreement in IP discourse that IP in catching-up economies is partly hampered by weak state capacity, in the form of either policy or administrative capacity or both (for an overview of arguments, see Karo and Kattel, 2010a; Kattel, 2010a; Piech and Radosevic, 2006; Reinert et al., 2009). To simplify, IP rhetoric usually ends in a tautological or 'dead-end' conclusion: weak state capacity is caused by weak policy coordination and, accordingly, governments should work towards better 'policy coordination' (e.g., OECD, 2005; Box, 2009; EIPR, 2008, 2009). The truth in this simplification is that IP research hardly ever deals in detail with how the policy coordination problems are, in the first place, caused by various policy and administrative processes and how to overcome them (while innovation theories discuss coordination problems, it is mostly centred on the issues of coordination between private sector agents). Further, the IP research hardly ever defines precisely what is explicitly meant by policy coordination problems.

For example, OECD (2010) innovation strategy and European benchmarking activities on IP governance (EIPR, 2009; also OECD, 2005) emphasise that one of the crucial challenges of IP is to increase policy coordination. Problems of coordination are seen to stem from both vertical (ministries – agencies) and horizontal (between different policy fields) specialisation/fragmentation and/or compartmentalisation of IP brought about either by the evolution of IP (becoming more broad and extensive) or by governance systems in general. Subsequently, these documents recommend introducing new policy coordination mechanism to solve the problems. The overall understanding of IP and IP governance is then presented as a conceptual benchmark model for catching-up and developing economies. Another good example from the recent literature is the excellent study by Reichman (2009) on policy flexibilities for developing countries under TRIPS (WTO's 1994 agreement on Trade Related Intellectual Property Rights). One of the main recommendations – along many detailed flexibilities – is that interagency coordination of intellectual-property-rights (IPR) policy in a country seems to be the most important factor in determining whether a given country is able to develop IPR policies (under TRIPS) designed to its needs or not [see also Deere (2009) on varying TRIPS implementation regimes among developing countries].

At the same time, PAM scholars who study governance and policy implementation issues in modern states (e.g., Peters, 1998) argue that the problem of policy coordination can also be viewed as partly unsolvable challenge for policy-makers and civil servants. Coordination problems stem from situations where past or existing structures and practices clash with present or future needs. Efficiencies, increasing returns, but also information asymmetries, etc. created by existing governance systems make structural and functional transformations to new systems an incremental, contextual and path-dependent process (see also Peters, 2005). The PAM research highlights (e.g., Drechsler, 2005; Pollitt and Bouckaert, 2004; Verhoest and Bouckaert, 2005; Verhoest et al., 2007) that governance reforms (over the last three decades) have tried to solve the problems of policy coordination in somewhat contradicting paths or cycles. At first, it was attempted [under the neo-liberal labels of managerialism and new public management (NPM) that were translated into 'good governance' for the Washington Consensus policies] to increase the efficiency and effectiveness of the public sector through decentralising the monolithic Weberian governance structure (to foster coordination mainly by market mechanisms).[3] Thereafter, the new challenge has become

(labelled as the Neo-Weberian State) to consolidate the decentralised and fragmented structures (i.e., dislocated and fragmented policy capacities) through contextual mixes of coordination practices that encompass hierarchical, market- and network-based mechanisms.

Thus, the PAM reform debates and trajectories have centred on fundamental choices, and subsequent compromises, between:

- centralised/hierarchical/consolidated administrative (governance) structure vs. decentralised/flexible/fragmented administrative (governance) structure

- classical Weberian civil service system (based on the career system, merit-based recruitment, the ethos of public sector, etc. influencing and motivating the behaviour of civil servants) vs. a managerial state (based on open civil-service systems, private-sector management techniques, individual and organisational performance measurement and management systems that influence and motivate the behaviour of public sector professionals).

In sum, the IP discourse in general tends to interpret the specialisation/fragmentation of the policy system and the need for coordination mechanisms as inherent characteristic of the IP governance (specialisation increases functional efficiency and coordination increases policy effectiveness), to which feasible ideal-type solutions (coordination mechanisms) can be designed. The PAM literature interprets the linkages between specialisation/fragmentation and coordination in a more complex manner highlighting historically and contextually opposing practices to solve the problems. Therefore, increasing the coordination of fragmented policy cycles is a more complex and contextual task than presumed by the IP discourse because coordination mechanisms usually intentionally contradict or counter-balance existing contextual structural and functional interaction modes (e.g., regulations coordinate markets) in order to re-balance information and communication flows within and across specific policy-cycles.

2.2 *Changing historical circumstances and policy challenges for catching-up economies*

Looking at the IP rhetoric, it can be concluded that the previous views of state-led technological and economic development (classic industrial policy) have been replaced by a more systemic view (innovation systems and policies) (Soete, 2007; Sharif, 2006). Thus, IP is a highly complex policy that covers (horizontally) many traditional policy areas and is implemented in the 'grey zone' of state-society relationships (close systemic linkages between the state, industry and other stakeholders). The systemic view has seen, especially in catching-up context, both 'market-based' and 'network', or public-private partnership (PPP)-based versions of it (see Radosevic, 2009; Kattel and Primi, 2010). Overall, these changes question the relevance of past classic studies on development (e.g., Amsden, Evans, Wade) that place the highly active and capable state at the centre of innovation and development.

Indeed, today's catching-up countries in Latin America and Eastern Europe (and elsewhere) have pursued economic development in a different context than prescribed by these classic studies. Latin America and Eastern Europe have been under rather similar external pressures to converge with the so-called Washington-Consensus policies that also have included a public-choice-based view of government policies and administration

('good governance' and the NPM). The criticism of the Washington Consensus economic policies in the context of development has become rather widespread (e.g., Cassiolato and Vitorino, 2009; Cimoli et al., 2009; Lundvall et al., 2009; Radosevic, 2009; Varblane et al., 2007; Rodrik, 2007; Serra and Stiglitz, 2008), much the same way as NPM (and good governance) have been criticised in PAM research (e.g., Drechsler, 2004, 2005; Pollitt and Bouckaert, 2004).

The legacies of the Washington Consensus period IP (horizontal or market-based IP) have eroded the majority of the pre-Washington Consensus period state capacities in the policy area, and post-Washington Consensus policy choices have been significantly reduced (see more below). Persisting external pressures on IP are further created through financial conditionalities of the IFIs (IMF, the European Union), and the normative spread of IP ideas (e.g., the PPP/participatory model). To complicate the policy challenges, catching-up countries lag behind developed countries both in terms of technological capabilities (placed towards the low end of value chains of global production) and institutional capacities (both knowledge creation and entrepreneurship, but also policy and administrative). Further, in most cases, institutional development may be much harder than technological progress (see Chaminade et al., 2009; Mazzoleoni and Nelson, 2009; Lundvall et al., 2009, 2002). Therefore, the challenges of development for these countries are more complex – not only to transform or refine existing capacities and capabilities, but to create them from the very basics and under internal (past legacies) and external pressures (global convergence), which makes it extremely challenging to develop these in a 'contextualised' manner (e.g., Karo and Kattel, 2010a; Kattel, 2010a).[4]

Further, it can be argued that the changes in IP have been interlinked with the 'techno-economic' paradigm changes whereby the engine of economic development has moved from a mass-production-based economic system (vertically integrated organisations creating economies of scale and scope) to an ICT-based economic system that is dominated by 'modularity' (horizontal and global networks and linkages creating synergies, flexibility and the capacity to accommodate with shorter product and technology life-cycles) (Perez, 2007, 2002). Thus, both societal modes of production and communication (i.e., creation of information and knowledge) have moved from classical hierarchical forms to a mode dominated by outsourcing, modularity, networks and linkages (see, e.g., Benkler, 2006).

Also, for the government in charge of IP, the forms of desirable and feasible policies and administrative models must change or be under the pressure for change. Indeed, it can be argued that the cycles of governance and techno-economic change should be ideally synced in one way or other (see also Drechsler, 2009), but the interplay of external pressures (technological changes and/or ideological shifts) and past legacies (existing state capacities and policy content) make it highly unlikely. This, according to us, is the root cause of policy coordination problems in IP.

2.3 *Conceptual approaches to the design of catching-up strategies and policies*

There are several approaches that have tried to conceptualise the models or frameworks that can be used for designing the policy arenas and practices whereby catching-up economies can devise and implement government interventions (IP) that support technological and socio-economic catching-up. In the following sections we highlight some of the generic and more detailed approaches and discuss their strengths and limits.

As pointed out above, Evans (1995) has classically argued (also in Evans and Rauch, 1999) that Weberian bureaucratic principles (mainly meritocratic recruitment and career system), or even a close approximation of it, are conducive to economic development as they create a long-term vision, institutional memory and the ability to reduce transaction and information costs for the private sector (thus also creating policy and administrative capacities of the state). According to this logic, one of the characteristics of a capable state is the ability to be 'selective' in choosing the right priorities to effectively use and further develop existing economic capabilities and institutional capacities. Selectivity can also be interpreted as 'coordination capacity' in developing, designing and implementing policies. The problem though is that because of the ideological and techno-economic paradigm shifts, the analytical value of Weberian ideas may not fit well into (or be easily legitimised in the policy processes of) the catching-up countries. Indeed, in Evans' analytical framework, Weberian structures are given variables that undergo changes, but whose initial evolution is not analysed in detail or in a specific theoretical framework. Evans' (1995; Evans and Rauch, 1999) thesis of the positive impact of Weberian principles was based on a compromise on Weberian ideas whereby catching-up economies had created Weberian structures that relied on the close linkages and inclusion of industrial or capital elite into the economic policy-making (see also Evans, 1979). It was largely a matter of coordinating the public and crucial private interest necessary for development policies (thus creating 'embedded autonomy') that was to be followed by a broader inclusion of other stakeholders in order to institutionalise economic and technological transformations through societal transformation.

