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Governance of Innovation Policy in Catching-up Context: Theoretical Considerations and Case Studies of Central and Eastern European Economies

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III Karo, Erkki (2011) Evolution of Innovation Policy Governance Systems and Policy Capacities in the Baltic States, *Journal of Baltic Studies,* xxx – xxx (forthcoming).

IV Karo, Erkki (2010) Improving Governance of Science and Innovation Policies, or Just Bad Policy Emulation? The Case of the Estonian R&D System, *Halduskultuur*, 11(2), 174 – 201.

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INTRODUCTION

Scope and aim

This thesis grew out of the interest to study how the Central Eastern European (CEE) countries have developed and implemented innovation policies through policy instruments that foster linkages between different actors (state, industry, academia) of innovation systems.[1] Originally, this seemed to be a theoretically interesting, policy-relevant and practice-oriented research topic, especially in the CEE. Previous research and analyses of policy practices have shown (e.g., Box 2009; EIPR 2008 and 2009; Kattel and Primi 2010; OECD 2005 and 2010; Piech and Radosevic 2006; Radosevic 2009; Suurna and Kattel 2010) that the CEE economies, and catching-up economies in general, seem to be increasingly converging on innovation policy mixes where instruments to foster better linkages and complementarities between innovation actors have become increasingly relevant and prevalent.

The critical analyses of the CEE (e.g., see **I**; Freeman 1995 and 2006; Kattel 2004; Radosevic 1998; 1999; 2004; 2006) argue that these tendencies have led to an under-emphasis of developing the core capacities and capabilities (such as absorptive capacity – see Cohen and Levinthal 1990) of innovation actors, which are a necessary component (next to linkages between actors) of functioning systems of innovation. The critics claim that the CEE innovation policy mixes presume high levels of public and private sector capabilities, which the CEE economies, and catching-up economies in general, in fact tend to lack. Consequently, his has reinforced the high-technology bias in innovation policy, both in terms of the priorities of policies (mismatch between academic excellence based R&D policies and industry needs) and in terms of understanding the dynamics between innovation and catching-up (emphasizing innovation over learning and imitation). Therefore, innovation policy success is often determined and measured by patenting and commercialization activities in high-tech sectors etc. (see **IV**), while theoretically technological catching-up could take place both through imitation/learning and invention/innovation (see Nelson and Winter 1982). The CEE innovation policy mixes tend to underemphasize the imitation/learning modes of technological progress (see also Karo 2009). At the same time, historical studies of catching-up and late industrialization (as the specific case of

[1] In this thesis the CEE encompasses the countries that have joined the EU since 2004: Bulgaria, the Czech Republic, Hungary, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.

industrialization of countries like Korea and Taiwan) show that the last successful catching-up processes (especially the East Asian economies) have been increasingly based on imitation/learning and less on original invention/innovation and that successful learning is strongly dependent on public policy and administrative systems, which explicitly target learning capabilities and activities through the coordinated mixes of micro- and macro-level economic policies etc. These systems are theoretically discussed through the lens of developmental state (Amsden 1989; Evans 1995; Evans et al. 1985; Johnson 1982; Wade 1990).

Despite these contradictions between theory, history and the CEE practices, it can be argued that the measures to foster linkages between actors within innovation systems (based on the high-tech logic) have become the core of innovation policy mixes in the CEE. In addition, there has been an evolution from single instruments (e.g., support for clusters, competence centers, academic commercialization etc.) into policy-making systems where, in addition to policy instruments, policy-making has also become highly networked and more dependent on decentralized public-private interactions and partnerships (PPP) (e.g., policy-making and implementation is increasingly relying on the competences of industry association, foresight exercises and other means to increase short-term linkages and inter-dependencies between actors). Radosevic (2009) has labeled this the *post-Washington (Consensus) approach* (see also Kattel and Primi 2010).[2] Borras (2009) argues that this has also become a prevalent trajectory in the 'old' Europe.

In several of the papers of this thesis (**I**; **II**; **III; IV**), it is argued that this new mode of innovation policy has become the prevalent trajectory in the CEE and this has been the result of particular evolutions of *innovation policy theory* and *practices of policy learning in the CEE*. Also, the problem of high-technology bias of innovation policies has evolved from the narrower issues of policy instruments and means of policy delivery to broader political economy concerns where the legitimacy of state actions, state-society (or state-business) relations etc., should have become central issues, but are often disregarded. In summary, there are three crucial and inter-dependent issues of policy-making, which the systems of innovation in the CEE face:

- definition of techno-economic challenges;
- search for policy ideas or solutions for defined techno-economic challenges; and

[2] In this thesis the new paradigm of innovation policy is referred to as public-private partnership (PPP), post-Washington Consensus or network-based policy model.

- search for governance instruments to implement the solutions to techno-economic challenges.

The first idea of the thesis was to study how the CEE economies have implemented innovation policy in the emerging PPP-based policy paradigm. During the first steps of the research, it became evident that existing theories and prevalent policy-making practices used to implement this paradigm (such as the 'triple helix', 'Mode 2', Bayh-Dole Act centered understandings of the interactions between science, R&D and production processes) are both theoretically contestable, especially if one adopts the evolutionary perspective for studying innovation (as is done in this thesis), and have little to say about firstly, how to define techno-economic challenges; and secondly, how to implement these policies in catching-up economies (**IV**; Karo 2009). Indeed, one of the insights that was gathered, which also became the biggest research challenge, was that innovation policy concepts, no matter from which theoretical perspective, place very little conscious and analytical emphasis on the issues of the ability/capacity of states to define relevant policy challenges; and also on how different politico-administrative systems are able to translate policy ideas into local practices, and then implement them.

Somewhat surprisingly, while the evolutionary (and increasingly also neo-classical) perspectives on innovation and innovation policies in catching-up economies have criticized innovation policy ideas influenced by the Washington Consensus (WC) macro-economic policy and ideological legacies (e.g., Cassiolato and Vitorino 2009; Cimoli et al. 2009; Lundvall et al. 2009a; Radosevic 2009; Varblane et al. 2007; but also Rodrik 2007; Serra and Stiglitz 2008), this criticism has been less conscious of the impact of the WC on policy-making and implementation practices.[3] But it can be argued that the WC ideas have also either more directly or indirectly affected the broader issues of political economy (the role and legitimacy of the state) and narrower issues of public administration (policy and administrative capacity of the state). Also, it could be argued that evolutionary innovation policy research has, to a great extent, de-legitimized the WC influenced innovation policy ideas, but has

[3] It is necessary to mention here that in this thesis it is recognized that the initial WC policies were centered on macro-economic policies and did not directly relate to innovation policies or governance issues (see Williamson 2000 and 2002). At the same time, it can be argued (see **I**; **II**; **III**) that in the case of the CEE economies the impact of the WC policies was also either directly or indirectly transposed to other areas of state actions (e.g., WC ideas created pressures not to adopt conscious innovation and industrial policies and also created an environment that supported the emergence of specific forms of governance in line with the economic rationale of the WC).

paradoxically kept on reinforcing the WC influenced modes of policy-making (see also **I**). It is not only to argue that there can be an extreme divergence in innovation policy rhetoric and practice, but it can also be argued that the spread of the PPP modes of innovation policy making and implementation to catching-up economies (e.g., network governance, public-private-partnerships, experimentation based modes, etc.) has largely followed the same *de-contextualized policy transfer and learning* patterns as the spread of New Public Management (NPM) and Good Governance based policy logic during the WC period (see Drechsler 2004 and 2005; Manning 2001). In public administration and management research it has been argued that the different participatory or network-based modes of policy making require contextual and high-level policy and administrative capacities and also high legitimacy (trust) for the state to engage in partnerships with other stakeholders (e.g., Goldsmith and Eggers 2006; Kickert et al. 1997; Painter and Pierre 2005a), which the catching-up economies seem to lack, almost by definition (see **II**; Brinkerhoff 2008). The research on the East Asian industrialization has also shown that, while these economies adopted complicated mixes of public-private cooperation in economic policy, it was strongly dependent on supportive state policy and administrative capacities (e.g., Amsden 1989; Johnson 1982; Wade 1990). As will be discussed below the currently dominating PPP-based mode of policy-making is de-emphasizing this causality without clear and theoretically sound rationale.

Thus, contrary to expectations, the first steps of the research for this thesis did not lead to narrowing down the research perspective, but instead led to broadening the research questions to be pursued. Therefore, this thesis has studied the following questions:

- How are the innovation policy models developed by innovation research (the evolutionary systems of innovation research) translated into policy-making practices of catching-up economies? Does this translate into clear and analytically explained definition of techno-economic challenges, search process for policy ideas or solutions for defined techno-economic challenges and search for governance instruments to implement the solutions to techno-economic challenges?
- How have the trajectories comprising innovation policy – definition of techno-economic challenges, search process for policy ideas or solutions, and search for governance instruments to implement the solutions – evolved over the last two decades in the CEE and have these economies been developing state capacities that can enable to pursue economic restructuring, or convergence with the rest of the EU?

Therefore, the thesis is not concerned with studying or measuring *the results* of catching-up processes or innovation policies. Rather, it is concerned with studying *the processes of techno-economic and socio-institutional catching-up* (see Castellacci 2006), where the state plays a crucial or central role. The thesis is concerned with the changing role and expectations set on the state and its public policies in techno-economic and socio-institutional processes. Most of the common knowledge (in the context of evolutionary economics) about the role of the state in these catching-up processes has come from comprehensive studies of East Asia (e.g., Amsden 1989; Freeman 1987; Wade 1990) or Latin America (e.g., Adler 1987; Evans 1995), which combine the issues of state-society relations (or state-business relations), content of policies and the structure/capacities of state to support catching-up processes and policies (the model of developmental state). There have been no significant attempts to create similar broad analyses about the CEE catching-up processes. Most studies, both neo-classical and more heterodox, have been limited to macro-economic policy and broader political economy issues (e.g., Myant and Drahoukoupil 2010), or study innovation policies in a narrower scope only (e.g., Piech and Radosevic 2006), or cover the CEE economies as part of larger set of countries (e.g., Ahrens 2002), which limit the contextual details of the analysis.

At the same time, in the beginning of the 1990s the CEE countries entered the path of market-based catching-up in a significantly different context compared to the previous experiences of East Asian and Latin American economies:

- Firstly, the CEE countries faced comparably different paths of state building and policy-making with windows for change opening at the height of the WC ideas and ideologies (see **I**; **II**).
- Secondly, the state-building efforts of the CEE economies have taken place in a unique multi-level governance context where the intervention of international actors, firstly the WC institutions and then the EU in state building efforts has been more prevalent and intervening than in other catching-up regions (see also **I**; **III**; Suurna and Kattel 2010). This has increased the tendencies towards policy convergence and the specific types of policy learning and transfer (discussed below).[4]

[4] In East Asian catching-up economies, the role of foreign assistance (US aid) has also been significantly important (see Amsden 1989; Cheng et al. 1998; Wade 1990). At the same time these analyses also indicate that East Asian economies were rather strongly negotiating and using the US aid based on nationally

- Thirdly, these evolutions have been paralleled by the intensification of the 'techno-economic' paradigm changes (starting already during the East Asian industrialization) whereby the engine of economic development has moved from a mass-production-based economic system (vertically integrated organizations creating economies of scale and scope) to an ICT-based economic system that is dominated by 'modularity' (horizontal and global networks and linkages potentially creating synergies, flexibilities and capabilities to accommodate with shorter product and technology life-cycles) (Benkler 2006; Ernst 2002 and 2009; Perez 2007 and 2002). The impact of these developments on the broader political economy issues of catching-up economies has not been fully studied or comprehended (see Karo and Kattel 2010).
- Fourthly, as a result of the historical timing, the theoretical and academic disciplines used by global policy-making communities (like the OECD, EU, WC institutions) to study economic and technological dynamics behind economic development went through significant changes (see **I;** Karo and Kattel 2010). The CEE economies were initially subject to the influence of WC institutions, which followed mostly neoclassical perspectives and interpreted the successes and failures of the past catching-up processes contrary to heterodox perspectives. The leading influence of the WC institutions was in the mid-1990s overtaken by the EU (and the OECD), which looked at the industrialization perspective of the catching-up policies mostly through the *systems of innovation* (SI) approach (see Godin 2009; Lundvall 2010; Lundvall et al. 2002; Sharif 2006). In general, as will be discussed below, both of these perspectives de-emphasized the lessons of the developmental state approach, either by arguing the contrary (neo-classical analysis) or reducing the scope of analysis (the SI approach).

In this broader context of ideological and techno-economic changes, Castellacci (2006; see also **II**) has argued that the trajectories of techno-economic and socio-institutional processes of catching-up economies are highly likely to mismatch:

> *Paradoxically, however, while the current trends and transformations in the techno-economic system* […] *are increasing the need for the State policies to sustain the catching-up process, recent changes in the socio-institutional system* [the

designed needs and priorities (to the extent of consciously conflicting with the interest of the aid providers).

> impact of WC] *have significantly decreased the scope for public interventions. In fact, institutional changes in the international regime of regulation have assigned to market forces an increasing role in the development process, while the possibilities and the resources that the State has to concretely drive and affect technological patterns and economic performance have been dramatically reduced* (Castellacci 2006, p. 855).

It seems that the conceptual misunderstanding of the possible development alternatives, which Chalmers Johnson phrased in 1982 – i.e., the Western or Anglo-American perspectives seeing only development alternatives of 'plan-ideological' (the Communist system) and 'market-rational' (the Anglo-American regulatory state), while the East Asian model in fact represented a third 'plan-rational' model (governing the market, or development through closely embedded state and market) – is still a relevant notion, though somewhat changed (i.e., 'market-rational' perspective perceived industrial policy as the opposite 'plan-irrational' perspective). Overall, these evolutions have significantly pressured and challenged the legitimacy of the role of the state in techno-economic and socio-institutional processes (see also Evans 2008). On the one hand, the state finds it increasingly difficult to justify its role in these processes, at least based on the classic Weberian/bureaucratic rationale of the state. On the other hand, whatever the acceptable role, the state needs to be increasingly capable of fulfilling the expectations and justifying its role. The economic crisis, which began in 2008, has only reinforced this paradox.

As the aim of the thesis is, on the one hand, to analyze the processes of how theoretical policy models are transformed into policy practices (both how this is understood in theory and how it plays out the in CEE economies) and, on the other hand, to analyze the evolution of state capacities for catching-up processes (both how this is understood in theory and how it plays out in the CEE economies), the concept of state capacity is the core analytical lens in this thesis (**I**). Based on Painter and Pierre (2005b, pp. 2-7) it is possible to distinguish several analytical levels for understanding the meaning of state capacity which create a framework for encompassing broader political economy, policy level and narrower governance (public administration) considerations:

- The broadest concept can be defined as *state capacity*, which means achieving appropriate outcomes such as sustainable economic development and welfare (based on values such as legitimacy, accountability, compliance, consent). It can also be viewed as the extent and depth, and/or legitimacy of government

involvement in a particular policy area (or techno-economic and socio-institutional processes) and interaction with other actors. The multi-level and systemic meaning of this concept can be further highlighted by distinguishing two interlinked concepts that are, on the one hand, preconditions for the state capacity to emerge, but, on the other hand, do not constitute the only variables (see also Grindle 1996).[5]

- *Policy capacity* refers to the ability of making intelligent policy choices (based on values such as coherence, public 'regardingness', credibility, decisiveness and resoluteness); in the context of innovation policy, policy capacity refers to the ability of the political system to decide or compromise on the best approach (what is *desirable* and what is *feasible*) for techno-economic catching-up in a particular techno-economic and socio-institutional context.
- The level or quality of the policy capacity is dependent on the third concept of *administrative capacity*, which refers to effective resource management (based on values such as economy, efficiency, responsibility, probity and equity); this capacity refers to the ability of the political system to use its resources for implementing the policy choices that have been made.

Crucially, administrative and policy capacity have to be seen as interdependent because the institutional memory of a political system, which is pivotal for making intelligent policy choices, is stocked both in institutions of administration and policy-making. This also means that policy and administrative capacities develop in a systemic interaction. In order to analyse the research questions posed in this thesis, this multi-level definition of state capacity is applied both to the literature on innovation policy to understand the strengths and limits of this literature and also to the case studies of the CEE economies to study the evolution of state capacities for innovation and economic restructuring.

[5] The discussions on state capacities are rather broad and dynamic, encompassing the 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. 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, which is conditioned by different variables.

Methodological note and the structure of the thesis and analysis

Methodologically, the thesis is based on two levels of analysis. Firstly, the thesis and the different articles develop the theoretical framework to integrate the concerns and ideas proposed above through interdisciplinary literature review and analysis. Secondly, the thesis applies the proposed theoretical framework to study historical evolutions of the role of the state and innovation policies in the CEE economies using stylized, comparative and in-depth case studies.

Theoretical analysis

This thesis follows the Schumpeterian understanding of innovation. As the thesis is concerned with the systemic and changing role of the state in innovation processes, it applies and advances theoretical and conceptual derivates of the Schumpeterian understanding that are geared towards understanding techno-economic and socio-institutional changes in the context of catching-up processes. In this paper broad definitions (Edquist and Hommen 2008a, pp. 8-9) are used:

- Innovations are understood as '*new creations of economic significance, primarily carried out by firms (but not in isolation)*'.
- Innovation policy is understood as '*actions by public organizations that influence the development and diffusion of innovations*'.
- System of innovation is understood as '*determinants of innovation processes – i.e. all important economic, social, political, organizational, institutional and other factors that influence the development and diffusion of innovations*'.

The thesis departs from the evolutionary theory of economic change (Nelson and Winter 1982), taking into account how it understands catching-up processes (see Karo, 2009; Karo and Kattel 2010) and what it says about the role of institutions in economic development (see Nelson 2002 and 2008). To take into account the systemic role of the state in innovation processes, the thesis follows both the developmental state approach (see Amsden 1989; Evans 1995; Johnson 1982; Wade 1990) and the systems of innovation (SI) approach, in its broad sense (see Lundvall 1992 and 2010; Lundvall et al. 2002), and tries to integrate these historically and contextually separate concepts for a better account of the state capacities as part of catching-up processes. To structure the historical analysis and highlight the changing role of the state in techno-economic trajectories, the paper is also embedded in the thinking of techno-economic paradigms (Perez 1985; Perez and Soete 1988; Perez 2002). In

the mindset of the appreciative theorizing that is followed by these evolutionary perspectives and in order to better highlight, on the one hand, the evolutions of the role of state in society and, on the other hand, how policies evolve in politico-administrative systems, the thesis also integrates Weberian, managerial and Neo-Weberian understandings of the role of the state in society and policy-making (e.g., Drechsler 2005; Pollitt and Bouckaert 2004) and new institutional theories of political science explaining politico-administrative change (see Christensen and Laegreid 2001 and 2007; Peters 2005).

In sum, the theoretical perspective of this thesis is itself an attempt to provide a refined discussion on the theory of the *co-evolution of technologies, industrial structure and institutions* (Nelson 1994; Nelson and Sampat 2002). On the one hand, this perspective is narrowed down to studying the co-evolution of state-led institutions and techno-economic structure of the catching-up economies in the Post-Fordist industrial paradigm. On the other hand, it is broadened to include the logic and impact of politico-administrative changes as a variable that affects these co-evolutionary processes.

Empirical analysis

The thesis is a combination of independently written articles and the empirical research is also divided between different sections of the thesis. As the theoretical perspective of the thesis has been a work in progress throughout this thesis, each of the papers has applied a somewhat different angle within the general theoretical framework (best summarized in **II** and **I**; see also section 4 below). Therefore, the structure and methods of empirical study have also slightly differed. The common feature of the empirical research has been to conduct historical studies of the evolution of innovation policy ideas/models, practices and systems in CEE (also comparing these trajectories with the Latin American cases, as the other 'WC laboratory' – see **II**). Therefore, the thesis combines qualitative case study method with the interpretation of existing literature and policy practice using the refined theoretical approach. The differences in the empirical analyses are related to:

- the scope of analysis – from stylized region-wide study of the CEE (**I**) to comparative country studies (**II**, **III**) to country case studies (**IV**, **V**) and;
- the methods of data gathering – from literature review (**I**, **II**), to the creation of historical databases of innovation policy and politico-administrative evolutions (**III**, **IV**, **V**) to expert interviews with policy-makers and stakeholders (**V**; but also

gathered during the field-work for other research projects, e.g., Karo and Kalvet 2008; Kalvet et al. 2010; Kattel et al. 2007).

