
Public policy, governance and innovation: entrepreneurial states in East Asian economic development

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Abstract: The analytical framework presented in this paper addresses the transitory character of the East Asian developmental states. It argues that the specific governance pattern of an entrepreneurial state combines the exercise of governmental entrepreneurship with distinct institutional, structural and spatial dimensions in coping with evolving techno-economic paradigms. The notion of the entrepreneurial state thus highlights the role of the state in shaping and coordinating national innovation systems. In conclusion, the transition to the institutional set-up of entrepreneurial states constitutes the major developmental challenge for the East Asian economies.

Keywords: developmental state; entrepreneurial state; national innovation system; governance; innovation; techno-economic paradigm; East Asia; catch-up growth; economic development.

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1 Introduction

The role of governance and public policy in the rapid growth of the East Asian economies has been subject to persistent discussions. A key issue in these debates has been the concept of the 'developmental state', which was originally dedicated to frame research on the institutional foundations of the Japanese development trajectory yet soon came to be refined in order to include comparative analyses of East Asian development.

Still, in coping with the character of the corresponding developmental transformations, the matter of technological innovation requires further clarification. Indeed, the capability for generating novelty by combining both localised and globalised resources becomes essential for sustaining economic development as the East Asian economies approach the technological frontier. In that context, institutionalist positions on the co-evolution of institutions and technology, as put forward in the systems of innovation approach, explore the developmental impact of institutional networks in the generation and assimilation of new technologies. Yet, despite references to the impact of governance and public policy in determining the performance of national innovation systems, this approach lacks robust concepts in exploring the corresponding role of the state.

In confronting these problems, the analytical framework presented in this paper originates from a distinctly Schumpeterian perspective on entrepreneurship and innovation. The entrepreneurial function is defined by the introduction of technological novelty into an economic system, focussing on epochal innovations with economy-wide effects. Its articulation is subject to historically specific institutional constellations, as even government may carry it out temporarily. Owing to the transitory setting of developmental states, a specific pattern of governance evolves when the exercise of governmental entrepreneurship is combined with the generation of innovations. This constellation characterises the rationale of an entrepreneurial state. It is based on modes of coordination between private and public sector that shape the developmental efforts in generating and absorbing new technology, highlighting political leadership, institutional learning and the evolution of innovation capabilities.

The paper proceeds as follows: First, Current debates on the concept of the developmental state are taken to the fore, underlining the role of governance and public policy in the industrial transformation of the East Asian economies as they close the technology gap in catch-up growth. Second, As a complementing institutional perspective on East Asian development, the systems of innovation approach is introduced with special consideration to the role of the state in shaping and coordinating the institutional networks in which innovation processes are embedded. Third, The concept of the entrepreneurial state is presented, pinpointing the transitory character of the East Asian developmental states and the reconfiguration of the related national innovation systems as they need to cope with developmental tasks that involve both the assimilation and generation of novelty.

2 Beyond the East Asian miracle: innovation and the developmental state

The role of government in the rapid growth of the East Asian economies has been subject to persistent discussions on the relationship between states and markets in transforming industrial structures and promoting further developmental efforts. Especially, the World Bank's 1993 policy research report on the so-called 'East Asian Miracle' has provided influential arguments on the role of government and public policy in East Asia – in particular, highlighting the development experience of the 'Four Tigers', namely, South Korea, Taiwan, Hong Kong and Singapore (World Bank, 1993, p.xvi). It suggests that private investment and human capital have served as engines of growth, combined with allocative efficiency and technological catch-up framed by a stable macroeconomic and legal framework. Growth-promoting market interventions in the domain of industrial policy are addressed as wide-ranging components of coherent public policies with clear

cost-benefit considerations and performance criteria, thus considerably moderating ensuing market price distortions (World Bank, 1993, pp.5–8). Capital accumulation, resource allocation and technological catch-up are identified as functions of economic growth, which have been promoted by a mixture of competitive market processes and supporting public policies (World Bank, 1993, p.10n). Accordingly, even in acknowledging the role of public policies as determinants of the East Asian growth dynamism, the matter of competitive discipline stands out, as exercised by both market competition and the contest-based practice of selective interventions (World Bank, 1993, pp.87–89). Thus, according to the World Bank, the institutional basis for economic growth is associated with government-business relations, in particular, with regard to promoting policy regulations concerning income distribution, the establishment of business-friendly institutional environments and the use of deliberation councils that serve the communication between state and private sector (World Bank, 1993, p.13n). Although the Asian financial crisis exposed these assessments to further qualifications, the corresponding impact of public policy in facilitating catch-up growth has been reaffirmed, even though the call for liberalising reforms has become hegemonic (Stiglitz, 2001, p.519n).