By now Evans (2008) himself recognises that the relevant group of stakeholders has widened (questioning the scope of the 'embedded autonomy') and become more complex (also foreseen by Evans in his 1995 study), making it more difficult to legitimise the initial ideas of linkages between Weberiansim and economic development and close ties between the narrowly determined stakeholders in the policy processes. The change towards modularity, global outsourcing, global production and innovation networks and value chains, networking and linkages may be an important advantage for industrialised or developed countries, but for catching-up countries, it creates important challenges and limits the possibilities for government action (see also Ernst, 2009). Through modularity, the barriers for catching-up (in economic and technological terms) are reinforced and often raised because development of capabilities and capacities becomes more fragmented (Karo and Kattel, 2010b; Kattel, 2010a). Thus, instead of providing prescriptive recipes for development and catching-up policies, there is also a need for a better conceptual understanding of the underlying processes (e.g., creation and preservation of policy capacities). In IP studies, there have been several important efforts in this direction.

Bell and Pavitt (1993) have classically analysed the dynamics of 'technological accumulation' (i.e., accumulation of the skills, knowledge and institutions that make up a country's capacity to generate and manage change in the industrial technology it uses, or its technological capabilities) between developed and developing countries. They have given a very powerful argument that technological changes (i.e., the ICT paradigm) have increased the distance between technological accumulation and growth of industrial production capacity (because of the increasing knowledge- and change-intensity of industrial production accompanied by increased differentiation and specialisation in the knowledge-resources used by industrial firms). This has made it more important for developing countries to concentrate policy attention on technological capabilities (and

learning activities). Bell and Pavitt argue that the Asian economies have been more successful than the rest of the developing countries because of a better combination of firm and policy level strategies. At the same time, their analysis of policy responses to the catching-up challenges is largely based on comparing policy practices (or policy mixes) across developed and catching-up countries and emphasising the contextual and historical differences that complicate the policy processes. Thus, the limits of this approach are similar to our criticism of Evans.

Lall and Teubal (1998) have proposed the 'market-stimulating technology policy' (MSTP) framework for making better sense of the policy debates over government selectivity in IP, horizontal vs. vertical IP, etc. Similar to the approach of Bell and Pavitt they centre on the key issue of technological learning ('collective learning of technology and routines') and use the Asian countries as the example of different strategies. The value of their approach lies in the attempt to clarify the differences between the types of MSTP (functional, horizontal, vertical), categories of MSTP (priorities, incentives, institutions) and levels of MSTP (national, strategic, specific). In the analysis they highlight the strategic IP differences within the Asian countries and provide deeper empirical and contextual insights than were discussed in Bell and Pavitt. But crucially, the analysis and framework departs from the economic rationale for government intervention and therefore overlooks certain inter-linkages of different MSTP measures and categories that are linked to the existing levels of state policy and administrative capacities. For example, Lall and Teubal (1998, pp.1374–1375) differentiate between three categories of MSTP (priority setting; providing incentives for the market through policies and programmes; creating proper institutions and capabilities for implementing priorities and incentive programmes) and discuss the economic rationale for creating government actions in each category. At the same time, the approach is not able to encompass the inter-linkages of the different categories and implicitly presumes that policy-making has certain linear characteristics (e.g., priority setting in this context does not explicitly presume institutional capabilities and the latter can be designed after priorities and incentives mechanisms have been agreed upon.). The implicit relevance of existing policy and administrative capacities is hidden in the emphasis of 'highly context specific' nature of policy-making [Lall and Teubal, (1998), p.1375] which is not further elaborated upon.

Avnimelech and Teubal (2008) discuss the role of IP for supporting the emergence of new industries, clusters, etc. which can also be relevant in the context of catching-up. They develop a conceptual 'evolutionary targeting' approach which is based on close linkages between government policy and market-led development processes whereby government targeted policy interventions need to be flexible and contextually designed in order to leverage the success of key market agents, or depart from the market-led pre-selection (i.e., to assure or support market processes). In principle they argue that 'evolutionary targeting' enables policy-makers to overcome the complexities of selection and policy targeting of present time characterised by uncertainty, complexity and competition (compared to the era of classic industrial policy). Further, it enables the policy-makers to overcome the policy-making paradox that targeted programmes require policy capabilities and actions which are not common during the early phases of government intervention/support (therefore there is the dominance of horizontal programmes) [Avnimelech and Teubal, (2008), p.157]. In principle, they also claim that the evolutionary targeting enables governments to provide supportive coordinating activities to the private sector in times when the emergence of new industries/clusters is

faced with its own paradox whereby there is a need for collective action by market agents (to solve coordination issues in forming new industries, clusters) but the industry is still too young to act collectively [Avnimelech and Teubal, (2008), p.157]. Crucially, applying the 'evolutionary targeting' approach in policy-making requires the understanding of how the governments can coordinate private agents. Avnimelech and Teubal use the case study of Israel to provide examples but do not discuss analytically how the coordination activities of the government can be designed and set-out. The neo-classical counterpart to 'evolutionary targeting' is Rodrik's (2007) 'growth diagnostics', as also Avnimelech and Teubal admit. The same criticism applies, mutatis mutandis, to 'growth diagnostics' approach as well.

2.4 Empty and overlooked spaces in analytical frameworks

Although, all of the approaches analysed above have significantly increased our understanding about the necessity, rationale, logic and context of government IP, we argue that there are at least two crucial aspects that are overlooked by these approaches.

Firstly, in addition to the techno-economic changes that all of these approaches have encompassed, most catching-up countries operate under an international policy regime unprecedented in history in terms of its reach into domestic policy-making. WTO and its treaties do not simply limit available policy space [see Wade (2003) for a classic summary of arguments], but moreover give various stakeholders (e.g., multinational companies; foreign IPR holders, etc.) high bargaining power towards policy-makers of catching-up countries. In addition, the WTO regime assumes that catching-up economies are able to implement international treaties according to their own needs. Both stakeholder bargaining power and implementation capacity assume pre-existing policy and administrative capacity. Almost all studies, never mind from which theoretical perspective, agree that this is precisely what these countries lack. In essence, while the post-WWII development consensus assumed that countries can choose their own policy mix and, further, that the process of choosing, as a learning process, constitutes a key element in creating state capacities (also embedding state and business), the WTO regime turns this around.

Secondly, although the above mentioned approaches have given us ample historical evidence and experience of what kind of state policy and administrative capacities and policy traditions have provided successful catching-up development, its' analytical value for future IP making has remained rather limited. As argued above, in Evans' analytical framework, Weberian structures are given variables that undergo changes, but whose initial evolution is not analysed in detail or in a specific theoretical framework. Frameworks by Bell and Pavitt (1993), Lall and Teubal (1998), Avnimelech and Teubal (2008) and Rodrik (2007) all depart from economic analysis and seek economic rationale for government IP, to start with. Therefore, these approaches are more elaborate in discussion when and on what conditions should governments intervene in IP and how to conceptually analyse this. They remain analytically more vague (or limited to empirical discussions) in discussing how governments should implement the interventions; in fact most of the authors discussed above remain mute on the question whether it plays any role at all how policies are administratively implemented. Thus, terms like 'contextual policy-making', 'adequate policy-mixes', 'supportive institutional capabilities', 'coordination activities', 'coherent policy interventions' are emphasised across different approaches without due analytical account to the meaning of these terms. It seems that

the core problem of these economics-based analysis is the somewhat too linear understanding of policy-making and implementation and expectations of 'rational' policy-makers who take the existing economics-based understanding of IP and implement it in the best possible manner.

In sum, we argue that integration of PAM research into IP models will provide better insights into the variables (external pressures and historical legacies) that affect policy-making and policy-implementation institutions and individuals.

3 Towards a conceptual framework

The interplay of different external pressures (impacts of Washington Consensus on IP and governance, techno-economic paradigm changes, changing international political economy) tends to contradict with the past legacies of catching-up countries and reduce the margin for error for state actions. Policy choices are limited and state capacity is assumed to exist. In this context, policy failures, because of the limited alternatives and options for creating policy capacities, can be comfortably labelled as 'coordination' problems to hide away the fundamental challenges. In this section we will highlight the different meanings or levels of 'policy coordination' that can be used to encompass the different policy problems and failures that we have discussed above. Based on these distinctions we will propose a framework that provides more elaborate insights into the trajectories of IP in catching-up economies by taking into account the overlooked variables and the PAM perspective on policy-making.

To start with, coordination capacity can be perceived as a close proxy for state capacity – this does not imply that high coordination capacities automatically bring about higher levels of state capacity and better IP performance, but rather that state capacity in IP is among other things conditioned by coordination capacities. Coordination capacity enables a state to combine policy, administrative, financial, etc., capacities for goal achievement [e.g., Nassif (2007) looks at the links between IP and macroeconomic policy through the lens of coordination; also Kattel (2010a)]. As state capacity can be perceived as an interdependent mixture of policy and administrative capacity (e.g., Painter and Pierre, 2005; Evans, 1995), coordination is in fact a multi-level and interdependent concept.

Linking the IP and PAM perspectives on IP (as a combination of policy and administrative features), 'coordination problems' of IP can be analysed and analytically allocated at several levels of the policy process [derived mostly from arguments by Evans (1995, 2008) and building on the more detailed PAM framework of Verhoest et al. (2007)][5]:

- *coordination of the policy-making arena* – whom (defining stakeholders) to include and how (defining the level and tools of 'embeddedness') to include them in the policy-debates over IP, its priorities (or strategies) and tactics (or measures)

- *inter-policy coordination* – to what extent (how widely) and how (with what instruments) to coordinate different policy fields (e.g., economics, education and research, labour market, finance) that define IP

- *intra-policy coordination* – given a defined scope of IP [e.g., science and technology (S&T)-based view vs. broader institutional understanding of IP], how to design the policy cycle and what type of management (and coordination) mechanisms to prefer.