Next to the existing literature on the CEE innovation policy and interviews with policy experts (Estonian and foreign), the main sources of empirical data gathering have been national reports of innovation policy systems, measures and historical evolutions (covering Estonia, Latvia, Lithuania and Brazil) and the OECD- and EU-wide innovation policy analysis and benchmarking exercises. Of the latter, the following crucial sources have been used:

- *European Innovation Progress Reports* (EIPR) that provide comparable and structured data-sets of both innovation performance and policy trajectories; [6] and
- *ProInno Europe* and *Erawatch* country analyses – both initiatives compare and benchmark innovation and science policy practices and trends across the EU. The initiatives publish yearly comparative policy performance and policy reform reports and yearly country-specific reports prepared by local experts. The initiatives are creating a database of national science and innovation policy measures and key reforms. Most of the empirical data of policy evolutions (especially for the study of Estonia, Latvia, Lithuania – **III**) have been gathered from ProInno Europe annual national progress reports covering 2000-2009 and Erawatch annual national progress reports covering 2008-2009.[7]

The empirical information has been used both as a chronological source of historical developments (cross-verified between national and international sources) and also as a source of expert assessments and analyses which has been placed and re-interpreted in the theoretical framework developed in this thesis. Thus, the thesis both builds a historical account of innovation policy evolutions in the CEE using the proposed theoretical/conceptual approach and offers a re-interpretation of the historical developments. The following sections of this introduction give an overview of the main findings of this research project.

Section 1 discusses the changes in understanding the role of the state and how the evolutionary theoretical literature on innovation policies and techno-economic development has encompassed these dynamics. **Section 2** elaborates on the strengths and weaknesses of the evolutionary approaches to innovation policy. **Section 3** discusses the role of public

[6] See: http://www.proinno-europe.eu/trendchart/european-innovation-progress-report.
[7] See: http://www.proinno-europe.eu; http://cordis.europa.eu/erawatch.

administration perspectives for analyzing the evolution of innovation systems and the role of the state. **Section 4** introduces the refined theoretical framework, which has been the basis of this thesis. **Section 5** introduces the findings of the CEE empirical studies. Concluding sections summarize the main findings and propose future avenues for academic research and policy analysis.

1 The changing role of the state in catching-up development

Alice Amsden (1989) has argued that the catching-up progress of East Asian economies like Korea and Taiwan during the 2nd half of the 20th century should be seen as a new era of catching-up development that differs significantly from the past events (therefore, calling the process *late industrialization*). She argues that East Asian development has been based more on imitation and learning, as opposed to classic innovation processes (invention, innovation, application, manipulation), which were the dominant modes of development in historically earlier cases. Overall, this fundamental difference has strongly affected the role of the state and policies in the development processes. Embedding the ideas in the techno-economic paradigm perspective, the argument goes as follows:

> *The First Industrial Revolution was built on laissez faire, the Second on infant industry protection. In late industrialization* [the cases of Korea and Taiwan], *the foundation is the subsidy – which includes both protection and financial incentives. The allocation of subsidies has rendered the government not merely as a banker* […] *but as an entrepreneur using the subsidy to decide what, when and how much to produce.* (Amsden 1989, pp. 143-144)

According to scholars like Amsden (1989) and Wade (1990) these historical differences, which have led East Asian economies to develop complex interaction between state and private sector institutions, also make East Asian development progress somewhat different from:

- the less effective developments in Latin America of the same era (see Adler 1989; Evans 1995);
- the historical cases of catching-up and industrialization preceding East Asian late industrialization (e.g., Germany, USA); and
- the neo-classical explanations arguing that mainly market forces have been behind East Asian development and the role of the state has been relatively insignificant.

In evolutionary catching-up literature, the term 'catching-up' denotes a general process where less-industrialized countries are moving closer to technological and socio-economic frontier (see also Abramovitz 1986). Here the term does not imply the existence of one single catching-up trajectory, which tends to be forgotten in policy transfer and policy learning practices. Rather, the term is used to describe the different periods and trajectories of industrialization and socio-economic changes through which developing countries seek to move closer to technological (and socio-economic) frontier, which itself should be seen as a dynamic horizon (see discussions of Nelson in Figueiredo 2010, p. 1093).

Further, the heterodox perspectives emphasize (see Johnson 1982) that the process of catching-up (or development) is not a purely market-based process, where individual private entrepreneurship and profit motives steer the process, but it is also (and maybe even more importantly) a political process, where political actors define the goals and success (or performance) criteria. According to heterodox perspectives this also implies that these processes – and its' efficiency and effectiveness – cannot be defined and analyzed merely through market logic and using the toolboxes of market theories.

In the catching-up processes of the CEE economies since the 1990s, these ideas of heterodox and late industrialization research have never held a strong position, neither in terms of the content of policies nor in terms of the broader role of the state. It has been argued that in most spheres of economic policy, which have been relevant for the CEE economies, the neoclassical perspectives have become more legitimate (among policy makers, but also to a certain extent among researchers) than heterodox perspectives (see Kattel et al. 2009; Lundvall et al. 2009b; Reinert 2007). This has also reduced the complexity of the issues around the role of the state and its policies as most of the neoclassical analyses and theories have centred on the concept of *market failure*, which defines one-directional causalities and limits or simplifies the scope of research, thinking and theorizing about the role and dynamics of the state capacities. At the same time, both Amsden (1989) and Wade (1990) have emphasized that, even if adopting the neo-classical perspective, it should not mean that the state needs to be less capable or that the capacities are easier to create. In fact, they claim that establishing a market may need as capable a state as governing a market.

In somewhat parallel to the spread of neoclassical economic policy approaches to the catching-up processes, the 1980s witnessed the emergence of the evolutionary systems of innovation (SI) approach in the OECD technology policy context (see Godin 2009; Lundvall 2010; Sharif

2006). It can also be said that in the context of developed countries *innovation policy* has become a sort of a cumulative substitute for *industrial policy* in the policy discourses (or has become the central policy concerns in the broader industrial policy). The policy research around the SI approach (in the context of developed economies) has been mostly concerned with understanding the cumulative developments from industrial policy to innovation policy (see Soete 2007). This also means that certain industrial policy legacies (e.g., the state-business relations, bureaucratic structures, etc.) have been implicitly carried over (as presumptions) to the new innovation policy discourse.

It is fair to say that evolutionary economics and the SI approach as its derivatives have also taken on a dual challenge to defy neo-classical economics as the tool for understanding techno- and socio-economic change (Nelson and Winter 1982 and 2002) and also to take the lead in the quest for bringing formulas for innovation and development, or at least the knowledge of it, to catching-up and developing economies. At the same time, the SI approach started to develop conscious attempts at theorizing and developing innovation policy approaches for catching-up and developing economies only during the 2000s (e.g., Cassiolato and Vittorino 2009; Lundvall et al. 2009a).[8] Thus, it can be also argued (see below) that the SI approaches spreading in the catching-up context like the CEE are both contextually and theoretically more 'de-contextualized' than in developed countries. For example, the SI approaches have not placed much emphasis to the role of the state–society interactions or state structures. Rather, the approaches presume on-going development towards somewhat social corporatist structures and sufficiently capable states. Also, the differences between innovation and learning activities and its impact on techno-economic development, which may be extremely relevant for current catching-up economies, are still conceptually and empirically discussed in the SI- based policy research as issues that need to be better understood (see Bonnaccorsi 2007; Jensen et al. 2007; although the issues were also recognized in the original SI approaches, see Lundvall 1992).

Therefore, in the SI models there may be significant implicit presumption about the role and tasks of the state, which are taken over from the original industrial policy discourses. At the same time, Amsden (1989) has argued that the old or classic (state-centred) industrial policy paradigm itself is not that relevant for catching-up economies anymore because the new ICT-based techno-economic paradigm (see Perez 2002) has significantly affected the techno-economic and socio-institutional

[8] Also, the first Globelics conference that acts as the academic link between developed and developing countries SI researchers was held in 2003.

dynamics. The model of developmental state is historically placed between the old state-led industrial policy and present market-led and systemic innovation policy periods, but also historically seen as a different and a middle ground between the minimal Anglo-American regulatory state and the Soviet overly interventionist state (see Johnson 1982). Thus, it may be taken as useful analytical starting point (and a compromise between past lessons and present extreme conditions) for analyzing the dynamic developments of the role of the state that can be integrated into the SI based innovation policy theories. Especially, as the developmental state perspective represents an approach that tries to include both the understanding of catching-up as a dynamic process and seeing it as a political process, which the SI approaches tend to de-emphasize.[9]

1.1 The idea and relevance of the developmental state

The arguments by Amsden (1989) and Wade (1990) encompass the uniqueness and explanations for the success of East Asian development pattern in several levels of analysis:

- the role of the state (in relation to other actors) in the development processes;
- the contextual mixes of policies;

[9] Article **V** discusses the emerging new concept of 'open innovation', which proposes that techno-economic changes have brought about a significant change in the mode of innovation, whereby also traditional innovation policies may lose its importance and potential effects too. Therefore, the state should increasingly rely on policies that reactively rely on market forces and merely pursue policies, which create favorable environment for private sector actors to increasingly engage in networks and increase interdependencies within the innovation systems and globally. On the one hand, the argument that techno-economic realities have significantly changed, seems to be an easy and powerful way for legitimizing current PPP-based and alternative policy models, which reduce the role of the state from proactive to reactive participant in the innovation systems. On the other hand, both article **V** and Karo and Kattel (2010) provide a critical analysis of these ideas in the context of catching-up economies. In principle, it can also be argued that the way by which the open innovation concept has been developed into policy-making model replicates the WC era tendencies to de-contextualize innovation policy research and thinking. Thus, although the idea of the significant change of techno-economic realities seems to be a powerful reason for disregarding the historical lessons of developmental state etc., this cannot be done without fully comprehending the dynamics of how state policy and administrative capacities have and can emerge and evolve. To date, there now is a successful catching-up process where an economy has firstly created and later fine-tuned the needed public and private sector capacities and capabilities using models like open innovation and PPP based policy making.

- the bureaucratic structure and capacities of the state; and
- the structure and capabilities of the private enterprises.

In both of their arguments the state acts as a central node that keeps together public and private interests (governing the market in Wade's terms) through creating or steering and controlling key economic actors (e.g., large industrial enterprises, industry associations, research centers, etc.). This is achieved through a complicated mix of policies (from market regulation to exchange rate and investment policies to technology and industrial policies etc.), which try to foster a compromise between public techno-economic interests (e.g., growth, development, selective wealth distribution) and private interests (e.g., growth, wealth accumulation) relying both on state-led long-term visions (national plans) and signals from the market actors.[10] These policies are implemented in a complex web of public private interactions where the state structures are based on highly capable Weberian bureaucratic institutions (usually centered around a key development agency, either a ministry or government agency staffed with the best of the labor force) and private sector stakeholders who are usually chosen by the state (large private enterprises) or created by the state (state-owned enterprises, industry associations) to participate in development policies as a source of feedback and mechanism of policy implementation. Thus, the structural models provide both stability and coherence in core principles (state priorities and core values represented by state institutions) and high level of flexibility for fine-tuning actions/policies and activities within these broader core principles.

Peter Evans has extended this logic to the cases of Latin American development (see Evans 1979 and 1995) and offered broader empirical proofs of the positive relations between Weberian state structures (mainly meritocratic recruitment and career system) and development (Evans and Rauch 1999). Articles **II** and **III** have taken Evans's concepts of 'embedded autonomy' and bureaucratic capacity as important theoretical models, which enable the trajectories of state-business relationships and state capacities to be analyzed.

[10] A notable exception in this complex policy mix is often the issue of social policies, which many East Asian governments did not emphasize (Amsden 1989) and most social policy concerns were in a way privatized. From other approaches to developmental state (Evans 1995; Wade 1990) this could also be interpreted as an issue of sequencing, as early emphasis on social policy concerns in catching-up processes reduces the capacity of government for investment. In long term though, social equality becomes a key issue for sustaining the development path (see also Rueschemeyer and Evans 1985), creating social cohesion and in Wade's terms for movement from state corporatism to social corporatism.

It is interesting though that both Amsden and Wade, while studying the development of Korea and Taiwan respectively and conducting in-depth empirical studies of industries, policies and techno-economic and socio-institutional processes, borrowed original concepts on the role and structure of the state from political science first elaborated by Chalmers Johnson as a model of capitalist developmental state. Also Evans uses the approaches and ideas of developmental state as an important analytical framework. Chalmers Johnson studied institutional arrangements common in the high-growth East Asian capitalist countries (such as the study of MITI in Japan – Johnson 1982) and developed a model or a descriptive approach, which encompassed the key features of the state in development process (revised and cited in Wade 1990, pp. 25 -26):

- The top priority of state action, consistently maintained, is economic development, defined for policy purposes in terms of growth, productivity, and competitiveness rather than in terms of welfare. The substance of growth/competitiveness goals is derived from comparisons with external reference economies, which provide state managers with models for emulation.
- The state is committed to private property and the market and limits its intervention to conform with this commitment.
- The state guides the market with institutions formulated by an elite economic bureaucracy, led by a pilot agency or 'economic general staff'.
- The state is engaged in numerous institutions for consultation and coordination with the private sector, and these consultations are an essential part of the process of policy implementation and intervention.
- While state bureaucrats 'rule', politicians 'reign'. Their function is not to make policy but to create space for the bureaucracy to maneuver in while also acting as a 'safety valve' by forcing the bureaucrats to respond to the needs of the groups upon which stability of the system rests: that is to maintain the relative autonomy of the state while preserving political stability. The separation or 'ruling' and 'reigning' goes with a soft 'authoritarianism' when it comes to maintaining the needs of economic development vis-à-vis other claims, and with virtual monopoly of political power in a single political party or institution over a long period of time.[11]

[11] Wade has omitted from the original list the item that the state supervises a heavy and consistent investment in education for all the people as it is not an organizational arrangement.

These principles of the developmental state are the basis from which the role and the structure of the state is derived both in the studies of Amsden and Wade in East Asia, but also in the studies of Evans in Latin America. At the same time, both Amsden (1989, p. 149) and Wade (1990, p. 26) criticize the studies of Johnson (especially the study of Japan – Johnson 1982) based on the argument that he merely proposes a description of the developmental state based on historical analysis without much theoretical elaboration. Furthermore, he does not discuss the role or importance of economic policies theoretically and credits the success of Japan to 'market-conforming methods of state intervention' (see Johnson 1982, p. 318; also Okimoto 1990, p. 50). Amsden and Wade object to this based on more in-depth empirical studies of the content of policies and state-business relations claiming that a more complex mix of policies (than merely market-conforming methods) and organizational-institutional interdependencies is in reality the more likely explanation.

Thus, it seems that the scholarship on the causes and dynamics of techno-economic and socio-institutional development, while trying to integrate different levels of potential explanatory variables (the role of the state in the development processes; the contextual mixes of policies; the bureaucratic structure and capacities of the state; the structure and capabilities of the private enterprises) has faced problems of inter-disciplinary research and 'academic blindness' where economics based research and governance (or public administration research) face mutual challenges of integration and complementarity. The example of Amsden, Wade and Johnson shows that the different disciplines are, at the same time, able to both significantly agree and disagree on crucial issues, which provide complex explanation for development and catching-up.

The accounts of Amsden, Evans, Johnson and Wade differed most strongly in describing what policies (in terms of content, scope and coordination) contributed to the development success. Partly, this can be explained by historical differences – Amsden (1989) has claimed that the speed and trajectory of catching-up is partly determined by the timing of the catching-up period in relation to techno-economic paradigms.[12] The approaches also differed in terms of what kind of role and relevance was given to the private sector actors who were engaged with the state in the

[12] Partly, this can also be explained by empirical investigations that were carried out by different scholars – Johnson carried out meso- and micro-level analysis from the perspective of political science; Amsden integrated historical industry-level analysis with firm-level studies of management and economics; Wade and Evans conducted country-level analyses integrating economics and political science based approaches.

development processes.[13] In explaining the developments in Japan (Johnson 1982; Wade 1990) and Korea (Amsden 1989), the emphasis was put to large industrial conglomerates, which were private sector entities (though significantly supported and steered by the state). In explaining the developments in Taiwan (Wade 1990) and Brazil (Evans 1979 and 1995), the emphasis was put to state created enterprises and state-legitimized institutions (e.g., industry associations).

Regardless of these differences in discussing the content of policies and the structure of the private sector, these approaches seem to have strong common lines in terms of what kind of state was seen as a source of capacities, which were needed for governing the market in support of late industrialization (also for creating the contextual mixes of policies and selecting the private sector agents to be engaged in development policies). Thus, in all approaches the following principles, here significantly stylized, can be seen:

- Legitimacy of the state is created by the political actors (usually, but not always authoritarian – either party or military) who envision the national project (development plan), de-engage certain interest groups that would challenge techno-economic progress and wealth re-distribution (in all cases this has been the agrarian or landowners' interests who have been de-engaged through land reforms etc.), and engage selectively new interest groups who are seen as crucial private sector counterparts for implementing the national project – the market-based stakeholders can be engaged either reactively (if they have pre-existed in the private sector) or proactively (through steering certain actors like industry associations, or creating new ones like state owned research institutes and enterprises).
- Behind the political actors lays the level of bureaucracy, which has been given significant autonomy from the external pressures by the political actors to fine-tune the national projects into explicit policies, coordinate different policy areas, practice selective policy intervention and gather feedback from the other public and private sector actors. High-level civil servants who are recruited, motivated and managed through Weberian structures and values, which create stability and induce long-term vision in the civil service, carry out these tasks.

[13] Wade (1990) has indicated that there seems to be some sort of correlation between state and private sector structures (centralization or consolidation vs. decentralization or fragmentation) that are central to the development processes, but the causality is not obvious.

- The bureaucratic activities are carried out in close public private interactions whereby bureaucrats engage in direct steering, communication, and consultation with private sector actors creating two-directional information flows between the public and private spheres. As the bureaucracy has been given significant autonomy from the external pressures, which would challenge bureaucratic discretion and selective choices, the bureaucracy can act highly flexibly within the broad limits of the national project and accommodate structures, institutions and policies to changing conditions.

In sum, out of the four broad explanatory variables found in the analyses of Amsden and Wade (also Evans and Jonson), the broader developmental state discourse seems to be more in agreement with the broad characteristics of two variables, which are related to state structure (the role of the state in the development processes; the bureaucratic structure and capacities of the state). Indeed, it could be argued that in reality, the consensus on these state characteristics creates the context or foundations on which the states are capable of designing the contextual policy mixes and modes of engagement with the private sector actors. At the same time, it should also be remembered that researchers studying techno-economic processes borrowed the theoretical rationale, why these characteristics of the state provide expected outcomes, from the discipline of political science (or more precisely from public administration).[14]

1.2 Changing historical circumstances and the role of the state

While Amsden, Wade and Evans offered empirical proofs of the validity of the developmental state concept at the time of their classic studies, they have also been aware of the potential impact of techno-economic and socio-institutional changes on their own theoretical models.