Related with these policy aspects yet distinct in its conceptual implications, the matter of innovation in that growth process has remained at stake, upholding doubts on the sustainability of the East Asian development pattern. Indeed, it has been argued with reference to neoclassical growth theory that rapid growth in East Asia is not sustainable, for the causal accumulation of input factors is subject to diminishing returns, whereas a sustained increase in per capita income requires a rise of output per unit of input through technological advance (Krugman, 1994, p.70n). Yet several methodological problems apply with regard to the principal concept of total factor productivity as a residual open to interpretation while allegedly mirroring the efficacy of industrial policy (Felipe, 1999, p.24n). Moreover, specific styles of governance and public policy have been largely neglected as groundwork of industrial policy in the World Bank report on the East Asian Miracle. Yet, they have informed institutionalist theorising (Rodrik, 1994, pp.42–44).

Related explorations into the conceptualisation of the role of the state for industrial policy in the East Asian context combine Schumpeterian and Gerschenkronian arguments. Schumpeter modelled economic development as an evolutionary process, driven by the entrepreneurial introduction of innovation in an established economic setting. This entrepreneurial function is carried out by historically specific agents whose leadership position enables them to enforce change by introducing novelty, which means that even government may temporarily carry out the entrepreneurial function (Schumpeter, 1926, p.111n). Such an exercise of the entrepreneurial function by organs of the state points primarily to interventions in the economic process, basically by setting up public enterprises in certain industries that proceed with the introduction of innovations. Moreover, an entrepreneurial conditioning of the economic process by means of the restructuring of institutional and physical infrastructures could become relevant for stimulating entrepreneurship in the private sector as a sustainable policy variant (Schumpeter, 1939, p.235).

This Schumpeterian line of reasoning inspired further reconsiderations of the relationship between institutional and technological change in the catch-up growth of less-developed economies. The corresponding catch-up hypothesis suggests that backwardness in terms of productivity levels implies a potential for rapid growth, expressed by an inverse relation between initial levels and growth rates of productivity

that reflects the degree of obsolescence of technology embodied in the capital stock in comparison with the technological frontier. The productivity gap could be reduced by the focused assimilation of new technologies (Abramovitz, 1986, p.386n). This perspective is intimately related with Gerschenkron's notion of late industrialisation and its perception of the state as an entrepreneurial agency in the making and shaping of markets. Gerschenkron identified a specific pattern of industrialisation in backward economies, characterised by a constellation of dispersed capital, lacking entrepreneurial talent and pressures for industrial centralisation that induces banks to propel industrialisation by organising large enterprises and cartels fit to manage large-scale technology transfers from advanced economies. Government could carry out entrepreneurial functions in the stimulation of economic development by mobilising and coordinating the use of industrial and financial resources to the benefit of large-scale production, thus contributing to the realisation of increasing returns (Gerschenkron, 1962, p.14n). In summary, Gerschenkron's approach suggests that socio-economic underdevelopment may require government entrepreneurship as a substitute for a lack of markets and entrepreneurial capabilities in the private sector. These topics have emerged as decisive features of the ensuing explorations into the institutional foundations of the East Asian development experience.

A key issue in the underlying debates on the impact of public policy on economic growth is provided by the concept of the 'developmental state', as informed by Chalmers Johnson's research on Japanese industrial policy. Johnson maintains that the regulatory function of states in Western economies that pioneered industrialisation focuses on rules governing the economic process, whereas states in late industrialising economies such as Japan exhibit a developmental function, as they lead the drive for industrialisation. Accordingly, the economic policy of regulatory states with their market-rational orientation differs markedly from that of developmental states, which is oriented at plan-rational, goal-oriented strategies for enhancing industrial competitiveness by the means of administratively guiding industries and markets (Johnson, 1982, p.19n). Industrial policy is differentiated in terms of industrial rationalisation policy, addressing the productive organisation within firms and industries, and industrial structure policy as the decisive format that addresses support for selected industries that are to be nurtured or restructured (Johnson, 1982, p.27n). As exemplified by Japan's former Ministry of International Trade and Industry, the quality of these policies is reflected by the coherence of the economic bureaucracy, which is in close contact with large enterprises of the private sector while keeping its relative autonomy from interest groups (Johnson, 1982, p.20n). Indeed, public – private cooperation may sustain developmental dynamism by implementing market-compatible policy instruments like the selective access to government-administered financial resources (Johnson, 1982, pp.309–311). These relationships are still subject to reconfiguration and bargaining in the context of various platforms, such as the deliberation councils, which allow for communication and knowledge flows (Johnson, 1982, p.312n). In summary, Johnson's model of the developmental state entails an elite bureaucracy in carrying out industrial policies, a political system that allows for the relative autonomy of bureaucracy vs. legislative and judicial organs, based on an orientation towards market-conforming interventions and administrative guidance (Johnson, 1982, pp.315–319). Yet, developmental states exhibit a transitory character, for the notion of the developmental state covers only a fraction of state functions, which may also contain aspects of welfare states, among others.