Overall, the three levels indicate the potential sources from where policy failures or coordination challenges may emerge.[6] In addition, these levels can also potentially highlight the contextual or developmental differences – it can be hypothesised that more developed economies (in search for more efficient and effective IP) face coordination challenges at lower levels of 'coordination problems' (inter- and intra-policy) than developing economies that need to start developing IP from scratch through defining the policy arena and stakeholders to begin with.[7] Furthermore, it could be hypothesised that changes of and dynamics within techno-economic paradigms/trajectories (or technology life cycles) re-introduce the higher-level coordination questions also into the IP challenges of more developed economies.
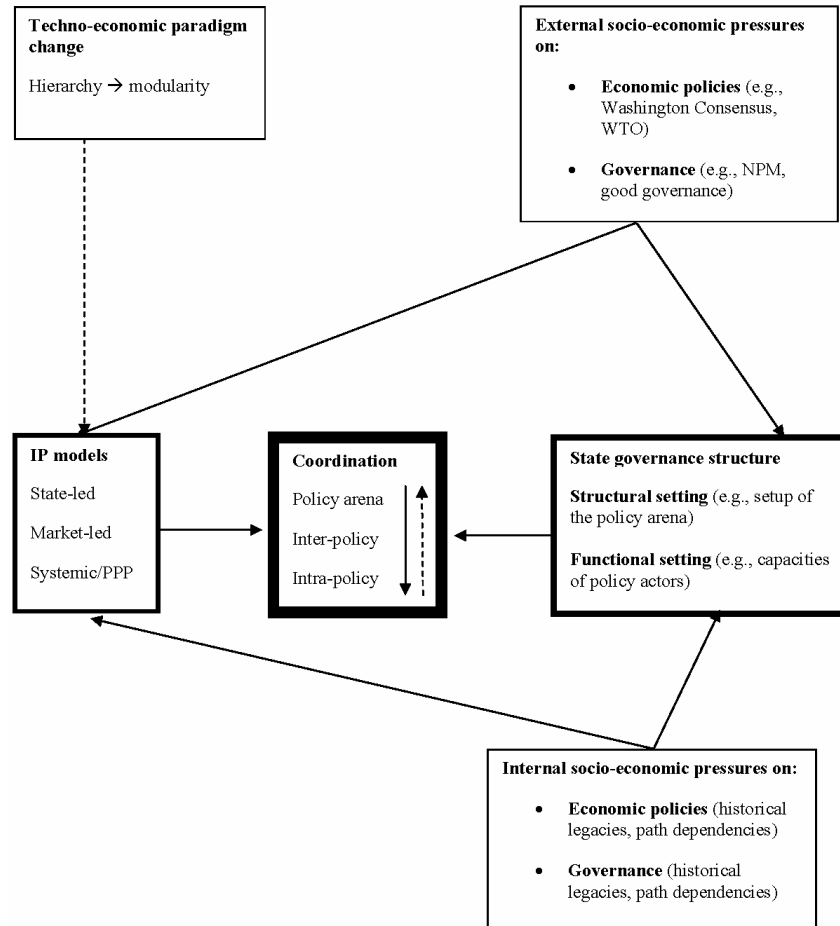
Based on these distinctions, it is possible to create an analytical framework where the different levels of potential coordination challenges are determined or affected by the prevalent IP models and by the parallel developments of the state governance structures. Here we presume that, while ideally, these trajectories should be in sync, in practice they hardly ever overlap. External pressures and national legacies create parallel trajectories that need be looked into in order to analyse IP developments and define the location of 'policy coordination' problems. Thus, coordination problems stem from the clashes between IP ideas (what is the dominant perspective on IP content and expected IP governance system) and IP governance realities (what is the current set-up of the governance area of the IP and what are the competing ideas on governance).

In the first sections of the paper, we argued that the IP ideas prevalent in the catching-up context have moved from a state-led and market-based models towards a networked or participatory model of IP (Radosevic, 2009; Kattel and Primi, 2010). This model (in order to work) implicitly presumes a highly capable and flexible state structure (from PAM research, see Goldsmith and Eggers, 2006; Kickert et al., 1997). At the same time, the governance realities of catching-up countries in general may provide less institutional and administrative capacities and flexibilities because the historical legacies and also the negative pressures of the Washington Consensus (and WTO) era that has eroded existing state capacities. Thus, policy coordination is characterised by persistent clashes and conflicts between the expectations and realities set by both IP and PAM perspectives on governance. Figure 1 provides a visual description of the analytical framework.

Based on the framework it is possible to highlight several aspects that are worthy of empirical analysis and usually are not explicitly included in the frameworks and models designed for IP making and analysis. Firstly, it will be possible to analyse whether the trajectories of IP ideas and supportive IP governance reforms have been in sync. Given that this is highly unlikely, especially in the context of catching-up economies, the framework enables a further analysis for indicating the starting level of coordination problems of IP. Secondly, based on the indication of the starting level of the coordination problems it will be also possible to analyse what are the feasible options for designing solutions to coordination challenges. As the framework links together trajectories of IP and PAM it will be possible to analyse (using the toolboxes of PAM research to complement the knowledge of IP research) what types of state capacities for policy coordination exist in the governance system (e.g., whether the governance models have so far used hierarchical, network-based or market-based coordination mechanism, or mixes of them; where do crucial policy capacities reside – are they centralised or decentralised, etc.) and how feasible are different policy interventions. Thus, compared to the economics-based frameworks, this approach enables a more detailed insight into the

logic and inter-linkages of policy-making cycles, but also requires a broader set of research tools.

Figure 1 Framework for analysis

In the following section we will apply the framework for a preliminary stylised case-study analysis of EST and BRA. We are not conducting a classical empirical study of these two countries. Rather, we start with a brief discussion of current IP challenges in both countries. This will be followed by a stylised-facts-based analysis and discussion of the historical trajectories of IP development in EST and BRA. The empirical evidence (facts, historical description) is gathered from secondary sources, i.e., in-depth country-case studies covering sociological, economic and PAM literature. The aim of the analysis is not to provide a detailed empirical account of the IP trajectories but to provide a stylised narrative of the evolution and trajectory of IP development within the given framework. This enables to highlight the value of the proposed framework for providing new insights on IP development in catching-up countries and provide hypothetical policy implications for IP making that need to be further studied through country case studies.

As the analysis is based on the example of a Latin-American large country and an Eastern European small country, the applicability of the hypothesis should reach above the two countries.

4   Coordinating innovation policies in Brazil and Estonia

At first glance, it might seem odd to compare BRA and EST from the perspective of IP and governance – cultural, politico-administrative, historical, etc. differences should be significant enough to provide large national differences.[8] On the other hand, EST and BRA also have some generic similarities as catching-up economies.[9] Crucial similarities for the current analysis can be found in the assessments of the socio-economic performance of both countries, in the current IP governance challenges and recent key IP reforms (e.g., for EST see Kattel, 2004; Technopolis Group, 2006; Karo, 2010; for BRA see Sa, 2005; Nassif, 2007; Koeller and Cassiolato, 2009):

- In both cases it has been argued that in terms of technological accumulation the period pre-dating the Washington Consensus era should be seen a period with better overall performance than what has been achieved during the Washington Consensus period (in both cases labelled as the 'lost decades') and after.

- The analyses also reveal that both EST and BRA have moved during the 2000 from Washington Consensus-based IP (no-policy policy of the 1990s) towards more conscious IP. The IP-governance challenges of the 2000s are in both cases summarised in rather similar terms across the national R&D and IP strategies: low private-sector investment in R&D; concentration of R&D in the public academic sector; low levels of cooperation and linkages between academia and industry.

- Since the 2000s, both countries have started to initiate explicit policy responses – gradually moving from low-priority horizontal IP towards more prioritised and consciously selective IP. At the same time, in both countries, there are increasing discussions about problems of policy coordination and policy implementation (too much bureaucracy, etc.).

In the following, we use the analytical framework to describe the historical trajectories of the IP governance systems and discuss what has been the role of the historical legacies and external pressures in the emergence of the current definitions of IP problems. The analysis combines the trajectory of IP ideas, trajectory of IP-related general governance reforms and also the trajectory of the developments in the policy arena and definitions of stakeholders. The latter trajectory is, according to our framework, affected by the interplay of the ideas and governance trajectories and largely determines the inter- and intra-policy dynamics of IP (or translation of the IP and governance ideas into the comprehensive IP governance trajectory). The stylised analysis of these trajectories looks back before the pre-democratic era in order to gain more insight into the impact of and interplay between historical legacies and external pressures. The analysis is divided into three periods – pre-democratic period, Washington Consensus era, Post-Washington-Consensus era – and structured as follows: for each period a summarising table of key events and characteristics is compiled (Tables 1–3); this is followed by a discussion that seeks to highlight the crucial evolutions within different trajectories and analyse the mutual inter-dependence between the trajectories.

Table 1 IP governance trajectories of the pre-democratic era (1940s–1980s)

		Brazil	*Estonia*
IP ideas		S&T policy emerged in the 1960s and formed a part of the ISI and 'triple-alliance' policy – i.e., both long-term macro-economic stability and accumulation of technological and institutional concerns were included and combined in the policy rationale.	State-led/planned industrial policy supported by extensive S&T policy that was centrally controlled by the Soviet Union and not by the state apparatus of EST.
Definition of the policy arena and stakeholders		Dominantly state-centrism based on 'national project' – state policies benefited from stable support of the local (and foreign) industrial elites – thus supporting the emergence of the local bureaucratic elite; In IP, stakeholder links were reflected in state-led policy-making where the scientific community and state-owned companies (also controlled foreign capital) became the main partners of the bureaucratic elite (top-down hierarchical policies).	State-centric model with 'distorted' societal and industrial structure as the 'societal elite' and counterparts for the state were state determined (either by the party or state-created institutions). Despite the distortions (overlaps in different sectors that were captured by the state – i.e., no autonomous business or academic sector) the relationship was top-down hierarchical.
Governance reforms affecting IP	1930s	Bureaucracy based on the Napoleonic legalistic tradition (1936 constitutional civil service reform highly Weberian).	Highly centralised and politicised state with limited policy autonomy for the 'state' itself. Government acting as 'implementation unit' under the communist party planning policy. State structure infused with societal structure. Economy dominated and structured by the state. Despite high levels of political centralisation, implementation or bureaucracy was often fragmented, specialised and spanning the lines of the classic public-private divide. Government lacked classical coordination, coherence, control – autonomy reflected in the monopoly power of 'controlling groups' consisting of political and industrial interests.
	1950s	State owned enterprises as part of economic policy, i.e., Petrobras (1953); emergence of regulatory agencies and agencies to support the government 'development' agenda (BNDES, 1952; FINEP, 1969).	
	1967	Period of decentralisation and de-bureaucratisation reforms (Decree Law 200 introduced decentralisation or specialisation).	
Key coordination challenges of IP		IP fragmented between S&T and industrial policy; emphasis on fostering links between industry and science; fragmented policy arena (universities, state owned enterprises, etc., all pursuing their own policies and priorities).	IP fragmented between S&T policy and industrial policy; the system highly fragmented: state-owned enterprises acting merely as 'production units' as the state was also controlling and fragmenting the traditional industrial production cycle.