Amsden (1989) implicitly argued that techno-economic paradigm changes influence how (and how fast) catching-up processes can take place. Her account of the three industrial revolutions indicates that the role of the state in these processes has followed a trajectory from a highly distanced one (laisser-faire) to a more engaged one (industrial policy) to somewhere

[14] Of course, it should also be recognized that many theoretical perspectives used in public administration (e.g., the pros and cons of specialization etc.) can be traced back to economics research. At the same time, public administration research often accommodates economics-based organizational research closer to the realities of policy-making and uniqueness of the state vis-à-vis the private sector organizations.

in between (state interacting with market). This also should imply that the ideas proposed based on the late industrialization of Korea are bound to be outdated at some point of time. In the evolutionary literature these changes have been also discussed, for example, in the context of economic history (e.g., Reinert 2007 and 2009), techno-economic paradigms (e.g., Perez 2002), and in research that deals with industry life cycles and evolutions (e.g., Okimoto 1990). The common line of argument is that while techno-economic changes are paradigmatic, the state has to play changing and cyclical (or even contradictory) roles during different stages of different technological paradigms – from highly active and interventionist to distanced and non-engaged. The catching-up processes make this more complex – the changes in the role of the state in techno-economic and socio-institutional processes can take place both on the trajectory determined by the techno-economic paradigms (largely common to all economies developing in this paradigm) and as cyclical moves within this trajectory (when countries are moving closer to techno-economic frontier, or are catching-up). The dynamic content of state actions is usually deemed to be dependent on the type of techno-economic change and national characteristics.

At the same time, the changing role of the state is usually discussed in terms of the broader state-society relations (how actively the state is engaged in techno-economic processes) and content of policy mixes, while the issues of the potential dynamics of appropriate structures (i.e., bureaucratic capacity) are not discussed in these approaches. See also Drechsler (2009) who argues that even the current evolutions within the ICT and further nano- or biotech paradigm will at certain points of time require the role of Weberian, or Neo-Weberian state structures. This also implies that the spread of managerial, network, PPP based modes of policy-making may be a 'fashion', rather than theoretically reasoned proposition (see also Drechlser 2005).

It is also recognized that techno-economic progress is much more complex and interlinked than ideal-type (one paradigm at the time) theorizing and there are conflicts in both techno-economic and socio-institutional processes, especially in catching-up economies, which try to speed-up or leapfrog stages in techno-economic progress. Thus, in simplified terms, the crucial issue is the timing or noticing when the role of the state has to change. This requires high levels of state capacity, among other things, to take a long-term vision of the development processes, to be selective in priority setting, and also to convince different actors of the suitability of this vision. How these leapfrogging attempts and subsequent techno-economic and socio-institutional dynamics may affect the modes of state capacity creation are not, however, truly

discussed. In this context, it has been recently emphasized that in the catching-up processes institutional convergence (or catching-up) may be even a bigger challenge than technological convergence (i.e., Lundvall et al. 2002 and 2009a; Mazzoleni and Nelson 2009;). Socio-institutional catching-up requires some sort of contextual policy and administrative capacity – but the content of this cannot be fully pre-defined because it is supposed to be contextual (Chaminade et al. 2009; Gregersen and Johnson 2009). The mainstream (neoclassical) criticism of the activist state usually purports that the state is not particularly capable of this task (e.g., picking winners and broader issues of selectivity etc.). At the same time, the techno-economic and socio-institutional changes have further challenged the legitimacy of state and created more complex problems in these very same techno-economic and socio-institutional trajectories.

In concluding his original study, Wade (1990, pp. 343-344) emphasized that many of the policy options that East Asian economies enjoyed (industrial policy as it was known then) are being increasingly narrowed or de-legitimized and that it might be highly likely that the process of democratization and emergence of social corporatism (substituting state corporatism) would challenge the legitimacy of the existing state-society relationships and state structures. He also proposed several general and theoretical lessons from East Asia, which were mostly limited to policy prescriptions (or policy rationale for intervention) and did not as much encompass the issues of state-society relations or state structures (except for the recommendations to create a pilot agency for industrial policy, to create effective institutions and corporatist structures before full democratization) (Wade 1990, pp. 371-381). In the preface to one of the latest reprints (Wade 2003) he succinctly summarized the key external changes (the role of the WC institutions in liberalizing the capital movements, limiting the room for technological learning and imitation etc.), which have even further reduced the room for industrial policy and developmental state. In a way of parallel criticism, he is also arguing that for most developing countries the international arena is proposing governance models (participatory governance), which presume high levels of state capacity without which the models are likely to be captured by different vested interests and result in weak state performance further reducing the legitimacy of the states.

Evans has also reviewed his ideas of development state based on the principles of embedded autonomy and bureaucratic capacity (see Evans 2008). He recognizes that the relevant group of stakeholders has widened (questioning the scope of the 'embedded autonomy') and has become more complex (also foreseen by Evans in his 1995 study), making it more difficult to legitimize the initial ideas of linkages between Weberiansim

and economic development and close ties between the narrowly determined stakeholders in the policy processes. In his 2008 essay he proposes two strategies for the future:

> *The first stresses continuity: the 'developmental state' will continue to play a crucial a role in economic growth and social transformation in the 21st century, just as it did in the latter half of the 20th century. The second is more radical: successful 21st century developmental states will have to depart fundamentally from existing models of the developmental state in order to achieve success.* (Evans 2008)

A recent study by the SI school has revisited East Asian late industrializing countries. In this study, Edquist and Hommen (2008b) have argued, based on the empirical studies of European and Asian small economies that East-Asian countries, which are usually seen as the success stories of catching-up policies (based on processes as described by Amsden and Wade) are increasingly facing problems of interest capture by current industrial elites who have vested interests in technologies and industries, or more precisely positions in the industrial value chains (e.g., Ernst 2002 and 2009), which are by all accounts destined to lose their role as the sources of further techno-economic development. Note that in many cases these elites are the same that were created or selected by the state in the beginning of the industrialization. Their argument is based on the premise that East Asian late industrialization and catching-up success was largely feasible because there was a lack of similar vested interests in the beginning of the catching-up processes (e.g., agrarian elite, or land-owners of the 'old paradigm' who were consciously de-engaged by the state and substituted by interest groups supporting industrialization), which could have challenged socio-institutional transformations needed for techno-economic restructuring (and redistribution of wealth).[15]

The problem of 'un-learning' past capabilities is also recognized in techno-economic paradigm literature and other evolutionary perspectives. Here, though, the problem is that the interests groups representing the out-dating capabilities have become central actors who give legitimacy and feedback to government policies. In principle, the study by Edquist and Hommen somewhat confirms the observations of earlier research that democratization process and move to more participatory or networked governance models, where the state is increasingly losing its central steering power and legitimacy, may limit the capacity of the state to keep

[15] They also argue that small Scandinavian economies have been increasingly facing similar problems of mutual lock-in of techno-economic and socio-institutional processes captured by particular interest croups.

control of the corporatist structures, maintain bureaucratic autonomy and steer the public private interactions through selective policies etc.[16] At the same time, this SI based research project by Edquist and Hommen highlights this general phenomenon as a hypothetical cause of growth and development challenges that need to be further studied.

In sum, what we see is an increasing new consensus that the legitimacy, autonomy and the role of the state are increasingly squeezed by external and internal factors, but the research (both development state and the SI scholarship) concerned with the general phenomenon of techno-economic and socio-institutional catching-up is dealing with these challenges rather superficially. Summarizing these developments, it has been argued in articles **I** and **II** that, in addition to the techno-economic changes, which all of these approaches to innovation policy in catching-up context have more or less encompassed, most catching-up countries operate under an international politico-economic regime unprecedented in history in terms of its reach into domestic policy-making:

- On the one hand, it has become an almost universal recognition that in one way or the other the external pressures (mainly WC-based macro-economic policy ideas) have also influenced the formulation of innovation policy (as the substitute to industrial policy) ideas and mixes and governance models, mostly reducing the scope of feasible state intervention and role in economic policies (see also **III**).
- On the other hand and more directly, it can also be seen that WTO and its treaties do not simply limit available policy space (see again Wade 2003 for a classic summary of arguments), but rather 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

[16] Also, the techno-economic change towards modularity, global outsourcing, global production and innovation networks and value chains, networking and linkages may be an important advantage for industrialized 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 the development of capabilities and capacities becomes more fragmented (Karo and Kattel, 2010; Kattel 2010a). Thus, instead of providing prescriptive recipes for development and catching-up policies and state structures, there is also a need for a better conceptual understanding of the underlying processes (e.g., creation and preservation of policy capacities).

power and implementation capacity assume pre-existing policy and administrative capacity. Also, the SI scholarship, even if it opposes the WTO regime, makes rather similar assumptions when it discusses its own vision of development policies.

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 and other external pressures turn this around. Articles **IV** and **V** discuss one of the dominant innovation and R&D policy ideas in the EU (Bayh-Dole Act based policy emulation) and a new emerging concept (open innovation) and argue that these approaches reinforce these global trends, at least in terms of state capacity evolutions. Namely, the theoretical rationale and logic of these ideas and concepts reduce the relevance of the dynamisms of techno-economic and, even more importantly, socio-institutional context, which differ significantly in catching-up context (especially in terms of policy and administrative capacities), and these ideas are transferred from developed to catching-up countries without the contextual analysis of their suitability in terms of correct problem definitions and their feasibility in terms of necessary governance structures for implementing policy models.

This is partly due to the changes in policy emulation. The models of developmental state (especially in East Asia) claimed that these and late industrializing countries were developing based on a benchmark economy (like Japan), which had had specific historical experience with what kind of state structures (state-business relationships and bureaucratic structures) were needed to design contextual policy mixes and public private interactions (see Wade 1990). The spread of neoclassical approaches to technology policies and governance systems and the external pressures (international organizations and the WTO regime) have changed the emulation processes towards accepting theoretically derived (but empirically more questionable) ideal-type modes of catching-up as opposed to alternative historically witnessed and appreciatively theorized modes of emulation (see also Reinert 2007 and 2009). The implications of this transformation have not been fully studied and understood.

1.3 The paradox of techno-economic and socio-institutional catching-up

Articles **I** and **II** argue that the challenges or problems of creating inter-disciplinary analytical, explanatory and prescriptive frameworks for catching-up policies, which were visible in the developmental state

approach are still prevalent both in the research and policy discourses of techno-economic and socio-institutional development in catching-up economies:

- The post-Amsden-Wade-Evans developments both in line with evolutionary economics (SI approach) and analyses that are closer or depart from neo-institutional perspectives (e.g., Rodrik 2007 and 2008) – and try to solve the problems of catching-up development from the perspective of state policies – do not theoretically and conceptually deal with the issue of how the respective state or institutional capacities needed for successful catching-up policies are created and sustained. In essence, these approaches have historical answers, with the perspective on state administrative structures borrowed from other disciplines, but not theoretical solutions. Accordingly, both have little to say once historical circumstances change.
- In the prevalent models of innovation policy (PPP modes) and wider discourse on innovation there is an overwhelming consensus that innovation policy in catching-up economies is partly hampered by weak state capacity, in the form of either policy or administrative capacity or both. To simplify, this rhetoric usually ends in a tautological or 'dead-end' conclusion, e.g., weak state capacity is caused by weak 'policy coordination' and, accordingly, governments should work towards better 'policy coordination' (e.g., Borras 2009; Box 2009; EIPR 2008 and 2009; OECD 2005). The truth in this simplification is that innovation policy research still hardly ever deals in detail with how these policy coordination problems are, in the first place, caused by various policy and administrative processes and how to overcome them. Mostly, the research still borrows concepts and governance ideas from other discourses (public administration, public management, governance), but these discourses themselves have been going through significant changes over the last decades, which have not yet been fully understood and linkages between forms of governance and state capacities remain open research questions (e.g., Painter and Pierre 2005a). Therefore, a more thorough discussion of the theoretical and policy-making approaches is still needed.

Thus, the research on techno-economic and socio-institutional catching-up faces a double paradox:

- On the one hand, there is ample historical evidence on what kind of policies may be needed for catching-up, but the same evidence

suggests that techno-economic developments themselves may make certain policies out-dated or less legitimate (i.e., the rise and demise of laissez faire and infant industry protection based catching-up strategies). On the other hand, there is a spread of new policy ideas for catching-up economies (from industrial policy to innovation policy and to increasingly systemic and PPP forms of these policies); however, these new policy ideas have not emerged from the empirical experience of economies, which have moved from catching-up position closer to the techno-economic frontier, but have been emulated from: a) the practices of economies at the techno-economic frontier, which have reached there through other policies; or b) from standard textbook economics and other abstract theories.

- While the historical examples of catching-up policies have been integrated with complementary evidence of supportive state structures (although with some difficulties), the new emerging policy ideas and conceptual approaches tend to remain even more detached from complementary evidence of what kind of state structures might be necessary. Rather, ideas or prescriptions of state structures are increasingly being emulated from developed countries and general theories, which are themselves testing out new modes of governance and policy implementation mechanisms since around the 1980s (see also **I**; **II**; **III**).

The paradox implies that although the catching-up research on techno-economic and socio-institutional development recognizes the changing historical circumstances brought about by techno-economic development, there are at least two open research questions:

- Do the new innovation policy ideas and models, which the catching-up economies are increasingly emulating (using the new system of emulation), offer the right solution to catching-up challenges?
- Do the emerging state structures for innovation policy support the creation of policy and administrative capacities that the catching-up economies require?

In this context, catching-up policy debates of the CEE economies have had clearer prescriptions given by the neo-classical schools of analysis (the WC ideas), which has further reinforced the simplification of catching-up problems. The now prevalent and heterodox SI approaches started to spread around the CEE economies only with the advent of the EU targeted convergence policies of PHARE and structural assistance in the mid- and late 1990s (see **I**; **II**; **III**; Piech and Radosevic 2006; Suurna

and Kattel 2010). Looking at the state of the SI literature on innovation policies in catching-up economies, it can be argued that this spread of the SI approaches was grounded on policy convergence (or new emulation) rather than theoretical and academic concerns of the suitability and appropriateness of the existing policy knowledge (see also **I**). In the light of the external forces influencing convergence processes, it can also be argued that there has not been a thorough analysis of the role of the state in techno-economic and socio-institutional processes. Indeed, it could even be argued (see **I**; **II**; **III**) that the emergence of innovation policy in the CEE economies has been partly externally imposed (mostly by the EU), but at the same time placed into a socio-institutional context where the role and legitimacy of the state has been limited (by the WC legacies). Therefore, there may be significant divergences between desirable policy ideas inserted into the CEE economies and feasible policy actions and results, which the CEE states would be capable of carrying out (see **I**). This in turn can further reduce the legitimacy of the state in the policy area and affect potential for developing policy and administrative capacities.

In sum, the innovation policy scholarship in catching-up context faces two open research questions as phrased in the introductory pages:

- How are the innovation policy models developed by innovation research (the evolutionary systems of innovation research) translated into policy-making practices of catching-up economies? Does this translate into clear and analytically explained definition of techno-economic challenges, search process for policy ideas or solutions for defined techno-economic challenges and search for governance instruments to implement the solutions to techno-economic challenges?
- How have the trajectories comprising innovation policy – definition of techno-economic challenges, search process for policy ideas or solutions, and search for governance instruments to implement the solutions – evolved over the last two decades in the CEE and have these economies been developing state capacities, which enable economic restructuring or convergence with the rest of the EU to be pursued?

2 Innovation policy and catching-up processes

If one takes on the presumption that the SI approach has become a general substitute for classic industrial policy (or innovation policy has become the central policy concern in the broader industrial policy) and

developmental state ideas, then there is a need to discuss how the SI approach deals with the crucial issues underlined above: *How are the innovation policy models developed by innovation research (the evolutionary systems of innovation research) translated into policy-making practices of catching-up economies? Does this translate into clear and analytically explained definition of techno-economic challenges, search process for policy ideas or solutions for defined techno-economic challenges and search for governance instruments to implement the solutions to techno-economic challenges?*

2.1 Neoclassical vs. heterodox understanding of innovation policy

Quoting economists standing somewhat away from the SI approach and evolutionary economics, but sharing the same research interest (Aghion et al. 2007, p. 20):

> *The theory of technology policy is pretty good. Unfortunately, understanding the basic principles of market failures, coordination failures and policy complementarities does not take one very far in the direction of useful, practical conclusions about how to construct technology policy.*

It would be easy to argue that this conclusion does not apply to the SI and evolutionary approaches, at least not anymore, because the narrow market-failure approach has been substituted with the more comprehensive *system failure* approach that allows more contextual, systemic and policy-relevant analysis (see also **IV**). At the same time, it can also be argued that the policy relevance of economics-based studies of innovation policy may be taken as an open research question, whichever perspective one uses (e.g., Chaminade and Edquist 2005; Edquist 2001 and 1997; Edquist and Chaminade 2006; Mytelka and Smith 2002; Smith 2000).

It can be said that neither neo-classical nor evolutionary perspective has found fully satisfactory answers to this challenge. Neo-classical perspective on innovation and innovation policy provides a simple trade-off – the analyses and rationales for government intervention and for the role of policy intervention are rather straightforward (generic, or even ideal-type; based on the market-failure approach and presumptions of equilibrium), but they disregard many important evolutionary and systemic phenomena that affect innovation processes. On the other side of the discourse, the evolutionary perspective or the SI approach claims that because of these simplifications the market-failure approach is not

suitable and provides and alternative trade-off – evolutionary approach claims to offer a contextual and systemic approach to innovation and innovation policy (based on systemic problems, or system failures and appreciative theorizing), but this automatically creates ambiguities and unpredictability into the analysis and makes clear or ideal-type approach to the system of innovation and innovation policy unrealistic. (See Edquist 2001; Edquist and Chaminade 2006; Chaminade and Edquist 2005)

In this thesis (see also **IV**) it is argued that although representing a more comprehensive understanding of the problems of innovation, the system failure approach may also lead to oversimplification of the policy problem, especially in catching-up economies that may be transferring or learning both techno-economic and socio-institutional processes from the developed countries. Namely, in addition to differentiating between *capability*, *institutional*, *network* and *framework* failures (defined from the perspective of non-state actors) as the classic core variables of the theoretical models (e.g., Arnold 2004; EIPR 2008), the problem of potential *policy failures* is also increasingly recognized as more empirical reality than a theoretical problem (therefore not always included in theoretical models). Thus, the alleviation of systems failures through policy actions, as proposed by these approaches, is conditioned by sufficient state capacity (see Arnold 2004; **IV**).[17] Yet, the universal existence of such capacity cannot be taken for granted and this also challenges the suitability of the economics-based understanding of innovation, the role of the state and the feasibility and/or suitability of implementing proposed solutions to systemic problems (see also **I**; **II**).

Overall, we can see that there are some crucial simplifications of the problems:

- The analytical models used (systems failures approaches) are by their nature static frameworks of analysis that cannot easily be used for historical analysis to explain the trajectories of

[17] Or, quoting Arnold (2004, p. 7): '[…] *failures justify state intervention not only through the funding of basic science, but more widely in ensuring that the Innovation System performs as a whole – always provided that the state is actually capable of reducing failure. Because systems failures and performance are highly dependent upon the interplay of characteristics in individual systems, there can be no simple rule-based policy as is possible in relation to the static idea of market failure* […] *Rather, a key role for state policymaking is 'bottleneck analysis' – continuously identifying and rectifying structural imperfections. In this way, it is possible pragmatically to make continuous improvements, without needing to have a general theory or complete understanding of the innovation system.*'

development, which is a crucial issue for understanding catching-up processes. Therefore, historical analyses of catching-up processes may remain descriptive and lack evolutionary explanatory analyses, which are crucial for policy analysis.

- Both failure-based methods of analysis rely on a certain presumption of existing state capacities (and complementary policies) while conducting policy analysis; or presume that the historical methods of creating or developing state capacities can be easily emulated or that the new modes of state governance systems will produce these capacities.

2.1 Systems of innovation and innovation policy

Some of the SI scholars (e.g., Edquist 2001; Mytelka and Smith 2002; Smith 2000) recognized in the beginning of the 2000s (and some even earlier) that while the SI approach enjoyed increasing popularity among academics and policy makers, as it turned evolutionary thinking of innovation into a model giving frameworks for studying interactions between the state and market actors, one of the drawbacks of the approach was the lack of a proper theory for the role of the state in the innovation processes.