The functional priorities of states thus determine their institutional essence while following situational imperatives (Johnson, 1982, pp.305–307).

The functional imperative of catch-up growth is also decisive for Amsden's approach to the role of the state in late industrialisation, perceived as a process that is not based on the generation of radical innovations, but on gradual upgrading and learning how to improve technology already in use abroad (Amsden, 1989, p.3n). Pinpointing the case of South Korea, the argument proceeds that next to institutional factors like organisational capabilities and human resources, an interventionist developmental state matters most in promoting late industrialisation – basically implementing performance standards on private firms, which receive subsidies in a reciprocal relationship (Amsden, 1989, p.8). The allocation of subsidies contributes decisively to the entrepreneurial role of government in making decisions on productive activities (Amsden, 1989, p.143n). The state then shapes market processes by providing incentives for investment and exports, thus deliberately getting the prices wrong (Amsden, 1989, p.13n). The entrepreneurial function of government is accordingly carried out by means of strategic planning, with entrepreneurship defined as deciding on production and innovation (Amsden, 1989, p.79n). South Korean development then invokes government as pro-active visionary in industrialisation, as illustrated by the promotion of heavy industries in the 1970s (Amsden, 1989, p.80n). Still, the process of state-guided adaptive technological learning in late industrialisation may face stagnation as soon as the technology frontier is approached without the formation of local innovation capabilities (Amsden and Hikino, 1993, p.259). Thus, the transitory character of the developmental state reflects its relative success in moving towards the technological frontier.

In elaborating on the institutional underpinnings of these processes, Wade's 'Governed Markets' approach addresses developmental jumps in the catch-up growth of Japan, South Korea and Taiwan, which have recently become members in the 'club of innovators' that dominates the global economy (Wade, 1990, p.3n). Their rapid improvement of per capita income levels during the post-war decades has been driven by concentrated investment in strategic industries, stimulated by economic policies that provide rules and regulations for governing the market processes of resource allocation. As exemplified by Taiwan, the corresponding attempts in leading the market by political means locate innovative initiatives within the domain of government, which then stimulates the private sector to follow its leadership position (Wade, 1990, p.28n). However, this rather hierarchical mode of industrial policy has recently given way to a more cooperative approach with technology upgrading since the 1980s, involving an intensified participation of the large enterprise segment of the local private sector that parallels established policy links with foreign capital (Wade, 1990, pp.276–278). Problems of foresight and planning in catch-up growth are confronted by learning strategies in public policy, involving the study of the national policies of leading as well as competing countries – with Japan as role model (Wade, 1990, p.334). In assessing the developmental potential of specific industries, various indicators have been applied, also following Japan's MITI. In particular, income elasticities of demand for selected goods in the markets of industrialised countries were scrutinised, accompanied by diverse technology assessment measures, in order to identify specialisation patterns (Wade, 1990, p.335n). Governing markets thus requires not only institutional capacity for inducing industrial evolution, but also shared knowledge regarding the developmental tendencies of the global economy and its technological underpinnings.

In elaborating on these requirements, Evans emphasises the transformative role of the state in industrial evolution, eliciting entrepreneurship and facilitating innovation capacities (Evans, 1995, p.5n). State capacity serves as the basis for the policy strategies of developmental states, which foster entrepreneurial perspectives in the long term by promoting transformative investments and lowering associated risks (Evans, 1989, p.562n). Moreover, developmental states advance distinct developmental projects whose entrepreneurial character in terms of social leadership implies that they reach beyond established political demands (Evans, 1995, p.248). However, as these projects cope with the dynamism of capital accumulation, their implementation calls for close connections with the private sector (Evans, 1989, p.569). The corresponding institutional set up of developmental states is based on a Weberian type of bureaucracy, yet it is not completely insulated from society, but rather embedded in social relationships that allow for continuous state – society negotiations. ‘Embedded autonomy’ then marks the internal organisation of developmental states and their capacity of industrial transformation (Evans, 1995, p.12). In this framework, specific entrepreneurial roles of the state are differentiated. ‘Midwifery’ denotes the role of the state in promoting the formation of entrepreneurial ventures in the private sector, whereas ‘husbandry’ points to the persistent need of assisting private sector entrepreneurship (Evans, 1995, p.13n). Public–private symbiosis then generates the synergies required for technological upgrading and the establishment of a high-technology industry that is competitive on international markets (Evans, 1995, pp.146–149). However, these transformations feedback upon the state itself, for the actors that emerge from the policy-related state interventions tend to recreate the underlying conditions of their activity – which is most relevant in terms of the shifting balance of powers among the social forces and their political articulation (Evans, 1995, p.226). In particular, the South Korean case suggests that successful industrial transformation makes industrial capital less dependent on the state, thus allowing for a reconfiguration of government-business networks (Evans, 1995, p.230n). Therefore, the reconstructive self-transformation of the transitory developmental state mirrors an increasing complexity of the socio-economic domain with further consequences for the development process (Evans, 1995, p.234).