Source: Compiled by the Authors based on diverse sources. For BRA, see Evans (1979, 1995, 2008), Bresser-Pereira (1999, 2001), Spink (1999), Glade (1999), Gaetani (2000), de Castro (1994), Kattel and Primi (2010), Koeller and Cassiolato (2009), Nassif (2007), Mani (2001), Sennes (2009), Villaschi (2003). For EST, see Kristapsons et al. (2004), Radosevic (1998, 1999), Kattel et al. (2009), Karo and Kattel (2010a), Kattel (2010b), Karo (2010, forthcoming), Masso and Ukrainski (2009), Kattel (2004), Kattel and Primi (2010), Beblavy (2002), Tõnnisson and Randma-Liiv (2009).

4.1   IP trajectories during the pre-democratic period

4.1.1   Brazil – the ISI period (until the 1980s)

The emergence of the explicit IP ideas in BRA can be tracked back to the development of S&T policy during the 1960s as part of the ISI (import substitution industrialisation) policy. The emergence of the policy field started with the creation of the National Council for Science and Technology (CNPq) and federal sectoral R&D institutes in strategic fields (e.g., aerospace, space industry) in the 1950s. The ISI policy was largely based on foreign investment and technology that was steered through policies of protection, promotion and regulation aimed at inter-sectoral integration and product diversification [Koeller and Cassiolato, (2009), p.38]. As the chosen ISI policy and the aims of technological development were rather complex and intensive, it resulted also in several new institutional transformations over the decades – e.g., the creation of state-owned enterprises (Petrobras in 1953), agencies with special tasks for S&T policy (e.g., BNDES created the National Technical and Scientific Fund in 1964; FINEP, the Agency for Financing Studies and Projects was set-up in 1969).

Koeller and Cassiolato (2009) have argued that the end of the 1960s and the 1970s differed from previous eras of S&T efforts as the economic growth had allowed significant amounts of resources to be directed to the field. Nassif (2007) has argued that S&T policy was allowed to grow because most military governments of the period placed a high emphasis on S&T autonomy. Thus, the design and implementation of S&T policy became more complex and was steered through the National Development Plans of the 1970s (for large scale investments) and a special emphasis on S&T planning (three plans adopted throughout the 1970s to the mid-1980s) that first emphasised new technologies and specific industries (energy, microelectronics, aerospace), but by the 1980s had become increasingly horizontal [Nassif, (2007), pp.6–7]. One of the key events for S&T policy coordination was the creation of the position of Secretary of Industrial Technology in 1972 under the Ministry of Industry and Commerce. A parallel development was the emergence of FINEP as the centre of S&T policy. It started to design policies to foster linkages between the S&T sector and the industrial sector to increase industry R&D because the ISI period had resulted in high levels of heterogeneity across and within industries (Koeller and Cassiolato, 2009). Indeed, it can be argued that overall, the S&T system was highly heterogeneous, or fragmented, with several agencies (e.g., FINEP and BNDES), state-owned enterprises (e.g., Petrobras, Embraer, EMBRAPA) and also subsidiaries of MNCs pursuing R&D efforts to build needed capabilities for technological accumulation. Thus, S&T policy had become rather complex and the S&T policy capacity was fragmented across the policy field, partly because S&T policy had been part of the larger ISI policy – no ministry of S&T existed at the time; some agencies such as the BNDES financed S&T as a side activity; weak linkages between S&T and industry resulted in industry pursuing its own dislocated strategies.

Next to S&T policy reforms, parallel transformations also took place in the state governance reforms that further affected the realisation of IP ideas and trajectory. BRA had inherited from the 1930s and before a rather Weberian and highly centralised governance model as certain elements of civil service were constitutionally institutionalised. Also, there was a high emphasis on the state as an autonomous and

leading actor in socio-economic development. At the same time, already in the 1950s, the unified and centralised model was gradually challenged through the creation of state-owned enterprises and agencies for steering and coordinating policy areas like S&T. This resulted in the major reform of 1967 (Decree Law 200) that decentralised the administrative structures, led to de-bureaucratisation of decentralised units of the government and granted significant autonomy to these decentralised units. In theory, this should have created contradictions with the general ISI and also S&T policy goals, as the latter required a high level of state involvement, steering and also selectivity. Increasing the levels of decentralisation and policy autonomy of agencies and state-owned enterprises (that acted as the 'hub' of sectoral policies; i.e., indirect public administration) should have increased problems of coordination, accountability, and adaptability/flexibility, etc. Also, Bresser-Pereira (1999) has argued that the military governments potentially reinforced these threats because it placed little emphasis on developing the core of bureaucracy and most potential capacity development efforts (e.g., high-level recruitments) were confined to the indirect administrative system (agencies and enterprises). The latter was easier to manipulate (less bureaucratic constraints) for personal favouritism, but positively also allowed more flexible policies. Evans (1995, pp.107–123) has also argued that the ICT sector was strongly influenced by regulatory agencies (e.g., Commission of the Coordination of Electronic Processing Activities) that had been granted significant policy autonomy and that managed to steer industrial policy (through regulation of imports for macroeconomic stability) in a manner that fostered the emergence of ICT capabilities in the 1970s.

Thus, on the one hand, decentralisation and fragmentation should have created problems of policy implementation and coherence (because policies were highly activist and selective), on the other hand, there seem to be indications that indeed, it also created some 'pockets of efficiency' (e.g., BNDES, regulatory agencies) (see also Evans, 1979; de Castro, 1994; Trebat, 1983; in general also Manning, 2001; Wettenhall, 2003). Thus, somewhat perversely, developments in IP and governance in general supported each other enough to generate relatively strong centres of coordination.

It can be argued (and has been before) that despite the seeming contradictions between S&T policy content and the governance context, the ISI-based industrialisation and S&T policy period can be evaluated as a relative success because of peculiar coordination of the policy arena and stakeholders characterising BRA at the time. Namely, while BRA has been facing shifts of government regimes over the last century, the country and identity of the nation were arguably relatively coherent, at least at the level of state and industrial elite, thus, maintaining a stable stakeholder group for policy. This is what has been labelled the 'national project' for development that was based on the 'industrialisation-led development' relying on close ties between the state and the capital (both local and foreign) elites ('triple alliance') that were relatively stable through different regimes over the 20th century, up until the last democratisation era began (Evans, 1979, 1995; Bresser-Pereira, 2001; Spink, 1999). Thus, the formal state structure that should have been theoretically inefficient for the S&T policies (IP ideas) of the time was paralleled by a complementary informal state-society relationship (coordination of the policy arena) that allowed the S&T governance system to fragment policy autonomy, but created pivotal pockets of efficiency, etc., and in the end provide the needed capacity increases.

4.1.2 *Estonia – the legacies of the Soviet era (from the 1940s–1990s)*

The case of EST provides a somewhat different picture about the relevance of historical legacies. Because of the occupation period and centrally planned policy model of the Soviet Union, it is often stated that in terms of public policies such as the IP and organisation of public administration, ex-Soviet republics like EST started the 1990s from 'scratch' (e.g., Tõnnisson and Randma-Liiv, 2009; also for R&D and IP policies, see Kristapsons et al., 2004). Because of the centralised management (from Moscow) of key policy and societal fields (including the organisation of state and economics), the ex-Soviet republics lacked substantive policy autonomy during the occupation and consequently, they also lacked the policy capacity for autonomous policy-making during the transition period. Thus, the Soviet state structure dismantled most of the state structures and capacities initiated during the 1st republic from 1918 to 1940.

The Soviet period was characterised by a state-led/planned industrial policy supported by extensive S&T policy that was centrally controlled by the Soviet Union, and not so much by the state apparatus of EST. Therefore, distinction of governance and state capacities can not be limited to national boundaries – in many ways the hierarchical centre of policy autonomy (definition of IP and S&T policy ideas; definition and design of policy arena and stakeholder involvement; development of policy capacities within the governance system) was steered by the Soviet Union on behalf of national entities, such as EST.

Thus, the whole Eastern European S&T and production system presented a rather unique mode of coordination and inclusion of relevant stakeholders and implementation of policy. Radosevic (1998, 1999) has argued that the resulting S&T and economic production system was characterised by a complex system of planning and cooperation, and high diversification with Academies of Sciences, universities, industrial research institutes and industrial corporations representing a complicated division of tasks (divided not within but across the conventional lines of public interests and market forces). The state owned and controlled all the institutions of industrial and innovation systems and the state designed them in a distinct functional model of a planned economy (e.g., Beblavy, 2002; Bell and Pavitt, 1993; Radosevic, 1998, 1999) – policy planning was consolidated into planning institutions (that negotiated with interested 'groupings'), basic science was consolidated into Academies of Science and its' institutions, both public and private/industrial R&D were consolidated into research institutes, universities were specialised in teaching only, state firms were specialised in production functions (i.e., even problems of production were solved outside the factories and firms, in research institutes).