It is often claimed that the traditional SI approach is constrained by conceptual ambiguities over the precise definition, borders, composition and interaction of actors, organizations, institutions, etc. that make up the SI (see Lundvall et al. 2002; Nelson 2008). The crucial difference has been represented as a friendly 'stand-off' between the broader Aalborg-school and the narrower US-school (see Lundvall 1992 vs. Nelson 1993). These conceptual differences and the active use of both perspectives in the SI research have made the emergence of a generic or universal understanding of the scope and contents of innovation policy rather unlikely. Or as stated in Lundvall et al. (2002, p. 221) the SI perspective has faced at least four major challenges:

> *The first concerns the need for a clarification and deepening of the concept of national innovation systems. The second is to base the concept much more strongly on the process of learning and competence building. The third has to do with the need to broaden the analysis of economic development and to study how knowledge production is conditioned by and affects social and ecological sustainability. The final challenge is to apply the concept of national innovation systems to innovation policy and to policy co-ordination.*

Thus, what can be seen is that once the original SI approaches emerged, both the narrow and broad approaches were much more limited in their approaches than the developmental state perspectives. So, the SI approaches have brought about a dual change:

- There is more detailed theoretical research on specific issues relevant for techno-economic development (innovation and learning activities; interaction patterns between production and science/R&D actors of the SI etc.).
- At the same time there has been a narrowing down of the policy arena that is looked at in this systemic manner, both in terms of policy mix (e.g., concerns over investment, finance and FDI policies are only superficially included in the SI approaches), but also in terms of structural analysis of state-led socio-institutional processes (e.g., issues of administrative and policy capacities tend to be reduced to concepts like policy coordination, which are not fully substantiated and are borrowed from other disciplines).

This also challenges the theoretical applicability of the SI approach to catching-up contexts, i.e.:

> *When applied to countries in the South* [applies also to countries behind techno-economic frontier in general] *it is important to be aware of some weaknesses of the innovation system approach, as it has been used so far. Some of these have directly to do with the fact that it has mostly been applied to the North. It has been used mainly as an ex-post rather than as an ex-ante concept […] It has been used to describe, analyse and compare relatively strong and diversified systems with well developed institutional and infrastructure support of innovation activities. It has not, to the same extent, been applied to system building. When applied to the South the focus ought to be shifted in the direction of system construction and system promotion. Furthermore, the relationships between globalisation and national/local systems need to be further researched. It important to know more about how globalisation processes affect the possibilities to build systems of innovation in developing countries and local systems are important parts of this. Another weakness of the system of innovation approach is that it is still lacking in its treatment of the power aspects of development. The focus on interactive learning – a process in which agents communicate and even cooperate in the creation and utilisation of new economically useful knowledge – may lead to an underestimation of the conflicts over income and power, which are also connected to the innovation process. Interactive learning and*

> *innovation immediately sounds like a purely positive sum game, in which everybody gain. In fact, there is little learning without forgetting. Skills and competencies are rejected and destroyed and many people experience decreasing income and influence. Increasing rates of learning and innovation may lead not only to increasing productivity and income but also to increasing polarisation in terms of incomes and employment. It may be more common in the South than in the north that interactive learning possibilities are blocked and existing competences destroyed (or de-learnt) for political reasons related to the distribution of power.* (Lundvall et al. 2002, p. 226)

Despite these theoretical limitations, catching-up countries like the CEE, which have tried to build up the systems in support of development and growth, have been quite open (or conditioned to be open) to the SI concept as a tool of policy learning and institution building.

One of the most comprehensive approaches to remedy these theoretical problems, which in many ways also contribute to the problems of system building, has been developed through the works of Charles Edquist (e.g., Edquist 2001; Edquist and Chaminade 2006; Chaminade and Edquist 2005). Taking a broad perspective, the SI approach has been refined from the 'traditional' SI approaches that deal with the constituents of the SI (i.e., institutions, organizations and interactions – e.g., Lundvall 1992; Nelson 1993) into an 'activities-based' conceptual and theoretical framework that has also been applied as a framework for a cross-country empirical study analyzing both the SI and implications for innovation policy (see Edquist and Hommen 2008a). Also, it can be regarded as a more advanced model of traditional SI approaches, which is more suitable for state-centric analyses. The 'activities-based' approach, by departing from the broad understanding of the SI and by focusing (still using the appreciative theorizing) on the processes within the system, claims to offer a better insight into the activities and functional scope of the SI (Edquist and Hommen 2008b; Edquist and Chaminade 2006). Also, public policies are seen to be an element in most activities that are derived by the SI approach. Table 1 lists the key activities of the SI as used by Edquist and Hommen (2008a), which constitute one of the broader (but still not definite) lists of key activities in the SI.

Table 1 Key activities in the Systems of Innovation

I Provision of knowledge inputs to the innovation process 1. Provision of R&D and, thus, creation of new knowledge, primarily in engineering, medicine and natural sciences 2. Competence building through education and training the labor force for innovation and R&D activities
II Demand-side activities 3. Formulation of new product markets 4. Articulation of quality requirements emanating from the demand side with regard to new products
III Provision of constituents of SI 5. Creating and changing organizations needed for developing new fields of innovation. Examples include enhancing entrepreneurship to create new firms and intrapreneurhsip to diversify existing firms; and creating new research organizations, policy agencies, etc. 6. Networking through markets and other mechanisms, including interactive learning between different organizations (potentially) involved in the innovation processes. This implies integrating new knowledge elements developed in different spheres of the SI and coming from outside with elements already available in the innovating firms. 7. Creating and changing institutions – e.g. patent laws, tax laws, environment and safety regulations, R&D investment routines, etc. – that influence innovating organizations and innovation processes by providing incentives for and removing obstacles to innovation.
IV Support services for innovating firms 8. Incubation activities such as providing access to facilities and administrative support for innovating efforts. 9. Financing of innovation processes and other activities that can facilitate commercialization of knowledge and adoption. 10. Provision of consultancy services relevant for innovation processes, e.g. technology transfer, commercial information and legal advice.

Source: Edquist and Hommen 2008b, p. 10 (based also on Edquist 2005; Edquist and Chaminade 2006).

The difference between the traditional broad/Aalborg approach to the SI and innovation policy and the activities-based approach is that the latter seems to be able to go into more detail in terms of specific policy areas that constitute innovation policy and highlight explicit actions where government activities may be of importance. The traditional broad approach remains rather vague on the role of government activities, e.g., (Lundvall et al. 2002, p. 227):

> *A broad concept of innovation system implies a new perspective on a wide set of policies including social policy, labor market policy, education policy, industrial policy, energy policy, environmental policy and science and technology policy.*

> *Specifically, the concept calls for new national development strategies with co-ordination across these policy areas. All these area specific policies affect learning and competence building. They need to be designed with this in mind and brought together and attuned into a common strategy*.

The common problem with both of the approaches is that the respective lists of policy areas or activities subject to public policy are not fully understood as they are created ex-post and all the relevant innovation processes cannot be fully understood as technologies and supporting institutional processes are constantly changing. Thus, this list itself is evolutionary (see also Borras 2009). In article **V** the thesis discusses the emergence of 'open innovation' as a new concept that brings about significant broadening of the policy areas that innovation policy needs to encompass, but also changes the legitimacy of the state to intervene, select and steer innovation processes.

The underlying logic for creating the lists of innovation policy activities has been to start from analyzing the potential rationale whereby the state can and should design and implement policies and actions that support innovation in firms (in a particular time and context, which determines the framework of analysis). According to the activities-based approach, theorizing or thinking about the role of the state in innovation processes means to '*focus on changes in the division of labor between the private and the public spheres, and on changes in those activities already carried out by the public agencies*' (Hommen and Edquist 2008, p. 459). Accordingly, Edquist has argued (Edquist 2001; Edquist and Chaminade 2006, p. 116; Hommen and Edquist 2008, p. 458) that there are two crucial conditions, which determine when and where the state should intervene through public policies in innovation activities:

- capitalist firms and market mechanisms fail in achieving the objectives formulated, i.e., there exists a *systemic problem* that is not spontaneously solved by the private sector actors and market forces (labeled as *public policy opportunity*); and
- the state (national, regional, local) and its public agencies must have, or be able to build up, an *ability* to solve or mitigate the problem (labeled as *policy competences*).

Thus, the activities-based approach allows conducting conceptual policy analyses whereby (Hommen and Edquist 2008, p. 459):

> '*One can identify the organizations performing the ten activities and examine the relationship among them as well as the*

> *institutions constituting constraints for the organizations when to pursue the innovations processes. When part of an activity is performed by a public organization, it is a matter of innovation policy – and most activities have a policy element* [...] *With respect to innovation policy, we can analyse the division of labour between private and public organizations with regard to the performance of each of the activities in the innovation system and determine whether this division of labour is justified or not'*.

Article **II** summarizes some of the key theoretical contributions in this direction, which have been developed in the context of catching-up processes (e.g., Avnimelech and Teubal 2008; Bell and Pavitt 1993; Lall and Teubal 1998; Rodrik 2007). Again, similar to the generic SI approaches, it has been argued that these approaches are more elaborate in discussing when and on what conditions governments should intervene and how to conceptually analyze this. They remain analytically more vague (or limited to empirical case studies and historical examples) in discussing how governments should implement the interventions. In fact, most of the approaches remain mute on the question whether it plays any role at all in how policies are administratively implemented. Therefore, in terms of system building these approaches remain rather narrow and limited and are based on certain strong presumptions about the legitimacy and capacities of the state, which the catching-up economies tend to lack. Thus, terms like 'contextual policy-making', 'adequate policy-mixes', 'supportive institutional capabilities', 'coordination activities' and 'coherent policy interventions' are emphasised across different approaches without due analytical account of the meaning of these terms.

It is possible to argue that while the SI approaches seem to offer a dynamic and evolutionary theoretical rationale for the role of the state in the SI, they seem to fall short on expectations in terms of opening-up the 'black-box' of policy making and introducing the SI approach into the box. It seems that the key problem of these economics-based analysis is their somewhat too linear understanding of policy-making and implementation and the expectations of 'rational' policy-makers who take the existing economics-based understanding of innovation policy and implement it in the best possible manner. Partly, this can also be linked to the simplifications discussed in the previous section whereby evolutionary perspectives on innovation policy focus on static analytical methods that can be used for analyzing present conditions (or snapshots from the past) and make recommendation for policy improvement, but lack frameworks to explain the causes and mechanisms of policy change and how these relate and contribute to state capacity issues. The existence of state capacity is either presumed to exist or treated as a less dynamic variable

than techno-economic change processes, which affect other institutions in society. The developmental state perspective took a somewhat opposite perspective arguing that the state capacities often need to be created before other stakeholders are engaged in the development activities and in many cases the state needs to act proactively towards the market. The SI approach, as discussed above, has come to these findings in the context of East Asia as well, without providing significant theoretical insights.

In summary, while the SI approach may be able to define 'problems' which require state activities and 'desirable' or theoretically good 'solutions', the SI approach is weaker at predicting and analyzing what the contextually 'feasible' solutions would be, because it does not analytically and theoretically discuss what kind of *state-society relationships* and *state structures* (or socio-institutional structures and governance mechanism designed by the state) are conducive to creating the state policy and administrative capacities. The latter though, should be ideally seen as mechanisms, which create the supportive environment for the creation and implementation of the contextually feasible policies leading to techno-economic development and catching-up. Thus, overall, the SI approaches tend to de-contextualize the theoretical discussions on innovation policies. Even if the analysis of the *search process for policy ideas or solutions for defined techno-economic challenges* may be correct, the missing theoretical and analytical lenses on the *definition of techno-economic challenges* (which are defined by the historical time and place into which the SI approach is inserted) and on *governance instruments to implement the solutions to techno-economic challenges* (which are borrowed from other disciplines) de-contextualize the policy rationale by not creating analytical lenses for translating ideal type or 'desirable' policy solutions to 'feasible' contextual policy mixes. In catching-up contexts, these tendencies are further reinforced as all aspects tend to be influenced by external pressures and policy emulation from the systems of innovations of techno-economic frontier economies.

The thesis argues that the development of innovation policy should be seen in the same cumulative logic as technological development is seen in the evolutionary perspective. The theory of the 'co-evolution' of institutions and technologies (Nelson 1994; Nelson and Sampat 2002) seems to at least conceptually recognize this aspect, although it itself is rather weak in discussing the role of state-created and state-led institutions. Therefore, it is argued in this thesis that instead of looking at policy developments in an 'idealized' or 'tabula rasa' form (what kind of state intervention is ideally necessary based on the SI understanding of innovation), it would be more beneficial to start looking at innovation policy as a dynamic or evolutionary phenomenon, or as a *policy reform* in

a broad sense that includes both the *content of policy* (activities) and the *context of policy* (public organizations and institutions influencing policy activities).[18] In other words, from the perspective if innovation policy making, policy learning and emulation, it can be said that it not only matters *what kind* of *activities/policies* (*and why)* are carried out by governments, but it also matters, and might even be more important, *how countries have come to the specific policy contexts.*

2.2 The new paradigm of innovation policy

Despite of the limitations of the SI approach, the new emerging network or PPP paradigm of policy-making (which is strongly embedded in the SI approach) implicitly claims to have solutions to these problems (see Table 2).

Accordingly, the definition of techno-economic challenges and the creation and social acceptability (legitimacy) of the long-term visions of the state (that in developmental state model are engineered by the political authority through selective stakeholder engagement) and contextual policy mixes and activities (that in developmental state model are designed by the autonomous bureaucracy through intensive public-private interactions) are better designed, especially in the ICT paradigm, through the broader inclusion of stakeholders and different actors of the SI. Or, as stated by Radosevic, there has been and increasing awareness that: (2009, p. 32):

[18] There are several implicit reasons for that, e.g.:

- *Context*-wise, innovation policy can be seen as a new horizontal policy (in a sense of covering several traditional policy areas) that in some countries is complementing and in others replacing industrial or R&D or S&T policies and affecting a range of traditional policy areas – therefore policy making takes place in a policy arena or context with significant legacies that may need changes;
- *Content*-wise, innovation policy can be seen as a combination of efforts that include the reform of existing state activities and design of new activities, but it also has to be recognized that in some cases the existence of no policy may be a conscious decision from the past (e.g., de-regulation) and the design of a new activity may in all cases demand complex changes in the existing legacies and activities;
- *Process*-wise, policy makers (politicians and bureaucrats) have both independent preferences (e.g., party ideas, personal preferences or past successes that are 'protected', contextual bureaucratic competences that contradict academic findings etc.) and also conflicting expectation to respond to (especially in innovation policy as the policy field is sharing the policy arena with other policies), and which complicate policy opportunities.

> *Growth and technology catch-up, in particular, are driven by uncertainty, and policy must take this into account. Due to endemic uncertainty and the inability of both public and private actors to predict outcomes, the policy focus shifts to search, which should be done in collaboration* […] *The main conceptual solution for authors along this line of thinking is the establishment of 'search networks' whose functions are to identify successive constraints, and then to identify the people or institutions that might help to mitigate (in part) the difficulties associated with these constraints.*[19]

Further (Radosevic 2009, p. 45):

> '*Post-Washington views assume that policies are developed and implemented in a specific institutional context and cannot be understood or criticized outside of that context. In line with Evans' (1995) idea of embedded autonomy, what matters is not a specific policy, but the institutional context in which search networks can be nurtured'.*

Nevertheless, while Evans placed significant emphasis on the role of the state capacities and bureaucratic structures as the central nodes of the systems, according to the PPP model, the creation of capacities, which was the task of the state in classic developmental state perspective, is being partly delegated out from the state institutions, or:

> '*Industrial policy is more appropriately conceived as a process whereby the state and the private sector jointly arrive at a*

[19] According to Radosevic, these ideas are also strongly lined with the World Bank's New Industrial Policy, which encompasses the following principles (Radosevic 2009, pp. 33-34): '*industrial policy is a process for fostering restructuring and technological dynamism. It offers solutions that go beyond the traditional focus on background conditions and improvements in the investment climate; from an innovation perspective, it is important to understand the policy implications of a 'binding constraints' view of economic growth; policy should rely on the 'islands of excellence' that exist in (almost) every country to reform less successful areas; unlike the old 'picking winners' industrial policy, the key assumption in the new industrial policy is that no one, government included, can have a panoramic view of the economy – all views are necessarily partial; mechanisms for creating new opportunities are search networks – private- public partnerships and programmes that should bring together the better performing segments of the public sector and the better performing segments of the productive sector in an attempt to relax and unblock binding constraints; the focus of policy is on missing connections, which, when established, should have synergistic and increasing effects'.*

diagnosis on the sources of blockages to new economic activities and propose solutions to them. In this case, policy implications cannot be derived as an outcome of analysis, as policy itself is process of experimentation and learning' (Radosevic 2009, p. 38).

Table 2 Innovation policy models in catching-up economies

Period	Import substitution; Soviet system	Washington Consensus	Post-Washington consensus; Accession to the EU
Policy regime	Linear Supply model	Linear demand model	Public-private partnership model
Main perspective	Public sector as main S&T provider	Private sector as main source of T&I	Public-private partnership as main source of knowledge and technology transfer
Pattern of knowledge diffusion	Hierarchical: top-down	Hierarchical: bottom-up	Systemic
Main policy measures	Selective and centralized supply S&T policies	Horizontal and demand-oriented innovation policies + technology transfer via FDI	Public private partnership and multidisciplinary-oriented T&I policies
Management criteria of S&T institutions	Predominance of criteria coming from the scientific community and the state-owned companies	Predominance of private sector and market mechanisms	Increasing orientation towards participatory approach in policy management and creation of agencies fostering public-private interaction

Source: Adjusted from Kattel and Primi (2010).

Also, Radosevic claims (2009, p. 44) that the old state-centric views (also analytical and theoretical) may not be that relevant anymore as:

'*In import substitution regimes, the demands on administrative capacity are high, as the state must be able to handle quite specific industry issues related to technology transfer. Hence, the institutional focus is on the administrative capacity of the state to perform such a role. Benefiting from hindsight, the view that this policy is faced with pervasive government failures has become*

widespread. Although these policies have improved the terms for technology transfer, they have not improved the indirect effects or the learning from imported technologies.'

Therefore, the state does not take a proactive role anymore (in Amsden's words, both supporting and disciplining the private sector through a mix of policies, subsidies and performance targets), but is seen as a more reactive participant in the SI, which does not want to lead, but reacts to the market forces and techno-economic dynamics. This should enable coordination between the most capable state, and non-state actors of the SI to build the long-term vision and policy models.

In this thesis, it is argued that this PPP-perspective provides a simplified understanding of the problem and only a partial perspective on state capacity building efforts (to simplify, increasing the amount of ideas, perspectives and stakeholders with direct or indirect 'voting power'). In a way the PPP-based model disregards the insights, which the developmental state model provided almost three decades ago without offering theoretical justifications for overlooking the crucial governance challenge. Johnson (1982, pp. 310-311) has brought out, as a conclusion of his longitudinal study of the Japanese industrial policy (1925-1975), three ideal-type modes of government-business relationships and policy-making:

- *Self-control* means that the state licenses private enterprises (e.g., state-sponsored cartels in Japan) to achieve developmental goals. The primary advantage of this model is that it affords the greatest degree of competition and private management in the developmental state system. Its greatest disadvantage is that it leads to control of an industry by the largest groups in it, and to the likelihood of divergence between the interests of the bog operators and the state.
- *State-control* refers to the attempt to separate management from ownership and to put management under state supervision. Its principal advantage is that the state's priorities take precedence over those of private enterprise. Its primary disadvantages are that it inhibits competition, and therefore tolerates gross inefficiency, and it fosters irresponsible management.
- The most important model is the *public-private cooperation*. The chief advantage of this form is that it leaves ownership and management in private hands, thereby achieving higher levels of competition than under state control, while it affords the state much greater degrees of social goal-setting and influence over

private decisions than under self control. Its principal disadvantage is that it is very hard to achieve.[20]

Thus it can be argued that the importance of cooperation and shared vision of public and private actors and cooperative mode of policy making is nothing new. What has changed is the rationale and understanding of the role and legitimacy of the state in these processes. This thesis claims that this projected change as followed by the dominant PPP-models lacks theoretical grounding and justification, if looked from the perspective of creating state policy and administrative capacities:

- Firstly, even the developmental state perspective recognized that the high legitimacy of the state might be a precondition for any public policy actions through public-private interactions (and may also be a higher precondition than in the case of hierarchical policy processes). The PPP-models are derived as a compromise between the purely state-led and market-led models, which is a position where the developmental state was positioned as well. But the prevalent PPP-models de-emphasize the relevance of the leadership of the state in these models (in terms of selecting the policy arena and stakeholders, initiating collaborations, collecting and systemizing the feedback from the private sector and steering the private sector agents through negotiating compromises between private returns to social returns). Note that this leadership was also considered a source of policy learning and capacity creation in the developmental state model. This also means, given that in catching-up economies both public and private sector actors tend to lack the capacities and capabilities needed for catching-up, that any policy initiative can have significantly less power for influencing the structural and institutional restructuring (system building) of the techno-economic and socio-institutional catching-up processes.
- Secondly, neither does the PPP-approach deal with the issues of state policy and administrative capacity, e.g., whether the state is capable of choosing the relevant stakeholders from the different interest groups (to avoid interest capture by interest opposing the restructuring processes) and whether the state has the administrative capacities to implement policy ideas designed by 'outsiders' to policy processes. The model usually prescribes that these complex policy ideas should also be implemented through

[20] According to Johnson (1982, p. 311) Japan achieved this through selective access to governmental or government-guaranteed financing, targeted tax breaks, government-supervised investment coordination, government support and assistance to industries in decline or distress etc.

complex networks of different actors and institutions, but again this model implicitly presumes some sort of capacities and legitimacy for these actions, which is again a contestable presumption (see Brinkerhoff 2008; Drechsler 2004 and 2005; Manning 2001).