This line of reasoning is taken up by Linda Weiss in an attempt to refocus on the strategic interdependence between government and private business sector. Weiss argues that the decisive economic aspect of state capacity is transformative capacity, that is, the ability to coordinate industrial change in accordance with the changing conditions of international competition, based upon the governance of domestic linkages (Weiss, 1998, p.7n). The underlying industrial-technological transformation of an economy involves the capacity for generating and absorbing innovations. Thus, international competition becomes a generalised process of innovation-driven attempts in persistently keeping up with technological grounds, fuelled by efforts in identifying and defining technological trajectories (Weiss, 1998, p.66n). As exemplified by East Asian development, the corresponding mode of governance involves a ‘catalytic state’, usually acting in cooperation with the private sector while exercising negotiated leadership in the coordination of policy networks that support technological upgrading and innovation (Weiss, 1998, p.67). In particular, the Japanese post-war development state is viewed as example of ‘governed interdependence’ between an insulated state, exercising leadership through consultation and coordination, and an organised private sector as strong partners in tightly structured negotiations, reflecting institutionalised cooperation on industrial change (Weiss, 1998, p.38n).

Transformative capacity then implies that government-business cooperation is subject to adaptation over time, with different forms coexisting in a dynamic institutional setting that exhibits the capacity to absorb external pressures by generating new means for governing industrial transformation (Weiss, 1998, p.43n). Accordingly, the East Asian developmental state is subject to a country-specific transformation with state capacity approaching a less hierarchical mode of coordination that relates to ongoing changes in the economic setting (Weiss, 1998, p.64n). Globalisation then involves an institutional transformation of the state towards a catalytic role in the progression of internationalisation and regional integration (Weiss, 1998, p.195n). Thus, in the East Asian countries the developmental motive of catch-up growth is gradually replaced by a strategic concern with continuous technological upgrading in an internationalising competitive setting (Weiss, 2000, p.22). However, an acknowledgement of the transitory character of the developmental state necessitates reviewing its role in the institutional setting of technological innovation beyond the mere reasoning on the rationale of industrial policy. In particular, the institutional networks among agents from the private and public sector, labelled as systems of innovation, which are embedding policy efforts in the promotion of industrial transformation need to be taken to the fore. Moreover, technological change evolves under the influence of diverse economic, political and social factors. It takes the directed shape of trajectories that delineate developmental opportunities. Thus, understanding the role of the state in promoting innovation-driven growth, as exemplified by the East Asian development profile, requires a reconsideration of the involved national innovation systems as manifestations of country-specific responses to changing technological conditions. In other words, the concept of the developmental state is in need for a complementing theory of innovation.

3 Systems of innovation and the nation-state

Innovation as a social process requires complex institutional arrangements that are well reflected by the interdependence of institutional settings and industrial structures (Chang, 1999, p.186n). Addressing these topics, the systems of innovation approach examine the developmental impact of institutional networks in the generation and assimilation of innovations within a territorial setting. Remarkably, while reflecting innovation-related problems of economic growth and unemployment in the OECD economies since the 1970s, this approach was originally presented in an elaborate format to tackle the institutional foundations of Japanese technology policy, in particular highlighting the role of MITI, company R&D, education and training schemes as well as industrial structures as components of the Japanese innovation system (Freeman, 1987, p.4). In dealing with the technological and institutional problems of catch-up growth, the systems of innovation concept thus rings not only a Schumpeterian tone but resembles also Gerschenkronian motives. Still, it emphasises a more gradual vision of economic development as an evolutionary process based on continuous learning in the formation of productive capabilities (Freeman, 2002, p.201n). It is this emphasis on innovation and learning that informs a corresponding criticism of the World Bank's policy analyses of East Asia, which are allegedly underrating the role of technological and institutional change (Freeman, 2002, p.203n).

In particular, the systems of innovation perspective suggests that additional to firms as a principal terrain for innovation, further institutional elements such as R&D facilities, education and training programmes as well as patent systems are to be taken to the fore.

Freeman's pioneering definition characterises a system of innovation in a broad sense as the network of institutions in the private and public sector whose activities and interactions initiate, import, modify and diffuse new technologies (Freeman, 1987, p.1). Lundvall highlights knowledge as a fundamental resource in economic development and learning as the most important underlying process, embedded in a specific institutional context. Systems of innovation then consist of the elements and relationships, which interact in the evolution of economically useful knowledge (Lundvall, 1992a, p.1n). Apart from these institutionalist propositions, however, the systems of innovation approach reflects structuralist, evolutionary and neo-Schumpeterian lines of reasoning (Ebner, 1999, p.143n).