Therefore, the role of the state in economic and S&T policy was highly influential, to the extent of reducing the role for autonomous capabilities of other actors in the production/innovation systems. In addition, the core policy capacities were stocked outside the national policy institutions. Thus, on the one hand, from the perspective of the relationship between state and society, the system was highly centralised and even hierarchical, but on different functional lines than in market economies. On the other hand, from the perspective of coordination and governance of the IP activities, the system seemed highly specialised and fragmented. But again, the broader coordination model of the policy arena (although unorthodox by conventional understanding of policy-making) created the framework for the relative success of this IP governance model.

Table 2   IP governance trajectories of the Washington Consensus era (1980s–1990s)

	Brazil	Estonia
IP ideas	No policy IP: market liberalisation, encouragement of FDI (and FDI-based technology acquisition); horizontal policies based on the market-failure principle of government intervention.	
Definition of the policy arena and stakeholders	Wider links between state and society had resulted in a loss of trust: e.g., legacies of military rule misusing the state structures (parastatal organisations). At the same time the economic problems challenged the role of the state in different policy areas and the economic crises led to a re-balancing of relationships towards more market-based structure. State and society relations were designed to be divided into: 1 core tasks where the state can communicate with society through bureaucracy 2 the rest that will be more reliant on managerial and market-based communication.	From the mid-1980s, the central control by the Soviet system and party was gradually relaxed and limited local autonomy (both policy and entrepreneurial) emerged. Relationship between state and society was re-designed from two perspectives: 1 as the Soviet system was characterised by no 'state policy autonomy' one of the tasks was to redefine the roles of different sectors in society 2 on the other hand, the period was characterised by weak state legitimacy, trust and participation; especially in economics.
Governance reforms affecting IP	1988 Constitutional reform was directed to re-establishing the strength of core bureaucracy (unified civil service and tenure re-established through 'single juridical system' for the whole administration without change of administrative structure). 1995 Managerial reform as a state reform to end the cyclical centralisation-decentralisation-centralisation cycle. Reform 'rethinking' the roles of the state by strengthening the core of the state and giving autonomy to 'autonomous agencies' and 'social organisations'.	Period until the mid-1990s was based on creating the basic state functions both in terms of legislation and organisational development. The legislative system was developed based on legacy and examples of the Germanic system. Basic legislation was created in the mid-1990s. 1995 Civil Service Act created a mixture of principles of the Weberian system – merit system and in-service training – and a more flexible open system (no career system was truly implemented). Government organisational reforms were directed towards establishing policy-administration split (small core ministries and regulatory and service agencies). Government reduced through widespread privatisation of state enterprises.
Key coordination challenges of IP	IP became a market-led policy model where close ties between state and the academic and industrial elite were transformed into government responsiveness to market signals (bottom-up hierarchical policies). During the end of the period, IP striving towards participatory policy-making (or exchange of abstract market signals with more embedded networks). At the same time there are indications that the structure of industry does not support the emergence of new alliances between the state, industry and science.	

Source: See Table 1

4.2   IP trajectories during the Washington Consensus era

4.2.1   Brazil (from the 1980s–1990s)

The 1980s and the increased external macro-economic pressures (external financing constraints; see Kregel, 2008) turned around the development model in BRA. Resources for S&T policy dried out significantly (for state policies in general but also in state-owned enterprises) – e.g., combined funding of FUNTEC, CNPq and CAPES (Coordinating Committee for Further Training for Personnel and Higher Education) in 1985 was only 40% of the 1979 funding. At the same time, BRA sought to balance the loss of S&T funding with a loan from the World Bank (Science and Technology Reform Support Project to increase and consolidate national scientific competencies in universities, research centres and enterprises) [Koeller and Cassiolato, (2009), p.43]. This was paralleled by the creation of the Ministry of Science and Technology in 1985. Thus, it can be seen that the 1980s brought about changes in both internal IP governance and external macro-economic context, but also significantly increased external pressures on the S&T policy (external macroeconomic constraints limiting autonomous policy options and external financing creating further conditionalities). While the previous era had been based on a rather unconventional S&T policy governance system that counterbalanced structural paradoxes with informal coordination of policy arena and stakeholders, the 1980s started to turn this around towards a more conventional governance context.

At the same time, the democratisation process of the 1980s brought about changes in the general governance model. Bresser-Pereira (1999) has argued that the new government of the end of the 1980s perceived the old state model as highly inefficient (based on patronage, corruption and waste) and one of the causes of economic decline. Therefore, the 1988 Constitutional reform sought to clear up the fragmented and unaccountable state governance model through a reinforcement of the centralised Weberian model. The reform foresaw the re-creation of the classical Weberian civil service model and reduction of the autonomy of the decentralised state organisations. At the same time, Bresser-Pereira (1999) has argued that while the problems were mostly defined at the centre of the bureaucratic core (lack of capacity, legacies of patronage, etc.), the reforms affected the whole governance model, or as he has argued: "semiautonomous agencies, foundations, even joint-capital companies were obligated to employ the same system of civil service examinations" (p.128). Thus, while external macro-economic constraints limited the capacities of the system and external financial support steered the S&T towards a new S&T or IP governance model, the reforms of the state governance further complicated the governance arena with the existing system of 'pockets of efficiency' etc. increasingly losing its' role as policy hubs.

A look at the coordination of the policy arena and inclusion of stakeholders in the policy processes provides another crucial argument why the 1980s were followed by a downgrading of S&T capacities, and the 1980s and 1990s reflect lost decades in terms of S&T and innovation (see Mani, 2001; Nassif, 2007; Villaschi, 2003). Namely, it can be argued that the crisis of 1980s increased the public distrust in the state and decreased the capacity of the state to overcome the crises – i.e., the democratisation process, as pursued (criticism of the state and past institutions as a whole, etc.), reinforced distrust in the state and demolished the past IP stakeholder relationships that had provided the informal backbone to the formal S&T governance system.[10] Thus, while up to the 1980s, the paradoxical S&T governance model provided significant capacity for development. The

1980s turned the model towards inefficiency and even decreasing capacity because the new ideas of IP and governance dismantled or paralysed existing capacities and presumed that the needed capacities can be easily inserted into the new governance and IP design.

Thus, the 1990s brought about explicitly no-policy IP period (starting with the 1980s IP and governance reforms) whereby until the end of 1990s, there were no real IP measures, and S&T policy was based on rather limited investments in the maintenance of infrastructure – monetary instability and the supremacy of macroeconomic concerns dominated the period (Koeller and Cassiolato, 2009; Nassif, 2007). In general, the period was characterised by market liberalisation, encouragement of FDI and S&T policy was steered through horizontal policies. At the same time, macroeconomic constraints complicated the implementation of most designed S&T and IP measures (such as the Programme to Support Technological Capacity of Industry, PACTI). Nassif (2007) argues that the adoption of Washington Consensus policy principles resulted in a limited capacity of BRA to incorporate or coordinate macroeconomic policy with IP and S&T policy. In terms of IP governance, the 1990s were in broad terms limited to the creation and reform of regulatory agencies (to provide the framework for market forces, to conform with the WTO rules). Most emphasis was placed on a narrow understanding of IP (limited to S&T) and it was limited to high-technology fields and an emphasis on patenting policies and other aspects of codified knowledge. Koeller and Cassiolato (2009, p.47) have argued that the period resulted in several undesired impacts on the innovation capabilities as liberalisation resulted in: foreign goods replacing domestic machinery and equipment; MNC subsidiaries cutting down local R&D investments and private R&D increases did not materialise; public R&D institutes moving from research to lower-intensity consulting activities; production becoming less intensive in the use of local engineering and technical capabilities. Thus, the 1980s to 1990s resulted in a complete transformation of IP ideas (from ISI to market-based IP) and resulting innovation capabilities.

At the same time, while the IP content experienced a radical shift in terms of ideal types and goals, the governance reforms were faced with past legacies and structural contradictions. In the mid-1990s, BRA started to pursue a managerial reform as a state reform to end the centralisation – decentralisation – centralisation cycle that had affected the state capacity from the 1930s onwards. The new managerial reform was designed to 'rethink' the roles of the state by strengthening the core of the state and giving autonomy (managerial or administrative, as opposed to policy) to 'autonomous agencies' and 'social organisations'. Thus, while the changes in the S&T and IP content were pursuing a conceptual revision of the whole policy arena, the managerial reform was pursued to rethink the division of tasks in the state in much the same way. In the context of IP, while the previous IP system of BRA had been based on rather paradoxical fragmentation and spreading-out of the policy capacities (e.g., state-owned enterprises acting as hubs of sectoral policies), the new reforms foresaw establishing a policy-implementation split in governance with the central core retaining (in effect still needing to start building) high-levels of policy capacity. Overall, these reforms can be characterised as attempts to create a classical state structure that strikes a balance between Weberian and managerial ideals. At the same time, the model required creation or existence of high state policy capacities to revise and coordinate policies on the broad scale (i.e., on all levels of the framework).

Looking at the coordination dynamics at the level of the policy arena and stakeholder inclusion, it can be said that the period introduced significant clashes between what could be seen as an ideal IP and what can be described as the realistic model. Namely, it was presumed (by the IP ideas) that the market forces directing the S&T and IP would create new links between relevant stakeholders in innovation processes – that is between S&T performers and industrial partners with the state or bureaucracy limiting its role to network facilitator or supporter that deals with market failures. At the same time, as liberalisation and radical transformation of the existing S&T and production system had reduced S&T and innovation capabilities of both sides (leading public R&D performers to internal competition and industrial stakeholders to global competition, where they were severely disadvantaged), the expected coordination dynamics have not materialised. Further, the ability of the state to take the central role in coordinating the policy arena has been challenged by the reformulation of the governance model because the new policy model of hierarchical policy-administration split, although being more rational and transparent, presumed that the state has policy capacities at the top of the hierarchy while the past experience indicates that the policy capacities have existed in lower levels of governance (i.e., pockets of efficiency).