Thus, paradoxically, the emerging solutions to socio-institutional catching-up processes may result in reduced legitimacy for the state and limited policy and administrative capacities (see also **I** and **II**). Also, paradoxically it seems that the PPP-based models would bring about much more un-coordinated (in terms of power and authority divisions, task allocations, interaction patterns) and therefore less flexible systems of innovation (both in terms of state-society relationships and politico-administrative structure and processes) than what was designed in the context of the developmental state model. For analyzing this claim, the thesis integrates public administration and management (PAM) scholarship with the SI approach.

3 Public administration and innovation policy

This thesis claims that integrating public administration and management (PAM) scholarship into the debates on innovation policies in catching-up economies can be useful for better comprehension of the issues of the political and administrative structure of the state and how this is linked to state capacities. PAM seeks to develop broad theories and explanations on how the organizational and institutional set-up or context of a policy arena affects the effectiveness and efficiency of the public sector efforts (e.g., Pollitt and Bouckaert 2004) that in turn influence state capacities and legitimacy among innovation constituents.[21]

3.1 Theoretical underpinnings of PAM approach

Similarly to contrasting views of innovation research between neo-classical and evolutionary strands, PAM research has experimented with

[21] While being useful for analyzing the organizational and institutional set-up of the policy arena, PAM approach does not look into the detailed goals and emergence of 'desirable' activities in policy areas (such as activities of innovation policy), takes them as given and seeks to explain how the set-up of the policy arena may influence the outcome of the policy process (or the performance of policy activities). Thus, for PAM approach, innovation policy is a horizontal policy issue qualified as a wicked policy that is almost by definition extremely tricky to be designed and implemented in a 'desired' manner.

more functional and constructivist theories for studying the evolutions of state structures in terms of potential organizational and institutional set-ups (see Pollitt 2002). It can be argued that the latter perspective, which studies the dynamics and cumulative development of the public sector's organizational and institutional formats using institutional approaches from political science, has achieved greater contextual policy relevance. Theoretically, it is sometimes labeled and consolidated as the *transformative approach* (e.g., Christensen and Laegreid 2007; 2005; 2001). Conceptually, it can be discussed as *public management reform* (PMR) research (e.g., Pollitt and Bouckaert 2004).

This conceptual and theoretical perspective '*proceeds from the notion that change, reform processes and their effects are based on multiple and intertwined driving forces'* (Christensen and Laegreid 2005, p. 142), such as polity features (political processes, structures, etc.), cultural variables (politico-administrative culture etc.), myths (international 'policy fads'), etc. Further, this approach asserts that the movement or reforms (policy, organizational, institutional) are not and cannot be simple and straightforward processes of diffusion, cloning or copying – but instead, reforms (ideal-type perceptions of policies, organizations, institutions) are translated, edited and adapted, i.e., policy-makers have limited freedom to initiate changes and are constrained by environmental factors (technologies, 'global ideas', etc.), national policy-administrative structures and cultures. In addition, the attitudes and actions of policy-makers are formed and molded by these factors. Therefore, '*problems and solutions are interpreted, edited, modified and revealed in a process of complex institutional change'* (Christensen and Laegreid 2001). Thus, the approach emphasizes three contexts that matter for evolution and the content of the 'politico-administrative systems' (Christensen and Laegreid 2007): *external (international) pressure*, *national historical-institutional context*, and *constitutional features and political-administrative structures*.[22]

Thus, somewhat similar to the developments of the SI approach, the issue of institutions and institutional change has become one of the central issues of PAM research (Peters 2005; Pierson 2004; Pollitt 2008). It has been indicated above that the activities-based SI approach utilizes a two-level analysis for deriving a rationale for policy: a) there must be a *public*

[22] Although the transformative approach to PAM has emphasized that the evolution of policy arenas is conditioned by at least these three variables, most of the core research over the last three decades has started from the importance and perspective of external pressures (Christensen and Laegreid 2007; Pollitt 2002 and 2001).

policy opportunity, and b) *policy competences* for seizing the opportunity. In this context, it is recognized that even if there is a policy opportunity, the state cannot always solve the problems straight away because it needs to develop its ability to solve it – e.g., by creating a new organization or institution or reforming existing ones (Edquist 2001, p. 222). It can be said that the conceptualization of *policy competencies* or the 'ability to solve the problem' may be one of the key areas where PAM research can help the SI clarify the meaning of the term and provide avenues for more detailed analysis of this necessary qualification that determines the role of the state in innovation processes (**I**; **II**).

Namely, it has been shown above that the innovation policy research pays limited attention to the politico-administrative context, at most simply limiting the analysis to empirical case studies or presuming the existence or emergence of proper administrative structures. Therefore, although ideally the two aspects of state capacity (policy ideas/content and administrative context) should mutually be reinforcing, these trajectories tend to get out of sync. This has been shown by evolutionary economists who analyze the historical strategies, policies and state competencies for economic development (e.g., Castellacci 2006; Drechsler 2009; Reinert 2007 and 2009; Perez 2002), but also by PAM scholars who have studied the path-dependent emergence of modern state administrations, or governance systems, both in developed and catching-up economies (e.g., Bresser-Pereira and Spink 1999; Bouckaert et al. 2009; Randma-Liiv 2009; Verhoest and Bouckaert 2005; Verhoest et al. 2007). The PAM approach in the context of catching-up economies is also discussed in articles **I** and **II**.

In summary, it has been argued that the CEE economies have been developing in a context where the external sources (WC and the EU institutions) have provided two sources of policy advice – economic and innovation policy ideas and governance ideas – and even when the content of both sides of advice has been somewhat changing, the same general trajectory has persisted and the sides of advice have remained somewhat detached or out of sync.[23] Namely, in essence there has been a presumption underlying both innovation policy ideas and governance ideas that the other discourse has got their own expertise correct (i.e., governance reforms support the emergence of policy and administrative capacities and policy ideas on innovation have been developed based on contextually sound policy analysis). At the same time, it has been shown

[23] In article **II**, the differences of these trajectories between the CEE and Latin American countries have been discussed. Although there are certain key differences, the general logic and dynamics of the trajectories in both regions tend to be quite similar.

above and argued in the articles of the thesis (see again **I**, **II**, **III**, **IV**; **V**) that over the last decades, the CEE economies have been subject to external pressures to converge both on the de-contextualized ideas of innovation policy and governance. The contextualization of these ideas, or translating them into locally relevant policy ideas and governance practices has been limited by both these very same policy and governance ideas inserted into the CEE economies, as they have been legitimized by the international discourse as well as by local politico-administrative structures and cultures, which have lacked the institutional experiences and skills for contextualizing these ideas. The crucial problem is that these issues have so far remained outside of academic research disciplines, as it would require the integration of different schools of thought and research practices, which has been a historical challenge in the different eras of studying techno-economic and socio-institutional catching-up processes.

3.2 Administrative capacity as a missing analytical link in the SI studies?

Similarly to the developments in economics and economic policies of both developed and catching-up economies, the 1980s witnessed quite widespread acceptance (at least rhetorically) of neo-liberal principles and policy and governance models based on neo-classical economics and public choice theories. In international discussions this transformation became labeled as the 'New Public Management' (NPM) and managerialism (see Pollitt and Bouckaert 2004), also rephrased as 'Good Governance' for catching-up contexts (see Brinkerhoff 2008; Drechsler 2004 and 2005; Manning 2001). The research of PAM has been mostly studying whether there has been a (justified) global convergence towards the managerial organizational and institutional model of state structures, i.e., whether this has become the new mode for creating state capacities. That is, has there been a justified move away from the traditional Weberian state structures (emphasizing long-term policy horizons, institutional memory achieved through career system, etc.) towards a managerial state model (emphasizing state-level, organizational and individual efficiency and performance that is achieved by downsizing state structures and creating detailed organizational and individual incentive through performance management, measurement and reward systems)? (See also Bouckaert and Halligan 2008; Bouckaert et al. 2010; van Dooren et al. 2010; Verhoest and Bouckaert 2005; Verhoest et al. 2007 and 2010)[24]

[24] The NPM approach (and its sub-types) has emphasized the supremacy of the private sector incentive structures and management principles. This has resulted in international reform movements towards increased privatization and the

Another perspective of PAM research looks at the trajectories of the organizational and institutional set-up of the policy arena through the lens of national characteristics (historical-institutional context and the relevance of the existing features of the governance system). From this perspective, one of the crucial variables is the role of path-dependencies on the organizational-institutional dynamics (e.g., Peters 2005; Pierson 2004; Pollitt 2008; Pollitt and Bouckaert 2009). Thus, the main research question has been whether the emergence of the existing organizational-institutional context (policy arena) has been an incremental path-dependent process and what kind of windows of opportunities have existed that have allowed radical changes in the policy arena. Similar to the lens that looks at the theoretical and empirical impact of external pressures (mainly neo-liberalism and its ideas), the more locally-oriented lens looks at the interplay between the historical, mostly Weberian state structures and institutions and the reforms since the 1980s, where the Weberian characteristics have become mixed with managerialism and other neo-liberal ideas.

This perspective has been based on in-depth country studies and international (mostly OECD based) comparisons (e.g., Christensen and Laegreid 2007; Kickert 2008; Pollitt and Bouckaert 2004) and gathering of contextual and longitudinal experience at the nation-state level. This has enabled to create the categories of state traditions, governance systems, administrative cultures, etc. (See Kickert 2002; König 1997; Torres 2004; Schedler and Proeller 2007). These categories emphasize that the PAM/PMR experiences and trajectories of different countries and regions have resulted in different mixes of Weberian and managerial ideas. In general, Anglo-American countries have faced less historical organizational-institutional obstacles for pursuing managerial reforms of neo-liberalism, while Continental-European countries (again with different variations – see Torres 2004) have had more historical legacies embedded in Weberian organizations and institutions and therefore the trajectories have been more incremental. Thus, current governance systems represent a mixture of both Weberian elements (ideally creating the foundation of governance) and managerial ideas (modernizing the governance practices). Theoretically or conceptually, these combinations are labeled as the Neo-Weberian State (NWS) (Pollitt and Bouckaert 2004; Drechsler 2005).

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contracting-out of government services and the increased adoption of the private sector management principles (like performance management to increase the managerial autonomy in the management processes and reliance on the measurement of results - i.e. outputs and outcome – as the tool for control and accountability).

Importantly, this also implies that for different socio-institutional settings, different politico-administrative structures may offer the best fit historically, culturally, institutionally, etc. In the context of innovation policy as a specific area of PAM, this may also imply that international best practices (such as the Scandinavian innovation systems) cannot be easily emulated because:

- on the one hand, the contextual differences may limit the effectiveness of emulated systems; and
- on the other hand, the systems found in different countries may not be the best or most rational mode for innovation policy making (as defined by the SI based analysis, for example), but are a compromise between innovation policy's specific perspective on governance and general PAM/PMR concerns; that is, the national system of innovation is developed in an interaction between policy-specific and generalist PAM communities.

Meanwhile these processes have played themselves out rather differently in the context of catching-up economies, like the CEE. Comparative studies indicate that most of the CEE economies have been similarly influenced by the NPM ideas, although with different intensity, depending on the scope of the windows of opportunity created by the collapse of the communist system in the beginning of the 1990s (Bouckaert et al. 2009). Still, the effect of these influences has been significant on developing policy and administrative capacities as the neo-liberal ideas have legitimized international policy learning and transfer, as opposed to contextualized policy analysis and capacity development. In this respect, it is also argued that while in the developed countries the NWS model is mostly an academic concept derived from empirical examples, in the CEE economies it could be used as a normative development model (Randma-Liiv 2009), which could be a tool for balancing between external pressures and national contextual needs and processes. Randma-Liiv (2005) has also argued that during the 1990s, the global pressures to converge on the PAM ideas had become conditional and prevalent pressures for reform in the CEE economies, because they lacked the institutions and legitimacy for contextualized and conscious policy learning in the early 1990s and the supply of ideas and governance models determined the patterns of actions.

In articles **I** and **III** it is argued that this supply-based policy transfer model has become the key driving force of innovation policy governance reforms in the CEE economies as *de facto* innovation policy itself has been exported to most CEE economies by the EU using the accession

negotiations, financial support and conditionalities (including rules of administrative implementation and governance), transfer of best practices and other soft learning mechanisms. Thus, while Randma-Liiv argues (2005) that by the end of the 1990s, policy learning and transfer in the CEE was shifting from supply-based transfer processes to more demand-based learning processes (i.e., also compatible with taking the NWS as a normative model, at least theoretically), the validity of this proposition in the context of innovation policy evolution may be questioned. It also seems plausible to argue that the initial supply-based processes have in fact persisted. Crucially, the governance ideas supplied for developing systems of innovation are highly NPM based, i.e., the good practices of innovation policy governance are based on politics-administration split, PPP-based policy making etc. (see **II** and **III**; also Borras 2009; EIPR 2008 and 2009; OECD 2005 and 2010).

Thus, there seems to be a huge canyon between what is seen as the 'best practice' for creating policy and administrative capacities from the innovation policy perspective and from the PAM perspective. And this canyon seems to be significantly wider than during the developmental state era when heterodox economists, sociologists and political scientists tended to agree on certain common ideas about the role of the state and bureaucracy, even if disagreeing on other issues relevant for catching-up.

In the SI approach, it has been recognized that innovation policy is a policy arena characterized by high unpredictability where small but highly uncertain (in terms of results) policy actions in the beginning of technological changes or product life cycles may result in bigger results than large policy actions in the later stages (Edquist 2001).[25] At the same time, PAM research has shown that managerialism or NPM reforms (in wrong contexts) may have potentially conflicting effects on the policy arena as the organizational and institutional reforms (e.g., downsizing, contracting out, performance management) may reduce the capacity of political systems to pursue flexible policies, policy outcomes that have long time-lags or have horizontal characteristics, and even lower the motivation and incentives of the state structures to take risks (even small ones). Thus, managerial reforms, while increasing administrative capacities in a narrow sense of efficiency (in best case scenario), may have reverse effects on policy capacity in a broad sense of effectiveness (at least in long term). Thus, while the SI approach looks mostly at the changing techno-economic conditions and rationales for determining activities where state actions may be justified, PAM perspective

[25] The same applies to catching-up processes in general, meaning that techno-economic choices and their interplay with socio-institutional processes in the early stages of catching-up also determine the future trajectories.

emphasizes that the *policy competences* (or policy and administrative capacity) of the states may also be dynamic and affected by other external variables, e.g., whether and to what extent the states have followed internationally converging reform ideas like managerialism and PPP-based policy logic. In this context, it can again be argued that the CEE economies entered the catching-up processes at the time when both the ideas of innovation policy (on governance) and public administration policy discourses where dominated by the very same managerial and PPP perspectives.

Thus, the current SI approaches are not fully able to encompass the whole set of variables that constitute policy competences – i.e., the SI approach is rather limited in including all the aspects of the dynamics of administrative capacity – and organizational and institutional trajectories of the policy arena also tend to follow their own logic. This means that the logic or cycle of public policy (problem definition, choice of alternatives, design of policy, implementation of policy, evaluation – see Anderson 2000; Parsons 1995) does not always have to, and does not start with a correct definition of a relevant problem. Indeed, it has been argued that most of the public choice theory-based organizational and institutional governance reforms since the 1980s started from a 'perceived problem' (lack of performance, responsibility, accountability, trust, etc.), which was defined (but not empirically proven) in order to fit the ideological solutions of the public choice theories (for overview see also Pollitt and Bouckaert 2004; for the discussion in the context of the CEE, see Bouckaert 2009 and Bouckaert et al. 2009). This implies that the reality may witness potential policy logic from 'perceived problems' followed by 'solutions' that create 'new problems' (i.e., solution being also a problem) that require 'new solutions' etc. (e.g., see Verhoest and Bouckaert 2005). At the same time, while the SI approach recognizes that innovation policy making is a highly pragmatic, risky and unpredictable endeavor, the analytical principles of the SI still implicitly presume that policy actions start from the recognition of a *policy opportunity* and the introduction of *state activities*, given the proper *policy competences*.

3.3 Summary

It is possible to bring out at least two examples (best practices) from the current innovation policy discourses of the OECD and the EU where, departing from PAM approach, we can see that innovation policy makers (using the SI approach) are in many ways 're-inventing' and 're-experiencing' ideas which the PAM scholarship has been studying for some time. The first is the introduction of the ideas of 'governance' and

'good governance' and the second is the introduction of the ideas of 'public-private-partnership' to the innovation policy discourse:

- Firstly, international initiatives on benchmarking and policy learning in innovation policy (i.e., OECD 2005 and 2010; EIPR 2009; see also **III**) study and discuss governance practices across the EU and the OECD countries and try to derive policy lessons, best practices and implicitly also converging innovation policy governance models. While raising important questions and comparing practices in terms of policy coordination across different policy domains, the division of tasks between policy making and implementation, the role of autonomous agencies in policy delivery, performance measurement and evaluation, etc., these approaches lack significant insight into PAM research on the very same issues. It is notable that these benchmarking exercises see the introduction of new organizations and institutions (independent agencies; overall splitting-up or specialization of the policy cycle; coordination bodies) as one of the solutions to the innovation problems/paradoxes (policy coordination etc.) seen as the root cause of competitiveness gap between the EU and the US etc. (For critical analysis see **I**; **IV;** Bonaccorsi 2007; Karo 2009; Dosi et al. 2006; Mowery and Sampat 2005). On the other hand, from PAM perspective (see Verhoest and Bouckeaert 2005; Verhoest et al. 2007 and 2010) it has be argued that while most of these reform ideas come from the managerialist understanding of organizational and institutional set-up of state governance systems, the last decades of the experience of the OECD countries show that these reforms are more likely to cause new problems in terms of the lack of accountability, loss of long-term policy horizons, dislocated policy capacities and overall lower effectiveness, as opposed to just increasing policy efficiency (i.e., making policy-making faster and cheaper). Furthermore, PAM-based national comparisons highlight that these managerial ideas have been more acceptable and legitimate (which does not guarantee better results) in a few developed countries, i.e. mostly in Anglo-American countries and to a lesser extent in some continental European countries (e.g., the Netherlands and some Scandinavian countries). But in the latter, the negative effects of these managerial reforms have been mitigated by specific consensual culture and high-level trust embedded in policy-making institutions. Introduction of these governance ideas into the systems of innovation of catching-up economies is only likely to increase de-contextualization (see also **IV**).