The structuralist strand focuses on the notion of user-producer relationships which describes modes of cooperation between producers and users of certain new technologies, products and applications, in which demand-sided user needs and the supply-sided technological opportunities are communicated by means of inter-firm linkages. These relationships may form processes of interactive learning and thus contribute to continuous knowledge generation and diffusion, primarily relevant for the case of product innovations (Lundvall, 1992b, p.47n). Industrial structures and the institutional set-up of an economy then determine the shape and performance of an innovation system whose structural constellations articulate an entrepreneurial potential (Andersen and Lundvall, 1988, p.19n). At this point, the evolutionary perspective on systems of innovation underlines the generation, transmission and selection of novelty, for technological change is characterised as an evolutionary process based on the systemic introduction of novelty, which increases diversity with an innovation system (Edquist, 1997, p.6n). In institutional terms, this implies that the selective roles of both markets and the socio-political domain are addressed, involving the impact of public policy (Nelson and Rosenberg, 1993, p.4n).

The neo-Schumpeterian research agenda views these aspects in the context of techno-economic paradigms, that is, it relates the institutional and technological dynamism of economic change with a technology-driven cyclical development pattern. Techno-economic paradigms are defined as ideal types of productive organisation. Their diffusion enforces a comprehensive technological and institutional restructuring, reflecting a conflict-ridden adaptation of the institutional set-up to the requirements of the dominant paradigm. National innovation systems provide the institutional means for coping with those paradigm changes and thus for defining a country's position in the hierarchy of the global economy, as the international division of labour is characterised by the technological leadership of those countries which are best equipped for meeting the techno-economic paradigm requirements, thus shaping the conditions of catch-up growth that are to be met by developmental competitors. Historical examples are late industrialising economies such as Germany and Japan, whose particular trajectories of catch-up growth in the 19th and 20th century followed the lead of Great Britain and the USA (Freeman, 2002, p.193n).

As institutional configurations are used for delineating the specificity of a system of innovation in terms of its territorial range, the dimension of national systems has excelled owing to the position that the most relevant level of economic order, innovation-related interactions and related market activity is constituted by the nation-state framework. Indeed, it is common sense within the systems of innovation approach that the policies of national governments, national laws and a shared culture delineate an institutional arena that affects the intensity and direction of technological innovation

(Nelson and Rosenberg, 1993, p.16). Corresponding efforts in comparative institutional analysis may be associated with a general interest in the diversity of national models of capitalist development and the institutional foundations of advantages in their innovation patterns (Hall and Soskice, 2001, p.38n). The reconstruction of institutional characteristics even allows for stylising distinct types of national innovation systems. Examples are 'myopic' and 'dynamic' types of national innovation systems. Myopic systems are archetypical for the USA and the UK with short-term modes of technology investment, as compared with dynamic systems of innovation in late industrialising countries like Germany and Japan, which tend to recognise the long-range character of technological investment by complementing market processes through specific policies for technological learning (Patel and Pavitt, 1994, p.91n). An associated proposal distinguishes creative and adaptive systems of innovation, referring to the dominant mode of coping with changing techno-economic paradigms. Adaptive response highlights a mere adaptation to perceived paradigm requirements, whereas creative response allows for an entrepreneurial penetration of the paradigm itself (Ebner, 2000b, p.89n).

However, the national character of innovation systems seems to give way to the evolution of regional or supranational systems of innovation beyond the nation-state; a tendency that allows for a reconsideration of the relevance of national institutions in technological innovation (Nelson and Rosenberg, 1993, p.17n). Yet despite its relativisation, economic and political modes of interaction on the national level remain essential, for the policy competence of nation-states may be paralleled yet not substituted by local, regional or supranational levels of interaction (Freeman and Soete, 1997, p.315). The nation-state as an institutional form that is endowed with unparalleled competencies in policy-making and public good supply, ranging from law enforcement via basic education to welfare provision, thus promotes the persistence of national innovation systems as terrains of interactive learning and capability formation (Lundvall, 1992a, p.15n). Even in the particular context of technological globalisation, the impact of national innovation systems through national regulations and policy strategies is to be reckoned with (Pavitt and Patel, 1999, p.113n). Innovation policies remain important, for they provide both legal environments and policy-related incentives, involving subsidisation as well as taxation, in promoting innovation-oriented activities of the private sector (Mani, 2002, p.29n). Yet the internationalisation of innovation-oriented interactions reflects a reconfiguration of national innovation systems towards international openness and market services (Galli and Teubal, 1997, p.348n). In accounting for the differentiation of these institutionalised interactions, then, national systems may be perceived as segmented institutional layers of national, regional, local and sectoral ensembles – all of them representing particular forms of innovation-oriented logic that is mediated and coordinated by the nation-state. Consequently, national innovation systems are increasingly subject to multi-level governance, based on an increasing complexity of institutional patterns. Besides, tendencies of structural convergence may even promote a further institutional divergence of national innovation systems (Amable et al., 1997, p.5n).