4.2.2   Estonia (the 1990s)

The start of the democratic era in the 1990s created a 'window of opportunity' for radical reforms. It can be argued that the Eastern European countries followed a radical shift of the S&T and economic policies that was mediated by strong normative and conditional pressures by the Washington Consensus institutions and the EU. Initially it resulted in a no-policy IP period during the 1990s (see Karo and Kattel, 2010a) that was based on policies of liberalisation, privatisation and the attraction of FDI and foreign technology. As a result, the old S&T and industrial policy structure was consciously dismantled (see also Tiits et al., 2008; Kattel, 2010b), and new mechanisms of market-based IP were introduced.

At the same time, as the collapse of the Soviet Union was not merely a regime change, but institutionalised re-independence of nations, such as EST, the new countries needed to re-build a basic state structure from scratch (thus, starting at the highest levels of potential policy coordination challenges). Policies and ideas for fostering IP in EST remained limited to macroeconomic policies (to guarantee stability) and R&D policies. It has been argued (see Kristapsons et al., 2004) that the Baltic States (EST, Latvia, Lithuania) pursued the most radical reforms of the S&T system. These countries pursued conscious dismantling, consolidation and 'marketisation' of the system of academies of sciences and industrial research institutions that further reinforced the no-policy IP idea. At the same time, the liberalised markets did not have sufficient absorptive capacities to pursue industrial R&D and the academic university sector was steered towards a market-based model with high levels of competition based on international academic excellence (see Kattel, 2004; Karo, 2010; Masso and Ukrainksi, 2009).

In terms of governance reforms, the 1990s resulted in similar fundamental revisions of the state governance principles. On the one hand, the reforms pursued basic legislative reforms and the introduction of basic state structures [in IP, this included the adoption of basic structures such as the R&D Organisation Act in 1994 and revised in 1997; the establishment of the R&D Council in 1994, etc. – for a more detailed overview, see Kristapsons et al. (2004) and Karo (forthcoming)]. Most of the key generic legislation

was adopted from the mid-1990s onwards. This has directed the state and general governance of IP from the institutional confusion of the post-Soviet years towards a minimal state with a basic hierarchical structure and legislation. By early 2000s the model started to develop more into a managerial state with a high emphasis on private-sector management principles, a mixed system of civil service (some Weberian elements, but an open and flexible system) and private-sector organisational characteristics (policy-administrative split, division of tasks between traditional hierarchical ministries and agencies, with high-level coordination mechanisms introduced, etc) (for a general trajectory, see Tõnnisson and Randma-Liiv, 2009; Drechsler, 2004). The IP governance reforms paralleled these reforms and EST established the basic market-based IP system with conscious IP by around 2002 (see also Karo, forthcoming).

The emerging IP model presumed that the state should have high levels of policy capacity at the top of the governance hierarchy. But as most of the IP governance reforms in economic policy spheres have been steered towards de-bureaucratisation (although the problem of bureaucratisation was a different phenomenon than in mature democracies – see Randma-Liiv, 2009), the emphasis on policy capacity has been actually limited. Therefore, despite the fact that both from the perspective of IP ideas and governance EST was pursuing rather modern IP reforms in the 1990s, the overall evaluation of the 1990s still characterises this period as the lost decade in terms of IP performance (e.g., Tiits et al., 2008; Kattel, 2004, 2010b). It is possible to argue that this is a problem of the de-contextualisation of IP reforms (see also Karo and Kattel, 2010a).

Namely, similarly to BRA, the 1990s brought about new ideas on IP and the role of different stakeholders whereby IP is designed and developed horizontally and based on market signals and the core relationships that define the trajectory are built between the R&D and industrial stakeholders (i.e., narrow S&T –based perspective of IP) with the state and bureaucracy limited to network facilitation and rectifying market failures. Similarly to BRA, the liberalisation and marketisation reforms had a negative impact on the IP capacities and innovation capabilities – the reforms dismantled existing S&T and innovation structures and replaced them with formally clear model that follows the classical policy logic. But the model contradicted the legacies of the Soviet S&T and innovation arena where private sector industrial initiative and also autonomous national policy capacities were lacking. The beginning of the 1990s introduced a new group of stakeholders (private-sector industrial elite) that lacked the experience and culture of relationships with either dominant public sector R&D stakeholders or the state as a whole. Thus, although the model presumed that the existing actors and capabilities to form the policy arena exist, the reforms of the 1990s (seeking to create a coherent policy and governance structure) had actually had reverse effects.

In this context, it can also be argued that the main reasons for the emergence of the new and more extensive/conscious IP ideas in the end of 1990s lie in the external pressures and not so much in the national trajectories (and policy learning effects). IP proper emerged in EST with the prospect of and financial support backing the accession to the EU in the late 1990s and 2000s (see Karo and Kattel, 2010a; Kattel, 2004, Kattel et al., 2009; Karo, 2010, forthcoming; Suurna and Kattel, 2010) that created normative and coercive isomorphic pressures to converge both on the content and context of IP as followed by the more developed EU members.

Table 3   IP governance trajectories of the Post-Washington-Consensus era

	Brazil	Estonia
IP ideas	Emergence of IP; horizontal policy but explicit IP measures (tax incentives, subsidies, programmes, funds for innovation); IP based on the narrow perspective on the system of innovation.	Emergence of IP proper, still horizontal policy but more explicit IP measures (subsidies, grants, programmes); high external influence through EU financial assistance and policy learning; IP based on the narrow perspective on the system of innovation.
Definition of the policy arena and stakeholders	As explicit narrow understanding of IP has emerged, also the policy arena and stakeholders are defined accordingly – as IP is based on the assessment that the weakest part of the IP is S&T and industry links, the relationship between the science community and industry is seen as a key issue with the state taking the role as linkage facilitator (analysis based on market-failure and system failure approaches). State taking a non-interventionist facilitator role and limiting relevant stakeholders to a small elite of internationally excellent S&T community and high-tech industrial elite that are foreseen to be the key actors from the perspective of the narrow innovation system.	
Governance reforms affecting IP	Managerial governance ideas explicitly extended to IP, e.g.: 1 Introduction of performance-management systems and performance contracts for steering and managing research institutes; 2 Emphasis on policy coordination initiatives, e.g., creation of a coordination committee for managing Sector Funds for IP; policy initiatives for policy coordination, i.e., Innovation and Investing for Growth (2008) to coordinate inter-ministerial cooperation between the Ministry of Science and Technology and the Ministry of Development Industry and Foreign Trade; emphasis on problems of inter-agency (FINEP, BNDES) duplication and overlapping of policy measures.	Managerial governance ideas explicitly extended to IP, e.g.: 1 Establishment of two-ministry model of IP and creation of policy-administration split in designing and implementing IP; 2 Introduction of performance for steering and managing entire IP cycle; 3 Emphasis on policy coordination initiatives, e.g., creation of National Technology Programmes in key technology fields to coordinate horizontal policies, creation of high-level coordination bodies to steer IP in the context of international policy initiatives (Lisbon Agenda/Europe2020; EU accession and cohesion assistance).
Key coordination challenges of IP	IP is largely re-visiting the S&T policy ideas of the 1970s whereby the emphasis is put on creating linkages between S&T and the industry. The IP model is largely fragmented and facing problems of horizontal and vertical coordination.	IP has seen considerable 'specialisation' and fragmentation, as on the one hand, the market-based principles, narrow perspective on innovation system and specialisation have been at the core of the policy ideas. On the other hand, EU cohesion assistance has created conditionalities and normative pressure to create specialised and fragmented governance structures.

Source: See Table 1

Table 4 Brazilian Sector programme and Estonian Competence Centre programme compared

		Sector programme – Brazil	*Competence Centre programme – Estonia*
Goals		Financial support (co-financing) for projects that foster university and enterprise partnerships or restore and expand the scientific and technological infrastructure of universities and other research institutions.	Financial support (co-financing) for consortia of R&D institutes and enterprises for the creation of new organisations that pursue industrially relevant pre-competitive and applied research, product development and commercialisation of research.
Target group and technology fields	Target	Enterprises and public R&D institutes (funding to R&D institutes that need to find partners that co-finance).	Enterprises and R&D institutes (both local and foreign) that create consortia.
	Current fields	(17 funds; 12 funds started in 1999–2002): two horizontal funds (for unversity-industry interaction and ICT infrastructure); 15 funds covering technologies and specific issues (culture, aeronautics, agrobusiness, R&D in the Amazon region, marine and river transport and naval construction, biotechnology, energy space, water resources, informatics, mineral resources, oil and gas, health, transportation and telecom).	(Eight CC financed): biotechnology (food and medicine); nanotechnology; ICT; machine technologies.

Source: Compiled by the authors, based on analyses of the Sector Fund programme (Sa, 2005; Koeller and Cassiolato, 2009; Araujo et al., 2010) and the Competence Centre programme (Technopolis Group, 2002, 2008; Karo, 2010)

Table 4   Brazilian Sector programme and Estonian Competence Centre programme compared (continued)

		Sector programme – Brazil		Competence Centre programme – Estonia
Implementation scheme	Measure design	Coordination body for Sector Funds (created after 2003), Ministry of Science and Technology, FINEP, National Council for Scientific and Technological Development (deciding sectors and funding needs; replying to special requests by the managing committees of funds).	Measure design	Ministry of Economy and Communications and Enterprise Estonia.
	Implementation	All but the ICT fund (managed by the Ministry of Communications) are managed by the FINEP; each fund has its own managing committee.	Implementation	Enterprise Estonia (agency under MoEcC).
	Funding	Special taxes gathered into the National Fund of Scientific and Technological Development (in 2008, 490 million R$); funding to R&D institutions that need to find co-financing from the industry.	Funding	Open competitive grant co-financing (together with enterprises and R&D institutes); national financing provided by the EU structural assistance and cohesion funds (2009–2013, overall budget €83 million).