- Secondly, as discussed above, the same OECD/EU benchmarking experiences and also practices spreading to the catching-up countries have complemented the above-mentioned trajectory of managerial organizational and institutional reforms with a new, more participatory and network-based perspective on policy-making (i.e., see **II**; Kattel and Primi 2010; Radosevic 2009; Reinert et al. 2009). From the perspective of innovation policy discourse, the more networked and stakeholder-inclusive mode of policy making is supposed to increase the speed, flexibility, stakeholder commitment and the efficiency of the policy-making. PAM research has also looked into the strengths and weaknesses of network-based governance and policy models (e.g., Goldsmith and Eggers 2006; Kickert et al. 1997) and has argued that network-based governance practices are suitable in very specific conditions. Namely, while this approach to governance can bring substantial gains (e.g., tapping into new human and/or financial resources; utilizing local initiative, etc.), there is evidence to imply that unless there is a high administrative capacity present, the impact of using networks may also be negative.[26] Thus, while in innovation policy discourse network-based governance ideas are often seen as a solution to problems (and sources of increased state capacity), from the perspective of PAM it is often considered as a new challenge created by international convergence trends, which needs further efforts and search for solutions to properly manage the new governance context.

In the context of these inter-disciplinary contradictions, the theoretical elaborations of this thesis (**I**; **II**; **III**) argue that:

- On the one hand, the evolutionary perspective on innovation policy understands technological and innovation processes quite well and argues that the WC-based understanding of innovation and innovation policies has in many cases (both in Latin America and the CEE) diminished the public sector capacities and private sector capabilities for economic restructuring and catching-up.

[26] Taking into account the basic logic of policy making, PPP-models are likely to squeeze bureaucratic or technocratic competences (administrative capacity, parts of policy competences) between two groups of stakeholders – on the one hand, politicians demand policy perspectives that respect the electoral cycles, and on the other hand, direct participation of labor unions, consumer groups, industry associations, etc. in the policy cycle creates further constraints on the long-term horizons that the bureaucratic or technocratic administrative system is expected to represent.

- On the one hand, this thesis claims that this is only one half of the explanation and the evolutionary theories of innovation and innovation policies leave out crucial institutional and organizational changes that the WC period brought about in the state structures, affecting both administrative capacities and policy competencies. Therefore, the solutions provided by the evolutionary analysis may only be part of the picture and furthermore, may require or presume state capacities or capabilities, which are absent. Or, to put it differently, in PAM research the effects of neo-liberal and neo-classical approaches on the Weberian state structure are transformed into a Neo-Weberian understanding of the state policy and administrative structures (and capacities), where the state retains the central coordinating position in terms of both state-society relations in policy-making and public-private interactions in terms of policy implementation. In the SI and surrounding research, the same effects of neo-liberal and neo-classical approaches on the Weberian state structures are transformed into an opposite understanding of the state policy and administrative structure (and capacities), where the state has lost this central coordination position and given the characteristics of catching-up economies (weak capabilities of actors in general), this role is not transferred to some other key stakeholder, but is in fact fragmented.

If we presume that government policies count (which continues to be a prevalent understanding in the context of catching-up economies), no matter how they are defined (either call them industrial or innovation policies), and that government policies should have a long-term vision (beyond private returns and thinking about economic restructuring and social returns) and the government should have significantly different capacities than the private sector actors (e.g., covering situations where markets mechanism fail), then adopting the currently dominant PPP-based governance model, which may undermine the abilities and legitimacy of the state, seems to be a dysfunctional development model.

4 An inter-disciplinary framework for analysis in catching-up context

Overall, based on the analysis of different theoretical and policy-making approaches, we see that innovation policy research is, to simplify, stuck between a rock and a hard place. On the one hand, the changing techno-economic context has reduced the relevance and legitimacy of the classic rationale and reasoning of the Weberian understanding of the role of the

state in techno-economic and socio-institutional catching-up. On the other hand, we see that the there is an increasing pressure to move towards the PPP/network-based governance model as a tool for increasing innovation policy capacities, which in the Weberian model were state-centered. This governance model has grown out of the mixture of innovation policy and governance theories, policy fashions, and experiences of developed countries. At the same time, PAM research enables here to shed light on broader challenges that may arise in the context of catching-up processes.

In reality, neither the SI nor PAM approach is able to provide proper analytical frameworks on its own, as there are different interlinked questions that need an interdisciplinary framework. In different articles of this thesis the following key questions have been discussed and analyzed using the refined theoretical perspectives:

- *Definition of the techno-economic challenges* – this question has been discussed based on both existing SI literature on the CEE and other catching-up regions (see **I**; **II**), but also based on further research into the spread of new perspectives for defining techno-economic challenges (i.e., the spread of Bayh-Dole Act based modes of R&D governance – see **IV**; and the emergence of open innovation concept – see **V**);
- *Search process for policy ideas or solutions for defined techno-economic challenges* – this has been discussed using the PAM ideas of policy convergence (differentiating between rhetoric and practice as sources of policy convergence; and between processes and effects) as elaborated in article **I** (see also **IV**)**;**
- *Search for governance instruments to implement the solutions to techno-economic challenges* – this has been discussed using PAM perspective on 'coordination' (as it is defined both as a policy and governance problem in the SI and developmental state perspectives) and PAM perspectives on governance of policy cycle (see **II**; **III**).

To summarize and visualize the framework, it has been argued that (see above and **I**; **II**) the interplay of different external pressures (impacts of WC on innovation 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. Because of limited alternatives and options for creating policy capacities, policy failures are in this context often labelled as 'coordination' problems both by the SI and PAM approach to hide away the fundamental challenges. Analytically, 'policy coordination' can be seen as a multi-

level concept that can be used to encompass the different policy problems and failures discussed above:

- the role of the state in the development processes (state-business relations);
- the contextual mixes of policies; and
- the bureaucratic structure and capacities of the state.

Also, 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 innovation policy performance, but rather that state capacity in innovation policy is among other things conditioned by coordination capacities. Linking the SI approach (taking also into account its limitations for catching-up economies based on the developmental state ideas and criticisms of the theoretical premises of the SI discussed above) and PAM perspectives on innovation policy, 'coordination problems' of innovation policy can be analysed at and analytically allocated to several levels of the policy process[27]:

- **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 innovation policy, 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 innovation policy; and
- **intra-policy coordination** – given a defined scope of innovation policy (e.g., the two models of the SI approaches: narrow science and technology – S&T – based vs. broader institutional understanding of innovation policy), how to design the policy cycle and what type of management (and coordination) mechanisms to prefer.

[27] 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*'.

Overall, the three levels indicate the potential sources from where policy failures or coordination challenges may emerge. Also, given the rather narrow (or one-sided) approach of conventional innovation policy and governance/PAM research, it is likely that both fields pre-define coordination problems according to their respective expertise – innovation policy research is more centred on the inter-policy coordination level and governance research on the intra-policy level. 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 policy) face coordination challenges at lower levels of 'coordination problems' (inter- and intra-policy) than developing economies, which need to start developing innovation policy from scratch through defining the policy arena and stakeholders to begin with.[28]
- Furthermore, it could be hypothesized that changes of and dynamics within techno-economic paradigms/trajectories (or technology life cycles) re-introduce the higher-level coordination questions also into the policy 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 innovation policy models and by the parallel developments of the state governance structures. At least in catching-up economies (the CEE) it can be presumed 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 innovation policy developments and define the location of 'policy coordination' problems. Thus, coordination problems stem from clashes between innovation policy ideas (what is the dominant perspective on the content and governance system) and innovation policy governance realities and capacities (what the current set-up of the governance area is and what the competing ideas on governance are).

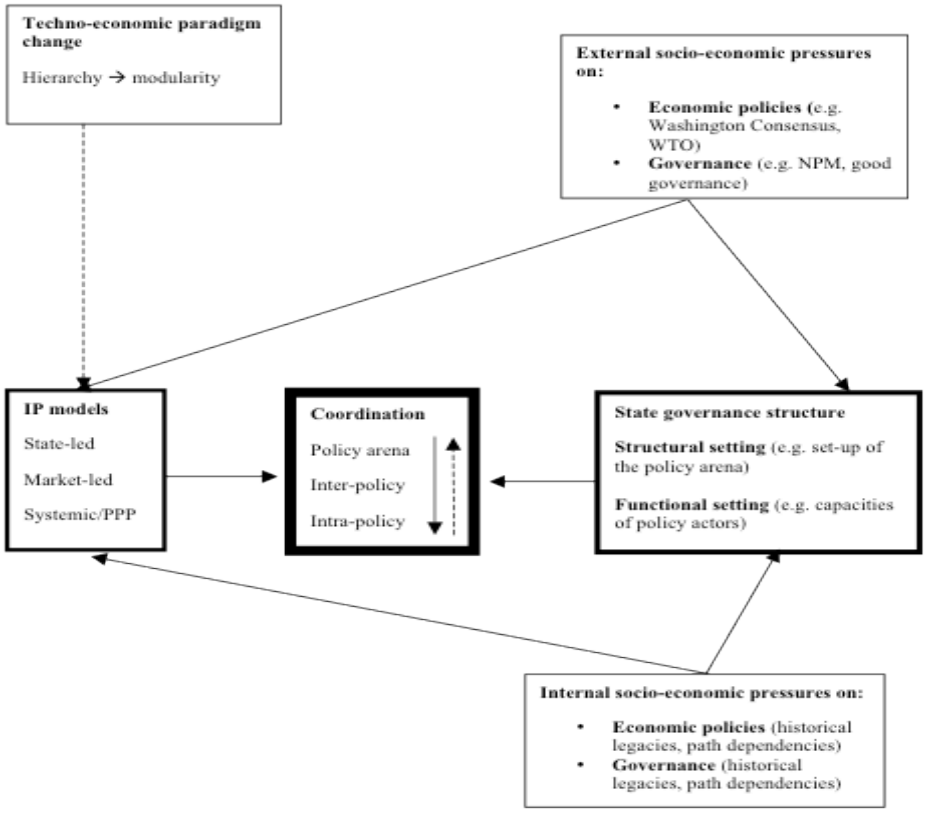
[28] In addition, reflecting the changing nature of influence many economic actors can exert under the WTO regimes upon developing countries' policy-makers, the linkages between the state and other stakeholders of innovation policy also become an exercise in creating what Galbraith calls countervailing power. As Reinert argues (2007, 2009), certain economic activities do not simply create 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)

In this thesis it is argued that the innovation policy ideas prevalent in the CEE context have moved from state-led and market-based models towards more networked or participatory models and are mostly externally imposed. Such models (in order to work) implicitly presume highly capable and flexible state structures. At the same time, the governance realities of catching-up countries in general may provide less institutional and administrative capacities and flexibilities due to their historical legacies and also the external pressures of the WC (and the WTO) era, which has eroded existing state capacities. Thus, policy coordination problems are characterised by persistent clashes and conflicts between the expectations and realities set by both innovation policy 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 are usually not explicitly included in the current SI frameworks and models designed for innovation policy-making and analysis:

- Firstly, it will be possible to analyse whether the trajectories of innovation policy ideas and supportive governance reforms have been in sync. Given that this is highly unlikely, especially in the context of catching-up economies, the framework facilitates further analysis for indicating the starting level of coordination problems.
- Secondly, based on the indication of the starting level of the coordination problems, it will also be possible to analyze what the feasible options for designing solutions to coordination challenges are. As the framework links the trajectories of the SI and PAM together, it will be possible to analyze (using the toolboxes of PAM research to complement the knowledge of the SI research) the types of state capacities for policy coordination that exist in the governance system (e.g., whether the governance models have so far used hierarchical, network-based or market-based coordination mechanism, or some mixes of them; where crucial policy capacities reside – whether they are centralised or decentralised etc.) and how feasible different policy interventions are.

Figure 1 Framework for analysis



Source: **II**.

Thus, compared to the economics-based or PAM 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. As such, it is at the moment a framework that can merely explain and open up different internal and external factors, which may affect innovation policy dynamics on different levels (and state capacity development) and highlight the multi-level and inter-disciplinary challenges, which make-up the crucial complexities that innovation policy faces in catching-up context, like the CEE.

5 The evolution of innovation policy governance systems in the CEE

This section briefly summarizes the empirical findings of the research carried out in the context of the articles written for this thesis. The aim is to highlight how the proposed theoretical and policy-level dynamics, encompassed in the proposed inter-disciplinary analytical framework, play out in the context of the CEE. Or, *how have the trajectories comprising innovation policy – definition of techno-economic challenges, search process for policy ideas or solutions, and search for governance instruments to implement the solutions – evolved over the last two decades in the CEE and have these economies been developing state capacities that can enable to pursue economic restructuring, or convergence with the rest of the EU?* Also, some research questions and current limitations for further research are highlighted.

5.1 Definition of techno-economic challenges

In article **I** it has been argued that the general thinking around technology and innovation policy in the CEE has centered around two key interlinked problem definitions through which innovation policy is made: first, the mismatch between R&D and education policies on the one hand and industry needs on the other (it can also be called a high-technology bias); second, the strongly fragmented policy arena where coordination problems are rampant. Thus, problems of fragmentation and coordination are defined both at policy (inter-policy) and governance (intra-policy) levels. These problems were already partially detected, or their emergence predicted, in the late 1990s (see for instance Radosevic 1998 and 1999) and by the 2000s, they formed the core of the European Commission's message to the new member states in terms of what they need to take into account while devising strategic plans for the implementation of the EU structural funding between 2007 and 2013. This thesis argues that these policy definitions have just been further re-emphasized and that they are closely linked and partially derived from the policy thinking of the WC era in the beginning of the 1990s.

In several articles (**I; II; III**) it has been argued that the CEE economies have from the beginning of the 1990s kept following a misinterpretation of the Soviet legacy in terms of the private sector and also general R&D

capabilities, which in the developmental state perspective was also a crucial determinant of the state structure and modes of public-private interactions. This has also formed the definition of techno-economic problems throughout the period under study. Namely, based on the works of Radosevic (1998 and 1999 which to date represent the most complex discussions of the R&D and private sector processes in the Soviet system), the Soviet system represented two unique features: industrial companies were built up and run in a complex web of planning and competition; and the Soviet R&D system was based on similar vertical integration of R&D into specialised institutions. This meant that the Soviet techno-economic capabilities were fragmented across the conventionally understood lines of the public and private sector and these capabilities were coordinated through complex state-led policy and entrepreneurship activities. The post-Soviet reforms, formulated through WC policies and neoclassical theories, de-emphasized or did not recognize most of these characteristics or presumed that existing non-political capabilities (high level of education and science, industrial capabilities that the Soviet system had created) will also function under market mechanisms. In many ways the Soviet industrial system was in fact quite similar to the East Asian model, whereas the neoclassical interpretations of the Soviet legacies have been quite similar to how this perspective has evaluated East Asian legacies. Crucially though, in East Asian context the neoclassical perspectives did not dominate, while in the CEE's case it became the central feature of the policy discourse.

Article **I** summarizes some of the key critical accounts, which claim that neoclassical perspectives have been misguided. These arguments have been based on the post WC reality of the CEE economic performance at micro and macro level. The sudden opening of markets and the abolition of capital controls made industrial companies (which functioned during the Soviet system) extremely vulnerable and so one of the most striking features of post-Soviet development emerged in the 1990s: the rapid primitivization of industrial enterprises or even the outright destruction of many previously well-known and successful companies. In sum, the replacement of the Soviet political system with market-based policies did not only result in democratization and liberalization, but also in further fragmentation of both the general capabilities of the private sector (enterprises lost most of their existing linkages with some capabilities, which the neoclassical approaches consider as core capabilities, but were in fact placed outside enterprise borders) and overall R&D capabilities (publicly funded research system became more fragmented and lost problem-orientation as applied research was not as relevant in the new policy paradigm, etc.).

Thus, from policy-making perspective, the result was further fragmentation of the state-business linkages and relations. In article **II** it has been argued that paradoxically the state-led systems of innovation and technology governance, which were found in economies like Estonia and Brazil, while being fragmented and dysfunctional according to conventional understandings of governance and management, were embedded in a broader inter-sectoral (state-business) contexts (with regionally different characteristics), which provided sufficient support for the systems to function. At the same time, the WC-based reforms de-contextualized the policy systems. Thus, according to management and governance perspectives the new systems were more coherent and straightforward (even if theoretically contestable). Yet, the broader state-business relations have not supported the combined functioning of these different aspects of the system. Therefore, it could also be argued that simple refinements of the governance and management principles in the given trajectory may not lead to significant improvements in the overall policy performance.

In a broader discussion, it could be argued that the CEE economies did not actually pursue to define (politically) complex techno-economic problems (as was the case in East Asian economies), which the state could solve through policy actions. This has been brought about by the WC legacies – the misinterpretation of the Soviet system and the adoption of 'no policy innovation policy' in the beginning of the 1990s. These legacies embedded the crucial misunderstandings into policy-making and resulted in the simplified understanding of the techno-economic challenges. In sum, there emerged a policy vision that techno-economic priorities can be best defined by the market forces and the state can at most create initial conditions through sound macro-economic policies (e.g., balanced budgets, stable or fixed exchange rates, openness to FDI, etc.) and then mostly reactively support or leverage the techno-economic priorities (that the markets define) through mainly horizontal policy efforts (better coordination of policies and actors in the innovation system). Therefore, in many ways innovation policies in the CEE have been placed into a rather vague policy or problem context. Also, Radosevic (2002; Radosevic and Reid 2006) has implicitly posed a question if innovation policies in the CEE, as they have evolved, really matter in the context of the economic problems, as defined by the more critical research.

Probably the best example of this issue in the CEE is a comparison between Estonia and Slovenia. In terms of catching-up policies, both are considered as successful (which can be debated – see Kattel 2010b; Tiits et al. 2008), but different or even extreme opposite models of capitalism (Feldman 2006; but see also Myant and Drahokoupil 2010). At the same

time, these countries represent rather different histories of innovation policy. While Estonia is considered to be one of the success stories in introducing innovation policy and the SI approach (see **III**; **IV**), innovation policy proper has lagged behind considerably in Slovenia and has been consistently hampered by problems of policy coordination, prioritization and coherence (see Bucar and Stare 2002 and 2006; Trendchsrt 2009 - Slovenia). At the same time, Slovenia seems to have a more stable and coherent broader catching-up policy mix, especially in the light of the impact and reaction to the economic crisis (see Kattel 2010b).

As a further elaboration, it also seems that grounding policy-making in the SI approach can reinforce this simplified thinking about techno-economic challenges and innovation policy in the CEE economies. Firstly, the analytical SI approaches in deriving rationale for policies and policy-making presume that the existing private sector capabilities can be adequately assessed, and that supportive policies (entrepreneurship, industrial, tax, investment, etc. policies) exist, which the state is capable of coordinating. Thus, theoretically the SI approach is not sufficiently capable of contextualized analysis in the historical context of catching-up economies like the CEE. Secondly, the policy approaches derived based on the SI approach (like the PPP-based approach) further reinforce the emphasis put on linkages (either of actors within the system of innovation or between policies through better coordination, etc.) as opposed to balancing policy analysis and subsequent efforts between developing linkages and capabilities in the public and private sectors. In articles **I** and **III** these tendencies are laid out in greater detail and it is showed that in the CEE economies (with more detailed analysis of the Baltic States) innovation policies are increasingly limited to high-tech fields (e.g., ICT, biotechnology and nanotechnology) with innovation perspective clearly dominating over learning perspective in policy rationale. Also, innovation policy performance is increasingly measured and evaluated based on performance criteria of high-end activities of high-tech fields (i.e., rates of patenting, commercialization and indicators of innovativeness, which are benchmarked against developed economies like the US and the EU average; R&D quality measurement in terms of global excellence as opposed to local industry relevance). This further reinforces the impact of the high-tech bias.

Importantly, the analysis in this thesis does not argue that the definitions of techno-economic problems in the framework of high-tech are unequivocally wrong (this would require a more in-depth analysis of the private sector dynamics and policy effectiveness), but it is shows that the techno-economic problem definitions are pre-determined by the policy legacies and analytical perspectives used in policy research and analysis.

This narrows down and constrains the thinking around innovation policies, i.e., creating and under-emphasis on learning and imitation as the sources of techno-economic catching-up. Further, it limits the policy analysis and thinking to intra- and inter-policy coordination issues, which is strongly based on borrowing governance and administrative principles from other disciplines, whereas the presumptions about functioning state-society relationships tend to be misinterpreted or under-emphasized as well.