This perspective provides common ground for proponents of the viability of developmental states – not only owing to the fact that an emphasis on the national specificity of development strategies belongs to the theoretical foundations of both the systems of innovation approach and the theory of the developmental state (Freeman, 1995, p.5n; White and Wade, 1988, pp.1, 26). This is most relevant in the portrayal of the state in late development as a 'historical animateur' of economic change,

framed by the ideology of developmentalism as a national project of industrialisation (White and Wade, 1988, p.1). Reflecting these considerations, Wade emphasises that national systems of innovation persist in variety, driven by nation-specific constellations of government that contribute to the generation of social norms and legal rules which mould the articulation of entrepreneurship and its impact on the development process (Wade, 1996, p.85). Nonetheless, the question of the actual role of the state in the evolution and performance of national innovation systems remains open to further consideration. Generally, the developmental aspects of the state in the formation of national innovation systems in late industrialising countries are acknowledged. Still, as in Freeman's pioneering analysis of the Japanese innovation system, it is the strategic pursuit of developmental long-run goals by the means of industrial policy rather than the institutional dimension of that policy which is addressed (Freeman, 1987, pp.33–35). This accords with recent advances in theorising on innovation policy from a system of innovation perspective, which focus on a systemic level of institutionalised interactions among organisational actors without an explicit reconsideration of state functions and policy capacity (Edquist, 2001, p.55n). At least with regard to the aspect of interactive learning certain refinements have been put forward by pointing to the role of the state in an emerging 'learning economy'. The corresponding 'didactic role' of the state underscores the need for promoting interactive learning on the level of firms and industries, involving the fostering of cooperative relationships in the context of industrial restructuring (Dalum et al., 1992, pp.307–309). Innovation systems thus include governance structures for handling the distinction between public and private goods in a manner that is supportive of economic growth (Lundvall et al., 2002, p.222).

Even with regard to the more specific problems of technological change in catch-up growth, the role of the state in national innovation systems is basically confined to the provision of public goods. Concerning the design of policies for the support of innovation and technology assimilation, thus, Nelson outlines three distinct roles of government: first, the support of basic and applied sciences, as well as scientific and technical education; second, government procurement, especially regarding military demands; third, the promotion of technological competence in firms and industries (Nelson, 1984, p.657). Yet, at least with regard to the aspect of industrial policy, the rationale of the developmental state is implicitly acknowledged, as government should refrain from comprehensive efforts in development planning and rather implement selective industrial policies, accompanied by public entrepreneurship and related government initiatives in carrying out strategic investment (Nelson, 1990, p.46n). In this framework, the responsiveness of policy programmes to the productive needs of the private sector stands out as a major requirement for implementing efficient development strategies, especially with regard to the public provision of resources for R&D (Dahlman and Nelson, 1995, p.119n). Furthermore, the assimilation of new technologies in catch-up growth requires an implementation of matching social technologies, involving comprehensive institutional reconfigurations (Nelson, 2004, p.370n). As pointed out in the conceptualisation of developmental states, it is the state itself which plays a decisive role in the design, modification and implementation of these social technologies – for instance, regarding education and training systems that provide the means for technology assimilation. Related components include legal systems that specify property rights and public enterprises that may stimulate knowledge transfers.

Therefore, the state plays a decisive role in the creation and maintenance of the diverse institutional ensembles that constitute a national innovation system; an aspect that is yet to be acknowledged in the related analytical approach. Directly or indirectly, this applies to all the decisive characteristics attributed to the East Asian systems of innovation in catch-up growth: an expanding education system with an emphasis on tertiary education and engineering, a rapid growth of business in-house R&D, a share of industrial R&D above 50% of gross expenditures on R&D, a rapid development of science and technology infrastructures, heavy investment in advanced telecommunications (Freeman, 1996, p.178). Still, national diversity needs to be taken into account. South Korea's industrial structures has been dominated by locally owned large enterprises and intense government intervention; Taiwan's structural pattern of small local enterprises and large foreign enterprises has been accompanied by comparatively lower degrees of government intervention; Hong Kong has also exhibited a dominance of small local enterprises and large foreign enterprises, accompanied by low degrees of government intervention yet high degrees of international openness; Singapore has been dominated by large foreign enterprises and government-linked enterprises, combined with high degrees of government intervention and international openness (Hobday, 1995, p.196n). Yet, an exposed role of government applies not only to the East Asian economies. Historically, it is decisive for understanding phenomena such as the catch-up growth of Germany in the 19th century – highlighting the public promotion of technology assimilation through institutional provisions (Freeman, 1995, p.6n).