Table 4   Brazilian Sector programme and Estonian Competence Centre programme compared
(continued)

		Sector programme – Brazil		Competence Centre programme – Estonia
Evaluation	Positive	Increased the funding of R&D and more bridging links between academia and industry.	Positive	Increased the funding of R&D and more bridging links between academia and industry.
	Negative	Outcomes of the measures have not resulted in the expected output in terms of export capacities, patenting practices etc.; the implementation of the measures has been challenged by duplication of IP measures in general, fragmentation of the implementation structures, the Ministry of Economics limiting the use of tax funds to create reserves for macro-economic policy goals.	Negative	Outcomes of the measures have not resulted in the expected output in terms of export capacities, patenting practices etc. (raising questions about expected self-sustainability); the implementation of the measure complicated by limited steering capacities for the government (form of organisation of centres – both non-profit and for-profit independent organisations allowed – and competitive funding limiting government involvement capacities), also by academic and/or industrial capture (some centres dominated by academic interests as opposed to combined interest in applicable R&D results; some centres dominated by industrial short-term interests reflected in an emphasis on low-intensity R&D activities and/or commercial problem solving, instead of patenting, etc.).

Source: Compiled by the authors, based on analyses of the Sector Fund programme (Sa, 2005; Koeller and Cassiolato, 2009; Araujo et al., 2010) and the Competence Centre programme (Technopolis Group, 2002, 2008; Karo, 2010)

4.3 Post-Washington-Consensus innovation policy trajectories in Brazil and Estonia

Overall, both BRA and EST entered the 2000s with the defined challenge to rebuild IP capacities in the public and innovation capabilities in the private sector and to foster linkages between different stakeholders. IP governance reforms have been taking managerial governance ideas also explicitly into IP governance (see Table 3).

Since the 2000s, both countries have introduced national strategic policies (e.g., industry, technology and foreign trade policy, PITCE and Guidelines to a Development Agenda adopted in 2003 in BRA; knowledge-based EST 2002–2006 and 2007–2013) that prioritise the need to overcome the low intensity of private-sector R&D, to foster better linkages between industry and public S&T, and to increase the capacity of the government to provide integrated and coherent IP (that is to broaden the scope and links of IP).

In this context, BRA has introduced the Sector Fund programme, Innovation Law and several coordination mechanisms and bodies that have sought to institutionalise support for private-sector R&D activities and provide links between public R&D and private sector innovation activities. Sector Funds (probably the most important new policy initiative of the 2000s) are targeted funds in key sectors of the economy that channel earmarked taxes collected from industry revenues into R&D (based on co-financed projects where the state finances public R&D institutes and the latter need to find industrial partners for R&D). Since the 2000s, EST has initiated Competence Centres programme and Technology programmes. The Competence Centres programme (the most complex and intensive policy initiative of the 2000s) has provided co-financing (open competitive funding – broad horizontal priority areas) for the creation of centres (new bodies for R&D&I activities) by consortia of industry and academia. Technology programmes have been designed as national coordination programmes that seek to prioritise specific technologies across different horizontal policy measures.

The Assessment of Sector Fund programme (Sa, 2005; Koeller and Cassiolato, 2009; Araujo et al., 2010) and the Competence Centre programme (Technopolis Group, 2002, 2008; Karo, 2010) find that in both cases, one can witness both positive and negative outcomes of the measures. The overview of the measures is presented in Table 4.

In both cases, the evaluations have argued that the expected linkages between different sectors tend to remain weak or short-lived (limited to the duration of the public financing). More critical assessments claim that although the programmes are designed to be R&D and innovation programmes, in reality, they tend to be limited to R&D programmes (as the measures are typically captured by either academic or business stakeholders). In the case of BRA, it has also been argued that the funds 're-invent' the IP of the 1970s.

Conventional IP analysis (e.g., OECD, 2005, 2010; EIPR, 2008, 2009) would claim that countries like EST and BRA need to reform the IP governance systems through more efficient and effective implementation of IP governance models (i.e., reinforcing the policy-administrative split, creating more efficient coordination mechanisms, increasing stakeholder participation as part of PPP-based IP). At the same time, based on our framework and historical analysis, it could be argued that these administrative inter- and intra-policy coordination problems stem from more fundamental coordination challenges at higher level where the arena for policy and inclusion of stakeholders are determined.

Therefore, simple administrative or organisational improvements of the existing models may not solve the core problems.

Our analysis has shown that there are at least two core problems why market-based and participatory IP models, even if supported by desired governance structures, may not result in expected IP performance. Both of these problems stem from the fact that the Washington Consensus IP and governance models assumed away the importance of historical legacies and exerted de-contextualised external pressures on both countries:

- Both the market-based and participatory IP models presume private sector actors with high levels of absorptive capacity and future strategic perspectives that overlap with those of public R&D (and policy) actors. The historically state centric development models (during non-democratic eras) of EST and BRA did not support the emergence of these capabilities in conventional forms (as capabilities were placed in non-traditional pockets of efficiency in BRA; and in non-market based 'production chains' of EST). The marketisation and liberalisation reforms of the WC area in reality steered the capacities and interests of both actors in different directions; most private sector R&D and innovation potential was gradually substituted by FDI; most R&D system was steered towards international scientific excellence as opposed to towards local industrial needs.

- Both the market-based and participatory IP models presume highly specific state policy capacities and detailed future orientation (either to predict the market-behaviour or to create future scenarios of techno-economic processes). Again, the historical state centric development models of EST and BRA did not support the emergence of these capacities in conventional forms (as in BRA the capacities where located again in non-traditional pockets of efficiency and levels of governance; and in EST these where divided between 'supra-national' communist regime, that defined the policy priorities and steering models, and national entities characterised by more administrative than political roles). The marketisation and liberalisation reforms of the WC area (both in IP and governance) in reality even reduced the existing capacities (in BRA the pockets of efficiency lost some of its role, autonomy and capabilities in the reform processes; in EST the reforms underemphasised the relevance, or presumed the existence, of long-term policy capacities and over-emphasised the modernisation of the administrative structure).

### 4.4 Summary of innovation policy trajectories

When we try to boil down the descriptions of historical trajectories in BRA and EST, we can summarise three key sets of variables that have had the most impact on the different levels of coordination capacity and its' evolution:

- first, in general governance trajectories, we see that there is a rather clear cyclical movement, more pronounced in BRA, between centralisation and decentralisation of the governance systems that affect coordination challenges in somewhat opposing directions

- secondly, in the evolution of IP ideas, we can in turn see a similarly cyclical oscillation around the policy focus on domestic industrial capabilities or on international competitiveness (both in the form of export and high-tech orientation)

- a third significant dimension is the almost linearly increasing role of external pressures in both trajectories since the late 1980s.

Our argument is that the evolution of coordination challenges and capacities – as a relevant variable for public-sector (state) capacity in IP – has taken place both in BRA and EST in an arena created and fundamentally impacted by these three dimensions. As we saw above, these three dimensions are in fact often in conflict and working or effective models are hard to build based on the conventional lines of IP analysis – indeed, both merely IP and PAM confined analysis are likely to simplify the challenges. Figure 2 attempts to visualise the different trajectories described above that shaped these three pivotal IP governance dimensions.

Figure 2   Evolution of IP/PAM reforms and external pressures in BRA and EST innovation policy governance, 1960s–2000s, (a) BRA (b) EST
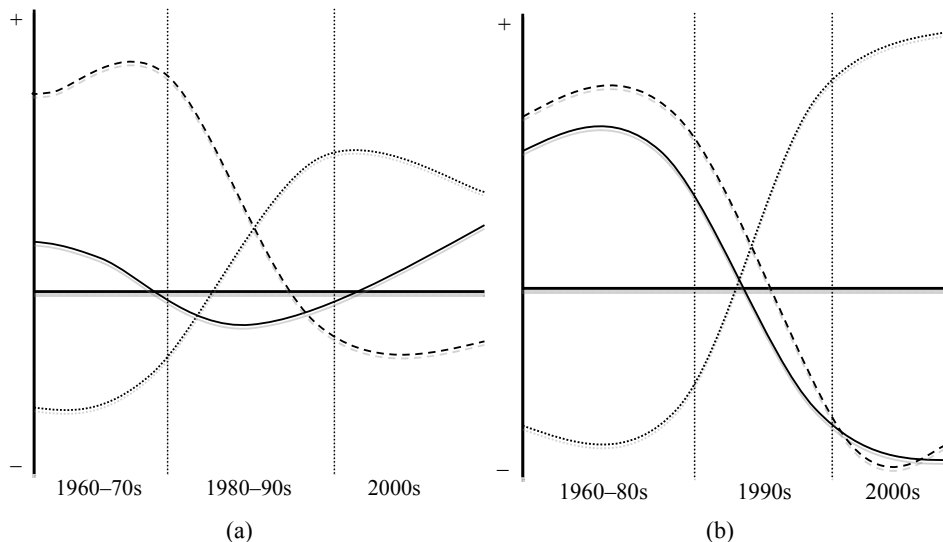
Notes: Legend: punctuated (….): external (de-contextualised) pressures;
          black line: centralisation – fragmentation in governance reforms;
          dashed (----): focus on domestic capacity building in IP.
              Source: Authors

The visualisation attempts to show how conflicting in our view reforms in IP ideas and resulting IP governance have been in BRA and EST and how external pressures have further complicated the interplay between historical legacies and reforms of IP ideas and governance models. The figure attempts, in other words, to visualise how coordination problems come about and why they persist in BRA and EST. We chose two highly different catching-up economies, and yet the analytical focus on IP and governance reforms has made it possible in our view to unearth significant factors determining how coordination challenges and capacities evolve in catching-up economies.

We can claim that the external pressures of the 1980s and 1990s have in both cases assumed away the significance of historical legacies in both EST and BRA. While a somewhat feasible strategy in the context of designing ideal-type IP models, clearly this is a dangerous avenue in the case of designing governance reforms that tend to be more

incremental but in the end are the sources through which ideas of IP are translated into the reality. In both cases the external pressures have led towards limited ability to steer IP to focus on domestic capacity building (de-contextualisation of IP). In both cases the state, although historically having been rather active (and successful) in S&T and R&D policies, seems to lack policy capacities to coordinate policy efforts in desired manner. Our analysis indicates that the coordination challenges is not only an administrative or governance challenge but also a more fundamental challenges of aligning ideal-type policies with contextual socio-economic capacities and capabilities. For the latter, simply economics-based analysis of innovation policy needs, rationales and models seems to be insufficient and more inter-disciplinary approach taking stock of the research of public administration and management may be a necessary step.