5.2 Search for policy ideas or solutions for defined techno-economic challenges

In the context of broad techno-economic challenges, the thesis has discussed three theoretical and policy-based factors that have affected the formulation of innovation policy ideas or policy mixes in the CEE: the impact of EU conditionalities, the impact of the EU-influenced policy learning, and the potential impact of convergence on the new modes of innovation thinking.

In article **I**, it has been argued that explicit innovation policy mixes (as opposed to 'no policy policy') emerged in the CEE economies largely with the accession negotiations to the EU and financial support given during pre-accession (PHARE) and post-accession (EU structural assistance) processes (for a more recent and more detailed analysis see Suurna and Kattel 2010). In article **III**, the dynamics of the innovation policy evolution in the Baltic States are laid out in more detail. It is argued there that the EU pre- and post-accession programs largely determined the content and evolution of innovation polices. The model of evolutions of innovation policy mixes in the old Europe (regulatory, economic, soft and meta instruments) proposed by Borras (2009) can also be seen as the trajectory of how the EU has imposed innovation policy ideas on the CEE. In articles **III** and I**V**, it is shown that in the economies of the Baltic States, most public finances consolidated under the label of innovation policy have been largely co-financed by the EU and the content of policies has also evolved in the same trajectory as defined by Borras (usually complemented with significant impact of the EU-based or supported policy learning, consultancy and policy assessment mechanisms).

Article **III** further highlights that even in the case of the Baltic States (which are often seen as more homogeneous than many other economies of the CEE) there have been some slight differences in the trajectory of the innovation policy content. For example, while Estonia seems to have rather consciously avoided the adoption of industrial policy and the use of tax policy as mechanisms for further leveraging of innovation policies for

economic restructuring, Latvia and Lithuania have been more open to increased coordination of innovation policy with these policy fields. At the same time, it also seems that Latvia and Lithuania have somewhat failed in these attempts, as it has required significant political (and state-business level) compromise and policy as well as administrative capacities to get it right. It needs to be further analyzed if and how this trajectory has emerged in the rest of the CEE economies, which may follow somewhat different patterns that are linked to broader issues of the socio-institutional context of economic policies. And again, the comparison of Estonia and Slovenia as the opposite models of capitalism (Feldman 2006) could be a useful starting point.

However, the argument of this thesis is that these potential differences represent merely slight varieties within a general and longer trajectory of the innovation policy. In this trajectory, the CEE economies tend to converge more during certain key events/periods (like the high-days of the WC policies and accession negotiations with the EU) and diverge more at moments when internal socio-institutional factors may be more significant. Thus, it could be argued (see again **I** and **III**) that narrow innovation policy as brought to the CEE policy arena by the EU (horizontal policy limited to high-technology rationale) has also been compatible with the patterns of state policy and administrative capacities evolution during the WC era. Namely, during the WC period the state capacities were developed in a somewhat narrow and fragmented manner (both macro-economic problems and solutions were externally imposed), with state policy and administrative capacities also consciously separated (as a good practice of WC-based governance principles). Introduction of the innovation policy mixes to the CEE economies has largely reinforced the same pattern, which is also embedded in the theoretical approaches of the SI towards designing innovation policies. Innovation policy has been introduced through new financing mechanisms and organizational arrangements (new units at the ministries, new agencies to implement the EU funds), while issues of broader coordination with other policies etc. have been arranged though PPP-based network models (coordination councils, meta instruments, etc.). Overall, this has made it easier to adopt innovation policies as an explicitly new policy initiative, but made it significantly harder to achieve flexible coordination and coherence (or systemic reform) of the broader policy arena.

In article **IV** (see also **I** and **III**), it has been shown that next to the more direct or indirect mechanisms of the EU conditionalities, softer and meta mechanisms of policy learning have affected innovation policy trajectories in the CEE economies as well. These mechanisms can also be seen as additional sources of external influence, which compete with national

factors in determining the path of trajectory during the times when explicit conditionalities have become less significant. In article **IV**, innovation policy is discussed from the lens of policies that foster R&D capabilities in general. It is argued that most of the R&D policy thinking in the EU is based on misguided assessment of the sources and logic of how the US innovation system succeeds in higher rates of commercialization of public sector R&D and high linkages between different actors of the SI.[29] The EU has interpreted its competitiveness problem as limited emphasis on creating and supporting linkages between academia and industry and therefore the policy measures and performance criteria of policies are increasingly geared towards supporting industry-academia partnerships and commercialization of publicly funded R&D activities (while the critics claim that the problems of the EU are in fact related to core capabilities of the actors, to begin with).

Article **IV** argues that this mode of policy thinking is also transferred, through both policy conditionalities and policy learning, to the policy mixes of CEE economies, which represents a duplication of the mistakes of policy learning (firstly misunderstanding the US context by the EU and then further de-contextualizing the lessons by transferring them to an even more different context). The empirical case study of Estonia (see **II** and **IV**) has discussed the negative impact of this process on innovation capabilities and policy capacities, which results in further re-enforcement of the innovation policy trajectory, which the CEE economies have followed since re-independence. In addition, articles **I** and **III** discuss the impact of soft policy learning mechanisms (EU-level benchmarking activities, policy communities, spread of common comparative policy performance measurement systems, etc.), which have further created soft pressures to converge on a similar policy thinking and problem definitions.

Finally, article **V** discusses the potential effects of open innovation as a new emerging paradigm of innovation, which may also have significant impact on innovation policy making. It is shown that the logic of policy-making, which is derived from the open innovation concepts, significantly reinforces the existing paradigm of innovation thinking with more emphasis given to reactive policy-making (or, proactive policy-making is increasingly seen as becoming more complex for the states to handle) and PPP-based modes (increasingly emphasizing cross-sectoral linkages and

[29] This understanding is summarized as 'European Paradox', which represents the idea that Europe, in comparison to the US, has relatively good private sector capabilities and general R&D performance, but lags significantly behind in commercialization of the R&D results through the private sector entrepreneurship activities.

partnerships). Importantly, interviews with Estonian policy-makers have also indicated that the same theoretical and conceptual tendencies to reinforce existing trajectory are in fact present in policy-makers' views on how concepts like open innovation can affect innovation policies. Clearly, if the concept of open innovation is further increasing its prevalence, as it seems to do, these issues need further critical research (see also Karo and Kattel 2010).

5.3 Search for governance instruments to implement the solutions to techno-economic challenges

As was noted, one side of the techno-economic challenges in the CEE has been defined through the lens of governance of innovation policies (fragmentation and coordination issues of the policy arena). The post-WC evolutions of innovation policy (from generic regulation to more specific measures) have made innovation policy a rather complex policy area (as was in the context of developmental state), where the design and implementation of policies takes increasingly place at the gray zones of state-business relations (the PPP model). This means that the state structures need to be increasingly in contact (as compared to the WC period) with private or semi-private institutions to gather feedback for assessing policies and getting input to new initiatives. The same institutions are often in one way or other carrying out policy implementation (e.g., either public sector or industrial research institutes, companies and/or entrepreneurs put the state financial allocation in use to achieve both private and social goals according to the rules and standards set by the policy makers).

In articles **I**, **II** and **III**, it has been argued that the WC period of 'no policy innovation policy' has also affected governance and policy implementation systems at several levels. Further, these impacts can also be traced to the functional and dysfunctional aspects of the current PPP-based innovation policy paradigm. As argued, the macro-economic and technocratic focus of the WC era sought to re-draw the non-traditional state-business relations of the post-Soviet economies. Thus, the highly inter-linked inter-sectoral relationships, which were steered by state planning institutions, were replaced by generic regulatory environment (e.g., property rights and IPR regulations, legal definition of the autonomy of public R&D institutes) and by formalizing inter-sectoral relationships (e.g., rules of providing subsidies for industrial upgrading, generic rules of public R&D financing in public, semi-public and private sector institutions). This meant that in the new policy context the market forces, or the private sector capacities (as state capacity had been reduced) should have defined the relevant state-business relations, which did not happen as

was discussed above. Therefore, in most CEE economies the WC period did not bring about any significant innovation or industrial policy visions (and supporting governance structures) for economic restructuring through conscious policy, or coordinated public-private efforts.

Most conscious reforms during the 'no policy innovation policy' were limited to modernizing the governance of public R&D systems (as there existed significant vested interests). The lack of consolidated vested interest on one side (innovation policy) and their presence on the other side (science policy) created a situation where previously interlinked and state-steered policy fields started to fragment and evolve in different directions. While industrial and innovation policies did not kick off, science policies were increasingly gearing towards international academic excellence as the underlying value of policy thinking (see also **III**; **IV**). The logical consequence of these dynamics has been the emergence of structural-institutional setting that has created and maintained high-tech bias in the explicit innovation policies, which have been (content-wise and structure-wise) externally imposed to this increasingly fragmenting system. And quite logically again (given the policy legacies and dominant governance paradigm of the SI approach), the PPP-models are increasingly seeking ways to create coherence and coordination in the policy arena through increased stakeholder engagement (e.g., reinforcing coordination bodies with business interests, creating formalized coordination mechanisms with industry associations), but the effects of fragmentation have also been carried over to the inter-policy and intra-policy levels.

To further highlight the changes at the level of inter-policy coordination, the WC policies reformed away significant institutions that partially played the role of 'development agencies' in the Soviet system (i.e., Academies of Science and its academic and industrial research institutes systems).[30] The abolition of their status and the marketization of their functions (which often resulted in the disappearance of certain functions, i.e., industrial R&D – see also **I** and **III**), led to further increased fragmentation of the policy arena. Subsequent conscious innovation policy evolutions (since the mid-1990s) have increasingly sought to alleviate the emerged coordination problems through high-level (above ministerial level) coordination councils, regulation mechanisms and meta level policy measures. During the EU-led and PPP-based policy era national programs and projects have re-emerged (see **II** and **IV**), which act as coordination mechanisms for previously existing policies.

[30] Also, parallel governance reforms increased the emphasis of specialization of policy institutions.

Thus, compared to the developmental state model, the marketization reforms of the WC era have actually reversed the coordination logic of policy-making from top-down to bottom-up model, but have also made the whole system more dysfunctional. In the developmental state model, the national projects, programs and plans acted as the highest level priority setting, which was followed by ministerial customization and public-private partnerships for feedback and implementations. The EU-led and PPP-models created a different system where policy initiatives have been formally set through the sectoral ministerial policies. If coordination problems have emerged (which has been very likely given the structural problems at the level of policy arena and establishing functioning state-business relations) the policies have been extended with higher-level coordination mechanisms, which mostly act as correctors of the initial structural dysfunctions (increasing coordination of existing policies) and not as high-capacity vision-creating institutions. In this context, the inclusion of business interests in policy-making system has often remained rhetoric instead of becoming a substantive reality. There are at least two additional governance-related reasons for that.[31] Firstly, as argued above, most policy ideas are externally imposed by the EU conditionalities and policy-learning mechanisms, which makes inclusion of business interests a mere rhetorical formality as the crucial techno-economic challenges and suitable solutions are to a great extent not determined by national policy makers, but pre-determined by external influences. Secondly, although the ministry level has seemingly acted as the formal centre of policy making (still lacking bureaucratic autonomy created by higher political levels as designed in the developmental state model), the linkages with potential business interest are further complicated by conscious fragmentation of the policy cycle (which runs according to the ministerial division of labour). This further level of fragmentation has been proposed both by the WC policies and the best practices of the EU innovation policy, because both have been embedded in the same governance approach, labelled either as good governance or NPM (see above).

Thus, at the level of intra-policy coordination, the CEE economies have witnessed increasing fragmentation throughout the 1990s and 2000s (see **I**; **II; III**). Again, in article **I** it has been argued that the trajectories of intra-policy coordination are increasingly converging in the CEE because the WC era created a governance logic for economic policies (specialization, policy-administration split, preference for contracting-out, etc.), which has been further extended by the EU hard and soft policy

[31] In addition, the private sector itself in the CEE economies tends to be rather fragmented and lack skills and experience to participate at the policy-level processes.

learning and transfer mechanisms. Namely, one of the crucial EU-imposed requirements that the implementation of the EU structural funds has to be administered through decentralized and specialized agencies (accredited by the EU) has had a significant impact on the structural composition of the CEE innovation systems. As the EU contributions make up significant parts of the innovation policy mix in most CEE economies, the institutions created by the EU are the central actors of innovation policy implementation. Also, the existence of an agency or institution specializing in implementing certain policies creates pressures to consolidate similar national activities in one institution. (See also Suurna and Kattel 2010).

In addition, in article **IV** it has been also argued that when comparing the CEE economies with the more mature economies of the EU (also the US), it can be seen that while there is significant specialization and role division, there is a crucial lack of institutionally established problem-orientation in governance systems. This has been reflected in the lack of problem-oriented national programs (as discussed in the previous section), but also in terms of problem-oriented R&D and innovation funding institutions (which in the cases of the EU and the US have acted somewhere in between political, generic science and administrative funding institutions and have provided significant input to problem- and mission-oriented research and innovation activities). Partly, the abolishment of Academies of Sciences (or turning them into symbolic organizations) in the CEE has been the key cause of this situation. On the other hand, the dominance of the EU-created administrative financing agencies (i.e., agencies without technology or problem-oriented missions) can be seen as a substitute for problem-oriented agencies (as they are also more compatible with general horizontal policy logic). Crucially, the management and steering of these fragmented and decentralized institutions, which has been highly formalized according to NPM logic (i.e., establishment of these organisations as agencies that are at arm's length from government and subject to less direct steering and control; controlled through more indirect influence of management and performance contracts, etc.), and the dominance of horizontal policy instruments have together reduced the capacity of the state (ministry) to flexibly interact with these institutions. Thus, the fragmentation of the policy cycle created obstacles to policy feedback, policy flexibility (which is in many ways not foreseen as a necessary variable in the logic of horizontal policies) and steering capacity to change policies in case of rapidly changing problem definitions (which is in fact not very likely given the externally imposed generic policy models). Thus, given the overall trajectory, it seems logical that national governments are

increasingly using new coordination mechanism (networks etc.) to increase coordination capacity within the policy system.

In article **III**, we see that this trajectory of intra-policy coordination is likely to show some variations across the CEE. For example, Estonia has established the clear-cut and ideal-type (according to the post-WC PPP paradigm) policy cycle and coordination system much faster and in a much straightforward way as compared to Latvia and Lithuania. But despite these differences, all three countries are in the end still converging on the same structural and functional logic where the contextual problems created by the WC legacies and EU conditionalities are solved though PPP-based innovation policy logic, which in fact is replicating the existing governance model in a more complex manner. Further research is needed to verify this trajectory and indicate and analyze the national variations within this path. For example, referring again to the case of Slovenia (which has been comparatively more laggard in innovation policy compared to Estonia), the 'state of the art' of the Slovenian innovation system in 2009 was very similar to the general trajectory and system described above. Also, recent reforms have been linked to clarification of the policy administration split (in the context of the EU funds) and increasing policy coordination capacities through creation of coordinating councils (see Trendchart 2009 – Slovenia).

5.4 Dynamics of state capacity evolutions in the CEE

Overall, it can be concluded that the WC and EU/PPP paradigms of innovation policy have been quite inter-linked in many ways. The crucial difference is that the WC-based models prescribed conscious decisions that there was little need to do more than create basic conditions for the market-conditions to function (even as decision makers over policy priorities and dynamics) in support of the techno-economic challenges. The prevalence of the market-logic also created a one-directional linkage between state and business, which greatly simplified the challenge of deriving the appropriate role for the state in techno-economic and socio-institutional processes. The EU/PPP paradigm has brought about the conscious introduction of policy ideas by the state. But the source of these ideas has not been the state or state-business embededdness or market, but external influences of the WC policies and the EU. Also, in terms of more detailed policy-making and implementation logic, crucial decisions are still delegated to market forces (or external forces/experts presumed to be able to interpret market dynamics).

One thing that both modes/paradigms seem to get wrong is the reliance or presumption that the market can also define techno-economic problems

that catching-up economies face. Therefore, there is very little emphasis on the coordination issues at the level of policy arena (state-business relations etc.) and, most policy ideas and governance ideas tend to be externally imposed. Overall, although innovation policy has increased and become more complex at the inter- and intra-policy level, policy-making as such by the CEE policy-makers has rather become a system of technocratic activities than autonomous policy initiative. Also, the limited role of the state has further reduced the ability of the state to reform or redefine innovation policy through rethinking the state-business relationships etc. Thus, the current state of the CEE innovation policies may also be described as a vicious circle, which is quite difficult to break, as national policy initiative has been limited and external factors have become increasingly prevalent in policy making (see also **II**; **III**).

In article **I**, this vicious circle has been labelled as 'copying paradox'. That is, while the CEE countries are – voluntarily or involuntarily – increasingly copying and transferring policies from developed countries and international organizations, this usually exasperates their problems as local capacity development is thwarted. Thus, there is a copying paradox: the more the CEE countries are converging at the policy level (the more 'mainstream' policies they choose), the lower their actual capacity at development becomes, hence diverging capacities for development. In terms of the evolution of state capacities, the following conclusions can be made:

- At the level of *state capacity* – Since the beginning of the WC period, the state has seen a steady increase in its role and legitimacy as a central actor in the techno-economic and socio-institutional processes. At the same time, this increase in the legitimacy has not brought about close ties or embeddedness between the state and the business, as has been the case in earlier catching-up cases. Rather, the legitimacy and the role of the state have been increased through external influences. The policy ideas that the state pursues are externally created and therefore also legitimized through the international discourses of best practices etc. Also, most of the financing and resources that the state has needed to take its position have not been accumulated from the private sector actors, but the state has rather acted as a sort of venture capitalist by bringing in significant external financing to the innovation system to finance the policies it represents.
- At the level of *policy capacity* – the empirical analysis largely confirms the statement given in the theoretical analysis that innovation policy represents a policy area where the CEE economies have been throughout the 1990s and 2000s developing

their innovation systems through supply-based policy transfer (as opposed to moving towards more conscious and systemic demand-based policy learning). In this context, the CEE economies have not developed indigenous policy-making capacities, but have rather excelled in policy transfer (supported by significant external support). Thus, paradoxically the increasing and high-level complexity of policy mixes in the CEE economies does not mirror increasing and maturing policy capacity (of course, certain policy learning takes place). Rather, the adoption of the increasing amount of policy instruments that foster international policy benchmarking and the creation of policy instruments (like national plans and programmes) that are mostly geared at coordination of existing policies can be seen also as a weakness in policy capacities.

- At the level of *administrative capacity* – The empirical analysis indicates that the CEE economies have been going through significant administrative improvements to increase the efficiency of policy implementation (both within the policy cycles and in the gray zones of public-private interactions). At the same time these reforms have been throughout the 1990s and 2000s influenced by the good governance and NPM reform movements, which presume high levels of state policy capacity in order to define and solve correct governance problems and provide suitable administrative capacity. Thus, while the administrative systems have increasingly become straightforward and conceptually coherent, they seem to be misplaced given the specifics of state and policy capacity. Also, the reality that policy and implementation coordination problems, which were recognized or evident around 2000s already, are still acute problems being solved through increasingly complex administrative and policy coordination mechanisms can be once again seen not as a strength but as a weakness in administrative capacities. In addition, the analysis of both the SI and PPP-based conceptual models and the CEE practices indicates that the innovation policy discourse tends to be 'one-paradigm-behind' the public administration research perspectives in understanding which governance and administrative principles can lead to higher policy and administrative capacities.

Thus, while public administration scholars are increasingly arguing that Continental European countries have been converging around an abstract and flexible notion of Neo-Weberian State, which is by some accounts seen as a normative model for the CEE economies, the innovation policy trajectories in the CEE economies are reinforcing the managerial state

ideas. Although, ideally the emerging model should be based on significant interactions between the state and business, in practice this remains a rhetorical characteristic, or at most a system where state-business linkages are symbolic or reactive processes (meaning that choices and future trajectories tend to be pre-determined by the policy rationales and/or emulation approaches adopted). Also, the linkages between policy and administrative capacities remain weak and policy implementation is seen as a technical exercise, which has rather a limited impact on the evolution of policy ideas and policy capacities. Given the complex external sources that have influenced the emergence of this governance model and the surprising stability of the innovation policy trajectory over the 1990s and 2000s (which even the economic crisis has not affected significantly), it is likely that these problems underlined by this thesis remain unnoticed and the search for new solutions can start only after significant changes in the external factors. Based on this thesis, the two crucial issues that need to change are the inter-disciplinary scope of the innovation policy research frameworks and the EU's innovation policy ideology, or the direct and indirect influence on the CEE economies.