Yet, the developmental state is not only crucial in the coordination of industrial investment to promote economic change. Reflecting the entrepreneurial dimension of the developmental state, it is also decisive in the provision of a developmental vision as a consensual project as well as in the implementation of that vision through institution-building in support of private sector entrepreneurship, accompanied by the political management of conflicts among interest groups (Chang, 1999, pp.192–197). It follows that developmental states and national systems of innovation co-evolve in a dynamic setting of institutional variety – with the latter representing a key determinant of innovation performance (Ebner, 1999, p.162n). Still, the provision of a coherent set of industrial policies that are in accordance with a promising developmental vision becomes ever more difficult as technology gaps are reduced which implies that the trajectories of the catching-up economies cannot rely any more on following the development path of the leading economies. Instead of absorbing established techno-economic paradigms, it becomes necessary to shift emphasis towards the entrepreneurial generation of paradigmatic novelty, based on adequate policy frameworks for doing so. Indeed, as outlined by Freeman, the decisive problem for research on innovation and economic development is the matter of forging ahead, based on the congruence of the various sub-systems of evolving national innovation systems; a process that is currently influenced by the global diffusion of information and communication technologies with their specific network patterns and spatial differentiations (Freeman, 2002, p.208n).

In this constellation, experimentation and learning represent distinct entrepreneurial activities that involve both states and markets as entrepreneurial terrain in reducing uncertainty and coordinating economic change (Chang and Kozul-Wright, 1994, p.862n). Even from the point of view of the Austrian market process theory, usually a hotbed of anti-interventionist sentiments, the matter of the entrepreneurial state is introduced by arguing that governments may act as entrepreneurs when their agents exercise alertness in the discovery of development opportunities (Yu, 1997, p.51). Nonetheless, in coping with

that matter, the Schumpeterian perspective with its emphasis on paradigmatic innovation and social leadership as manifestations of a historically specific entrepreneurial function provides most promising arguments (Ebner, 2005, p.267n). The underlying reasoning suggests that entrepreneurial aspects of state activity that had been already prevalent with the East Asian developmental states currently turn out as dominant policy features, thus changing the dominant rationale of government towards an entrepreneurial direction that implies a shift from the developmental assimilation of techno-economic paradigms to their entrepreneurial creation. Augmenting the developmental state discussion with a reconsideration of the paradigmatic dynamism of technological innovation while bringing the state in to the systems of innovation approach then allows for conceptualising a Schumpeterian notion of the entrepreneurial state that addresses decisive challenges for East Asian development.

4 The rise of the entrepreneurial state: challenges for East Asian development

The current World Bank policy discussion on East Asian development highlights the promotion of innovation as means for enhancing productivity, based on strengthening public-private interactions, local coherence and international connectedness of the national innovation systems, while claiming that major policy challenges relate to how East Asian countries cultivate creativity within their economies (Yusuf et al., 2003, p.29). This challenge mirrors the pattern of late industrialisation, as latecomer firms enter the international product life cycle in the phase of standardisation, reversing its usual sequence, until they approach the phase of fully developed productive capabilities, including R&D activities (Hobday, 1995, p.40n). Firms in industrialising economies then also reverse the pattern of technological trajectories that is associated with developed economies (Kim, 1999, pp.112–115). Yet, this implies not mere imitation, for already the assimilation of technology entails entrepreneurial activities, as new and uncertain economic areas are explored (Odagiri and Goto, 1996, p.2n). Indeed, the assimilation of technologies already employed elsewhere also involves elements of innovation, risk-taking and learning as crucial attributes of entrepreneurship (Nelson and Pack, 1999, p.432). Therefore, in approaching the technological frontier, the articulation, intensity and content of entrepreneurial effort become ever more knowledge- and science-intensive, building on established capabilities.

The state has a major role to play in the corresponding stimulation and coordination of these technological capabilities, for their evolution is embedded in nation-specific institutional frameworks (Lall, 2000, p.14). Consequently, although imitation may demonstrate corporate creativity in safeguarding competitive advantages, it is still mandatory that the corresponding development trajectories are sustained by further entrepreneurial impulses regarding the evolution of technological capabilities in R&D and product innovation – with public policy as a major factor in their formation (Hobday, 1995, p.200n). Yet, institutional deficits of innovation in East Asia primarily result from underdeveloped physical and knowledge infrastructures in the science and research systems, which are accompanied by a shortage of organisational capabilities in the generation of innovations with a commercial orientation (Dodgson, 2000, p.402n). Moreover, beyond the institutional domain of organisational structures and formal rules, innovativeness depends also on local demand as well as on societal tolerance of

entrepreneurial failure, that is, it depends on the orientation of social norms and conventions (Yusuf and Evenett, 2002, p.181n). Accordingly, as entrepreneurial skills and technological capabilities are embedded in historically rooted institutional patterns, their design and manipulation by policy measures remain constrained in the prevailing cultural context (Ebner, 2000a, p.370).