5 Implications for innovation-policy-making

Based on this paper we can bring out policy implications on two levels. Firstly, at the level of tools and methods of policy making, we argue that:

- Policy-makers in general need to apply more inter-disciplinary tools of analysis for IP making than merely economics-based analysis. As policy-making and implementation are in reality a process of translating ideal-type perceptions into politico-administrative reality, the economics-based ideals need to be complemented with governance realities and recognition of systemic or evolutionary (as opposed to more linear) characteristics of policy cycles.

- Policy-makers in catching-up economies need to especially recognise that because of the ideological and economic globalisation/convergence processes there is a high probability that international policy learning and spread of international practices becomes somewhat de-contextualised. Therefore, international policy learning needs to be complemented with national historical policy learning. Even if techno-economic changes and development of international political economy make past policy practices increasingly irrelevant, the historical analysis may shed important insight into national politico-administrative cultures and experiences that may be instrumental for designing feasible governance models in the future.

Secondly, in the context of our discussion of EST and BRA, we argue that although the definitions of the current IP problems (low private-sector investment in R&D; concentration of R&D in the public academic sector; low levels of cooperation and linkages between academia and industry) and solving them through increasing policy coordination effort are highly relevant, the use of narrow and de-contextualised policy analysis methods has missed the crucial problems and more appropriate solutions. In both cases we see that majority of the efforts of increasing coordination capacity are located at the levels of inter- and intra-policy coordination. We argue that the problems stem from both economics- and governance-based problems at the higher level of coordination (the policy arena in general):

- In terms of economics and IP ideas, it seems that policy efforts at creating or leveraging private sector technological capabilities have not been sufficient to create them at the expected levels [the same argument is also found at the systems of innovation literature which argues that catching-up economies should base their

policy efforts in the broad concept of systems of innovation as opposed to narrowly S&T based perspective – see Lundvall et al. (2009) for the argument and their proposed solutions].

- In terms of governance ideas and trajectories, it seems that the moves towards more networked or participatory governance models may result in opposite-to-the-expected results because the application of these models requires or presumes the pre-existence of high levels of policy and administrative capacities (at the top of the policy-making hierarchy) which seem to be lacking in our cases. Therefore, more participatory models are even more likely to increase policy capture by interest stakeholders. See here also Edquist and Hommen (2008, p.481) who have shown that by now the Asian tigers, that have been considered as the success-cases of catching-up strategies, are facing policy difficulties in pursuing structural and techno-economic transformations because the policy arena has been captured by interest groups with vested interests in *status quo* and therefore policy coordination problems are becoming relevant again at higher levels. We argue that participatory policy-making models without strong and leading state capacities are likely to result in similar dominance of *status quo* interests.

We believe that solutions to this problem lie in inter-disciplinary analysis of IP ideas and national governance realities that take into account politico-administrative characteristics and other constraints that affect national policy processes. We cannot provide detailed solutions as our empirical analysis has been based on stylised generic study, but more detailed country case studies based on our approach should be hopefully able to highlight more detailed and feasible solutions.

6   Conclusions

The paper has argued that conventional frameworks for innovation policy analysis underestimate the relevance of governance and administrative trajectories. Therefore, in this paper, we have built an analytical framework for IP analysis by linking together the two perspectives of IP ideas and wider state governance reforms. We have hypothesised that in developing countries these trajectories, although often presumed by the IP ideas, are almost never in sync and complementary because external pressures and historical legacies affect both trajectories. We have proposed that the challenges that emerge from these out-of-sync developments can be analysed though the lens of policy coordination (as it is often done in policy rhetoric) that has to be seen as a multi-level concept encompassing both definition of the policy arena and stakeholders, and issues of intra- and inter-policy coordination.

In this paper, we have conducted stylised case studies of BRA and EST that highlight the existence of periods where theoretically dysfunctional governance systems provide positive outcomes in IP performance (in BRA and EST during the ISI and Soviet periods respectively) and theoretically more functional and logical governance systems have provided less satisfying results (the 1990s and 2000s). This can be explained by either contextually supportive (ISI period), or dysfunctional (Washington Consensus period) coordination mechanism at the level of the policy arena and at the implementation level. We have also argued that the current policy solutions (more participatory modes of

policy-making) to the innovation problems are likely missing the crucial problems and are also likely to reduce government policy and administrative capacities even further.

Both our hypothesis and the issue of coordination are uncharted topics in the field of innovation policy. This research seeks to provide first steps towards having a more elaborated understanding of the perceived need to better coordinate different parts of innovation policies. For further research we provide three perspectives:

- Our cases studies have been conducted based on a stylised analysis. Further research could verify our tentative conclusions and connections highlighted between different variables and trajectories.

- Our framework provides also a guideline for studying the detailed governance and public administration trajectories in specific countries and contexts in a manner that is relevant for current innovation policy challenges. Further case study research could outline contextual alternatives to the dominant policy modes (PPP and participatory models) in order to increase innovation policy coordination and at the same time contribute to the development of long-term policy capacities.

- Finally, in light of the research by Evans, Amsden and Wade, who studied the role of Weberian principles as the core of state capacity, the current research on innovation policy has to move towards an analysis of how different countries have steered, controlled and coped with the pressures of managerialism that have challenged the Weberian principles and historical modes of state-capacity creation.

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Notes

1   The term 'catching-up' denotes a general process where less-industrialised countries are moving closer to technological (and socio-economic) frontier (see also Abramowitz, 1986). In this paper we use the term 'catching-up' rather flexibly. The aim of the paper is to shed light on different aspects of IP (and its impact on economic development) along historical trajectories of policy-making that spread across different governance regimes and several decades of development. Because the analysis covers both technological and broader socio-economic concerns of IP and the analysis encompasses two countries embedded in different socio-economic and cultural contexts, the term 'catching-up' does not imply here the existence of one single catching-up trajectory. Rather, the term is used to describe different periods and trajectories of industrialisation and socio-economic changes through which developing countries seek to move closer to technological (and socio-economic) frontier, that it should be seen as a dynamic horizon [see Figueiredo, (2010), p.1093].

2   The discussions on state capacities are rather broad and dynamic (see also Grindle, 1996) encompassing issues of political, economic, national resources; international relations and power plays; size of the state, etc. Here, we look at state capacity from the perspective of policy and administrative capacity (see Painter and Pierre 2005; Karo and Kattel, 2010a). It is considered here that policy and administrative capacity are conditioned by other variables mentioned above, and thus state capacity is not a simple sum of policy and administrative capacity. State capacity is seen first as legitimacy and second as the ability/capability of the state to intervene in certain societal affairs, such as economic and technological development that is conditioned by different variables.

3   Randma-Liiv (2009) has argued that in the context of catching-up economies these reforms movements lack any substantive logic because the NPM-type reforms have been intended to reform the rigidities and inefficiencies of the Weberian state (too much regulation, too much hierarchy, etc.) but in the case of the catching-up context, the problem is often the lack of basic stability usually created by Weberian principles (thus problems are partly caused by too much bureaucracy in certain policy fields and too little bureaucracy in others).

4 For example, Chibber (2003) offers a comparison between South Korea's and India's evolution of state capacity in the 1950s to the 1970s. As he shows, while the post WWII development consensus reached from Asia to Latin America and encompassed national political and business elites in many countries, state capacity evolution took highly differing paths with varying resulting economic fortunes.

5 In PAM literature [Peters, 1998; cited also in Verhoest et al., (2007), p.330]: "coordination in a public sector inter-organizational context is understood as the instruments and mechanisms that aim to enhance the voluntary or forced alignment of tasks and efforts of organizations within the public sector. These are used in order to create a greater coherence, and to reduce redundancy, lacunae and contradictions within and between policies, implementation or management".

6 Also, given the rather narrow (or one-sided) approach of conventional IP and governance research, it is likely that both fields pre-define coordination problems according to their respective expertise – IP research is more centred on the inter-policy coordination level and governance research on the intra-policy level.

7 In addition, reflecting the changing nature of influence many economic actors can exert under WTO regimes upon developing countries' policy-makers, the linkages between the state and other stakeholders of IP also becomes an exercise in creating what Galbraith calls countervailing power. As Reinert (2007, 2009) argues, certain economic activities create not simply higher productivity, higher wages and up- and downstream synergies, but also specific kinds of economic elites often interested in enhancing social values such as education and health [see also Reinert et al. (2009) on failed states in this context].

8 While both BRA and EST are obviously catching-up economies, they could not be more different in terms of size (190 million vs. 1.3 million), natural resources (BRA has well-known large oil reserves, EST has some oil shale reserves that are running out within few decades), IP traditions (BRA's experience reaches back at least to the 1950s/1960s; while EST had an activist state in the 1930s typical of the time and no autonomous economic and conscious technology policy from the 1940s to the beginning of the 1990s; in recent decades, it has used highly liberal policy regimes) and global political status (BRA being one of the very few countries daring to take on the USA for example in WTO and successfully so; EST being a member of the EU and thus having forfeited much of its foreign policy autonomy).

9 They are similar in the sense that their historical legacies include a fight between democratic and authoritarian/un-democratic regimes. BRA ended its last military regime in 1985, EST reestablished independence in 1991. Both countries have experienced high-levels of state control and intervention in economy before the democratisation period. From the start of the democratic period, both countries were subject to strong external pressure to reform the state and economy under the neo-liberal or Washington Consensus agenda.

10 Also, Evans (1995) argued that the concept of 'embedded autonomy' that was initially limited to the state and the industrial elite (triple alliance) would have needed to be expanded to include other parts of the society to provide socio-economic transformations. While BRA managed to show impressive technological development and growth indicators before the 1980s, it did not manage to overcome the problems of extreme inequalities faced by the country and to transform industrial development into socio-economic development.