Conclusions

This thesis has studied two interlinked research questions:

- How are the innovation policy models developed by innovation research (the evolutionary systems of innovation research) translated into policy-making practices of catching-up economies? Does this translate into clear and analytically explained definition of techno-economic challenges, search process for policy ideas or solutions for defined techno-economic challenges and search for governance instruments to implement the solutions to techno-economic challenges?
- How have the trajectories comprising innovation policy – definition of techno-economic challenges, search process for policy ideas or solutions, and search for governance instruments to implement the solutions – evolved over the last two decades in the CEE and have these economies been developing state capacities that can enable to pursue economic restructuring, or convergence with the rest of the EU?

Very briefly, the thesis has argued that both theoretical models and empirical practice of the CEE economies have greatly simplified the

content and complexity of the techno-economic and socio-institutional challenges that catching-up economies face. This has been caused by:

- Theoretical problems of interdisciplinary research or 'academic blindness', simplifications of the logic of policy making, increasing exclusion of analysis on the socio-institutional dynamics of state structures in innovation policy research (both neoclassical and heterodox), which have fragmented the systemic linkages between state, policy and administrative capacities.
- Practical problems of policy learning and policy transfer, where external pressures to converge on international models of policy-making and governance are in catching-up economies – voluntarily or involuntarily – adopted in a de-contextualized mode of policy emulation, which does not link external pressures and internal contextual characteristics of techno-economic and socio-institutional processes together.

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

- Policy-makers in general need to apply more inter-disciplinary tools of analysis for innovation policy making than merely economics-based analysis. As policy-making and implementation are in reality the processes of translating ideal-type perceptions into politico-administrative realities, 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 recognize that due to ideological and economic globalization/convergence processes there is a high probability that international policy learning and the spread of international practices becomes somewhat de-contextualized. Therefore, international policy learning needs to be complemented with national historical policy learning. Even if techno-economic changes and the 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, which may be instrumental for designing feasible governance models in the future.

Secondly, in terms of academic research:

- In terms of innovation policy governance ideas and trajectories, it seems that the move 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-level policy and administrative capacities (at the top of the policy-making hierarchy), which seem to be lacking in catching-up cases. The thesis argues that solutions to this problem lie in interdisciplinary analysis of innovation policy ideas and national governance realities that take into account politico-administrative characteristics and other constraints that affect national policy processes. Extending the theory of *co-evolution of technologies, industrial structure and institutions* may offer a useful perspective in this direction. This thesis has spelled out some of the crucial ideas of public administration scholarship that should be included in this perspective.

- Finally, in the light of the research by Amsden, Evans, Johnson 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 and network perspectives that have challenged the Weberian principles and historical modes of state-capacity creation. This thesis has highlighted some of the first indications of these dynamics in the context of the stylized studies of the CEE economies. Further research should verify or extend this discussion in a more empirical and detailed manner.

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SUMMARY IN ESTONIAN

Innovatsioonipoliitika valitsemine üleminekuühiskondades: teoreetilised lähenemised ja juhtumianalüüsid Kesk- ja Ida-Euroopa riikides

Käesolev väitekiri analüüsib nii teoreetilisel kui ka KIE riikide juhtumianalüüside tasemel innovatsioonipoliitika valitsemise ajaloolisi trajektoore üleminekuühiskondade kontekstis. Väitekiri otsib vastust kahele omavahel seotud uurimisküsimusele:

- Kuidas toimub innovatsioonisüsteemide lähenemises innovatsioonipoliitika teoreetiliste mudelite ülekandmine üleminekuühiskondade innovatsioonipoliitika kujundamise konteksti ja praktikasse? Kas see väljendub analüütiliselt põhjendatud tehnoloogilis-majanduslike väljakutsete defineerimises, analüütiliselt sobilike poliitika-põhiste lahenduste ning toetavate valitsemismehhanismide otsimisprotsessides?
- Milline on olnud innovatsioonipoliitika moodustavate põhiliste küsimuste - tehnoloogilis-majanduslike väljakutsete defineerimine, sobilike poliitika-põhiste lahenduste ja toetavate valitsemismehhanismide otsimisprotsessid - areng KIE riikides viimase kahe aastakümne jooksul? Kas need riigid on läbi innovatsioonipoliitika kujundanud poliitikakujundamise võimekusi, mis toetavad majanduse ümberstruktureerimise protsesse ja tehnoloogilis-majanduslikku lõimimist Euroopa Liiduga?

Väitekiri koosneb viiest teadusartiklist (**I**; **II**; **III**; **IV**; **V**) ja sissejuhatusest, mis võtab kokku ning sünteesib erinevate artiklite teoreetilise panuse ja analüüsid KIE riikide kohta. Väitekirja panuseks innovatsioonipoliitika teoreetilisse debatti on innovatsioonisüsteemide lähenemise kriitiline analüüs ning selle täiendamine avaliku halduse perspektiiviga, mis võimaldab avada poliitika ja haldusvõimekuse arengudünaamikaid üleminekuühiskondades. Väitekirja praktiliseks panuseks innovatsioonipoliitikate kujundamisse on Kesk- ja Ida-Euroopas domineeriva võrgustiku-põhise poliitikakujundamise paradigma/mudeli kriitiline ja kontekstiline analüüs.

Väitekirja sissejuhatus annab esmalt ülevaate ajaloolistest arengutest innovatsioonipoliitikaga seotud evolutsioonilistes teadusharudes (*developmental state* ja innovatsioonisüsteemide lähenemised, mida võib vaadata kui osaliselt vastandlikke alternatiive neoklassikalistele

lähenemistele), keskendudes ennekõike sellele, kuidas on mõistetud riigi rolli tehnoloogilis-majanduslikes üleminekuprotsessides. Üheks peamiseks väiteks on, et mõlemad teoreetilised lähenemised on laenanud teoreetilisi ja kontseptuaalseid eeldusi avaliku halduse distsipliinist, et selgemini avada poliitikakujundamise ja haldusjuhtimise võimekuste dünaamikaid. Kui *developmental state* lähenemine toetus ennekõike Weberliku bürokraatia printsiipidele, siis innovatsioonisüsteemide lähenemine toetub avaliku halduse lähenemistele, mis on seotud Uue Haldusjuhtimise, võrgustike ning avaliku ja erasektori koostöö põhiste poliitikakujundamise ja haldusjuhtimise perspektiividega. Samas, *developmental state* lähenemises olid avalikust haldusest üle võetud põhimõtted ja argumendid tuletatud ennekõike kontekstilise ajaloolise kogemuse põhjal ning ka lõimitud teoreetilisse arutellu. See võimaldas süsteemset arutelu tehnoloogilis-majanduslike poliitikate üle, mis hõlmas nii riigi rolli tehnoloogilis-majanduslike väljakutsete defineerimisel ning sobilike poliitika-põhiste lahenduste ja toetavate valitsemismehhanismide otsimisprotsesse. Innovatsioonisüsteemide lähenemise puhul on aga empiirilised ja teoreetilised seosed avaliku halduse lähenemisega muutunud nõrgemaks. Innovatsioonisüsteemide lähenemises levivad poliitikakujundamise ja haldusjuhtimise mudelid on tuletatud ennekõike läbi mitte-kontekstilise teoreetilise ja parimate praktikate kopeerimise. See tähendab, et innovatsioonisüsteemide teoreetilistes lähenemistes pole teadlikult (või vähemalt nii teadlikult kui *developmental state* lähenemises) keskendutud poliitikakujundamise ja haldusjuhtimise teoreetilistele tähendusele ja üleminekuühiskondade eripäradele. Seetõttu on ka innovatsioonisüsteemide kui majandusprotsesside keskse lähenemise teoreetilised ideed ennekõike seotud sobilike poliitika-põhiste lahenduste otsimisega, milles see lähenemine on teoreetiliselt selgelt tugevam, ning on nõrgemalt seotud riigi rolli lahti mõtestamisega tehnoloogilis-majanduslike väljakutsete defineerimisel ning toetavate valitsemismehhanismide mõistmisel.

Sellest probleemistikust tulenevalt pakub käesolev väitekiri välja järgnevad täiendused innovatsioonipoliitika teoreetilistesse ja KIE-põhistesse debattidesse.

Teoreetiliselt pakub väitekiri raamistiku/lähenemise avaliku halduse perspektiivi sidumiseks innovatsioonisüsteemide lähenemisega, mille alusel on innovatsioonisüsteemide lähenemist võimalik laiendada poliitika-põhiste lahenduste tasemelt ning hõlmata kõiki innovatsioonipoliitika kujundamise elemente. Innovatsioonisüsteemide ja avaliku halduse lähenemised on ühendatud läbi 'poliitikate koordineerimise' prisma, kus koordineerimise mõiste on avatud erinevatel tasemetel – riigi ja ettevõtluse vaheliste suhete, traditsiooniliste poliitikate

vaheliste ja poliitikasiseste protsesside koordineerimine. Raamistiku keskseks ideeks on, et erinevate tasemete koordineerimisprobleemid on omavahel süsteemselt seotud ning probleemide esilekerkimine (ja sobilike lahenduste otsimine) on mõjutatud nii välistest mõjuteguritest (n. innovatsioonipoliitika 'head praktikad' ja valitsemise 'head praktikad') kui ka siseriiklikest mõjuteguritest (n. olemasolev poliitilis-administratiivne kultuur ning avaliku halduse struktuurid). Sellest tulenevalt võivad innovatsioonipoliitikate kujundamise probleemid olla põhjustatud:

- Innovatsioonipoliitikate ja avaliku halduse lähenemiste teoreetilistest ebakõladest. Väitekirjas on näidatud, et innovatsioonisüsteemide lähenemised on üleminekuühiskondade kontekstis antud ebakõladest oluliselt mõjutatud.
- Innovatsioonipoliitika arenguid mõjutavate riigisiseste ja väliste mõjutegurite ebakõladest. Väitekirja alusel antud ebakõla üheks KIE riikide probleemiks, mis on tulenenud innovatsioonisüsteemide lähenemisega kaasnevast poliitikate ülekandmise ja õppimise protsessist, kus siseriiklike eripärasid kiputakse alatähtsustama.

KIE riikide juhtumianalüüside baasil võib väita, et KIE riikide innovatsioonipoliitikate kujundamine on olnud nii mitmeski mõttes paradoksaalne protsess.

- Esiteks, kuigi KIE riikide majanduspoliitika arengu alates 1990ndates võib jaotada kaheks suureks perioodiks või etapiks – Washingtoni Konsensuse institutsioonide ja EL institutsioonide mõju – siis innovatsioonipoliitika kontekstis on EL institutsioonide mõjuperiood mitmeti võimendanud Washingtoni Konsensuse ideede mõju. EL institutsioonid on KIE riikidesse toonud sisulise ja teadliku innovatsioonipoliitika (varasemat periood iseloomustas innovatsioonipoliitika mitte viljelemine kui teadlik poliitika). Samas, innovatsioonipoliitika kujundamise tunnused (tehnoloogilis-majanduslike probleemide definitsioonide ja poliitika-põhiste lahenduste ja valitsemissüsteemide kopeerimine arenenud riikide praktikatest ja/või teoreetilistest mudelitest, mis ise on tuletatud arenenud riikide kogemuste baasilt) on pigem kinnistanud Washingtoni Konsensuse institutsioonide loodud laiemat innovatsioonipoliitika trajektoori.
- Teiseks, vaatamata sellele, et KIE riigid on võrdlemisi aktiivselt üle võtnud EL tasandilt ja rahvusvahelistest praktikatest erinevaid innovatsioonipoliitika elemente ning KIE riikide innovatsioonipoliitikad on muutunud üha kompleksemaks, ei ole

sellega kaasas käinud olulisi muutusi avaliku sektori võimekustes kujundada iseseisvalt kontekstilist poliitikat. Suuresti on innovatsioonipoliitika endiselt jäänud kopeerimise protsessiks, kas probleemide defineerimise tasandil (tihti teadmatult ja tulenevalt kasutatavate poliitikakujundamise mudelite eripäradest) või lahenduste otsimise tasandil. Seda on tugevalt legitimiseerinud välised mõjutegurid (n. EL toetatud parimate praktikate võrdlemine) ja innovatsioonisüsteemide teoreetilised lähenemised, mis on teineteist tugevdava mõjuga.

- Kolmandaks, teadliku innovatsioonipoliitika esilekerkimine ning üha suurenev komplekssus on tekitanud ka riigi võimekuste paradoksi. Ühelt poolt on riigi legitiimsus rääkida kaasa tehnoloogilis-majanduslikesse protsessidesse pidevalt kasvanud, kuid samas on riigi sekkumismehhanismid jäänud väga üldiseks ning piiratud suurest universaalsete sekkumistega. Seega riigi rolli muutus on ennekõike olnud retooriline. Teiselt poolt on KIE riikide innovatsioonipoliitikate kujundamise ja haldusjuhtimise suutlikkuse arendamise protsessid toimunud rohkem välistest mõjudest kui siseriiklikest vajadustest lähtuvalt. Sellest tulenevalt on KIE riigid sattunud innovatsioonipoliitika kujundamisel üha enam keerulisse lõksu, kus riigilt oodatakse ühe enam sekkumist ja suunamist, kuid aktsepteeritud sekkumismehhanismid ja vahendid pigem takistavad riigil talle antud retooriliste ülesannete täitmist. Seetõttu toob ka riigi sekkumise katse kaasa probleeme, mille lahenduseks on olemasolevate meetmete komplekside ja valitsemisstruktuuride üha keerulisemaks muutmine. Kasvav innovatsioonipoliitikate komplekssus ei ole ennekõike mitte riigi poliitikakujundamise ja haldussuutlikkuse võimekuse näitaja, vaid ka poliitikakujundamise võimekuse ja haldussuutlikkuse nõrkuse näitaja.

Kokkuvõtlikult on väitekirjas tehtud järgnevad soovitused:

- Nii innovatsioonisüsteemide akadeemiline diskursus kui ka innovatsioonipoliitikate kujundajad KIE riikides peaksid liikuma innovatsioonisüsteemide-keskse tes lähenemistest inter-distsiplinaarsemate lähenemiste juurde, mis võtavad arvesse ka riikide poliitilis-administratiivsete süsteemide kontekstilisi erinevusi ning muutuvat ja dünaamilist rolli. Käesolev väitekiri on välja toonud avaliku halduse distsipliini võimaliku rolli laiemas innovatsioonipoliitika käsitluses.
- Üleminekuühiskondade poliitikakujundajad peaksid kriitiliselt suhtuma rahvusvahelistesse poliitikate ülevõtmise ja õppimise protsessidesse ning teadlikult täiendama neid siseriiklike

kontekstiliste õppimisprotsessidega. Samas, poliitikakujundamise muutust selles suunas takistavad nii välised mõjutegurid (EL-i suur osakaal innovatsioonipoliitikate kujundamisel ja rahastamisel) ning olemasolevate teoreetiliste lähenemiste piiratus.

- Innovatsioonipoliitikate akadeemiline diskursus peaks senisest rohkem keskenduma sellele, et mõista kuidas on neo-liberaalsete ideoloogiate ja neo-klassikaliste teooriate levik mõjutanud erinevate riikide poliitikakujundamise ja haldusjuhtimise struktuure ja institutsioone. Innovatsioonipoliitikate lähenemised peaksid ka senisest enam püüdma mõista poliitikakujundamise ja elluviimise protsesse süsteemsete ja dünaamiliste trajektooridena.

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PUBLICATIONS (Articles I – V)

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3. Education

2005	University of Tartu, Faculty of Social Sciences, Department of Public Administration, *Baccalaureus Artium* in Public Administration (4 year pre-Bologna program) Thesis: 'Inclusion of Labour Market Needs in the Higher Education Quality Assurance Processes: The Example of ICT Education'

4. Language Skills

Estonian	Native Language
English	Excellent
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5. Other Education and Research Visits

2006 – 2010	University of Tartu, Doctoral Studies in the field of Public Administration and Management

2010	Katholieke Universiteit Leuven (Belgium), Faculty of Social Sciences, Public Management Institute (2-month research visit)
2009	University College London (UK), School of Slavonic and East European Studies (2-month research visit)
2006 - 2007	Katholieke Universiteit Leuven (Belgium), Faculty of Social Sciences, Exchange student within the program of European Politics and Policies
2006	University of Iceland, Centre on Small State Studies, Summer School on Small States and European Integration
2005 - 2006	University of Tartu, Faculty of Social Sciences, Master Studies in Public Administration
2004	Universiteit Maastricht (The Netherlands), Faculty of Economics and Business Administration (Erasmus exchange student)

6. Employment

2009 -	Tallinn University of Technology, Faculty of Social Sciences, Department of Public Administration, Chair of Public Management and Policy, Research Fellow
2007 - 2009	Tallinn University of Technology, Faculty of Humanities, Institute of Humanities and Social Sciences, Chair of Public Management and Policy, Assistant
2005 - 2006	University of Tartu, Faculty of Social Sciences, Department of Public Administration, Assistant

7. Scientific projects (participation as a researcher)

2010 – 2013	Managing Innovation Policy

2008 – 2013	Public Administration and Development in Small States
2009 – 2010	Business Models of Intellectual property Based Firms. Open innovation Based Business Models and their Applicability in Estonia
2008 – 2009	Governance of executive agencies and public-private partnerships: coordination and control in the Estonian public sector
2007	Cluster Development in the Baltic Metropolises

8. Main Areas of Scientific Work

Innovation policy; Systems of innovation; Governance of innovation systems; public management reforms (all with emphasis on catching-up and developing economies)

9. Publications

Karo, Erkki; Kattel, Rainer (2011). Coordination of innovation policies in the catching-up context: A historical perspective on Estonia and Brazil. *International Journal of Technological Learning, Innovation and Development*, xxx - xxx. [in press]

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	Lõputöö: Tööturu vajadustega arvestamine kõrghariduse kvaliteedi tagamise protsessides Eesti IT hariduse näitel

4. Keelteoskus

Eesti keel	Emakeel
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Vene keel	Kesktase
Prantsuse keel	Kesktase

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6. Töökogemus

2009 -	Tallinna Tehnikaülikool, sotsiaalteaduskond, avaliku halduse instituut, haldusjuhtimise ja halduspoliitika õppetool, teadur
2007 - 2009	Tallinna Tehnikaülikool, humanitaarteaduskond, humanitaar- ja sotsiaalteaduste instituut, haldusjuhtimise ja halduspoliitika õppetool, assistent
2005 – 2006	Tartu Ülikool, sotsiaalteaduskond, avaliku halduse osakond, assistent

7. Teadustegevus (osalemine teadusprojektides)

2010 – 2013	Innovatsioonipoliitika juhtimine
2008 – 2013	Avalik haldus ja areng väikeriikides
2009 – 2010	Innovaatiliste ettevõtete intellektuaalomandil põhinevad ärimudelid. Avatud innovatsioonil

	põhinevad ärimudelid ja nende rakendusvõimalused Eestis
2008 – 2009	Täidesaatvate agentuuride ning avaliku- ja erasektori koostöö valitsemine: koordinatsioon ja kontroll Eesti avalikus sektoris
2007	Klastriarendus Balti mere regiooni suurlinnades

8. Teadustöö põhisuunad

Innovatsioonipoliitika; innovatsioonisüsteemid; innovatsioonisüsteemide valitsemine; avaliku halduse reformid (kõik rõhuasetusega arengu- ja siirderiikidele)

9. Publikatsioonid

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14. Erkki Karo. Governance of Innovation Policy in Catching-up Context: Theoretical Considerations and Case Studies of Central and Eastern European Economies. 2010.