However, in the context of industrial maturing and diversification in the East Asian industrialised economies, the rationale of industrial policy shifts from resource mobilisation in support of industrialisation to the building of science and technology infrastructures, accompanied by efforts in the deregulation of markets – yet with a persistent role of government as a stimulating and facilitating factor (Amsden, 1995, p.27n). Sustaining competitiveness then implies a continuous technological upgrading towards high-tech sectors – involving aspects of institutional change, industrial upscaling and agglomeration economies, as exemplified by the case of Taiwan (Amsden and Chu, 2003, p.1n). As government support of R&D in latecomer economies is usually closer to applied research and product development, the tendency of expanding efforts in science-intensive basic research is especially eminent (Amsden and Chu, 2003, p.162n). Increasing uncertainty in approaching the technological frontier also affects the financial aspects of innovation, for the availability of diverse funding schemes, in particular, regarding venture capital funds and the promotion of high-risk investment in novel technologies becomes a requirement (Beeson, 2004, p.35n). Yet, the capacity for responding to these challenges remains tied to the institutional specificity of national development trajectories and the underlying political and economic forces. For instance, it may be argued that Korea's state capacity had been dismantled already during the 1990s, hence the collapse of the developmental state during the Asian financial crisis in 1997, whereas the Taiwanese state had persistently kept its capacity in promoting technological learning, accompanied by a state-guided internationalisation of industrial structures (Wade, 2000, p.12).

In addressing these tendencies, the theory of the developmental state has become subject to various modifications. For instance, it is argued that the developmental state undergoes a transformation towards a new rationale in coping with staying ahead of or keeping up with international competitors, in particular, by assisting in industrial restructuring. A more gradual and continuous mode of upgrading skills and technologies is at stake – as witnessed by the maturing of Japanese and Taiwanese industries whose restructuring is guided by strategic policies, which resemble the rationale of a 'transformative state' (Weiss, 2000, pp.27–29). Related arguments suggest that Gerschenkronian patterns of state intervention to overcome market failures in technological learning during the early phases of industrialisation give way to a market-based economic order, which is still hindered by institutional inertia. As exemplified by the East Asian countries, the ideal type of a 'transitional developmental state' then balances state autonomy and private sector dynamism in a manner that allows for such a transition from interventionism to liberalisation – which need not entail a retreat of the state but even its strengthening with regard to the enforcement of the market order (Wong and Ng, 2001, pp.43–47). In associated terms, developmental and regulatory state functions are differentiated. The 'neo-developmental state' for high-tech industries copes with the promotion of competitive economies of scale, the support of industrial R&D and employment creation in industrial change, complemented by the 'regulatory state' for liberalised services, governing competition and international openness (Amsden and Chu, 2003, pp.167–172). Moreover, the

rationale of government shifts towards locational policies in support of industrial networks and technology-intensive interactions – resembling a pattern of state-led networking (Amsden and Chu, 2003, p.15n).

This position coincides with the wide-spread advocacy of policy strategies that combine the assimilation of information and communication technologies with efforts in deregulation as a means for promoting innovation capabilities, settled in the interaction patterns of industrial clusters and international networks (Masuyama and Vandenbrink, 2001, p.40n). The combined locational and technological aspects hint at the impact of globalisation as a constraint on the developmental state. Yet, there are also enabling aspects to be reckoned with, as globalisation may provide incentives for strengthening national innovation systems in increasingly open economies (Weiss, 2003, pp.15–17). Moreover, globalisation shapes the governed interdependence between states and firms in a regional, international and even supranational setting that requires the provision of rules and regulations for allowing cooperative relations (Weiss, 2003, p.17n). Again, the matter of multi-level governance in regional and supranational settings gains in relevance – as state capacity may be preserved by advances in regional integration (Wade, 2000, p.16).

Yet, globalisation also needs to be perceived in the context of changing techno-economic paradigms – with information and communication technologies as paradigmatic components of a fundamental technological and institutional restructuring that affects the global economy at large. Changes in the dominant techno-economic paradigm put the institutional setting under pressure, yet modes of adaptation resemble search and discovery strategies which include social conflicts and compromises (Perez, 1988, pp.86–88). Failure is intrinsically possible, for purposeful adaptation will be limited by non-intended consequences, involving an open-ended interplay between social forces and the technological frontier, subject to complex governance procedures. The direction of technological change then depends on chance discoveries and nation-specific aspects like social conditions, corporate strategies and government policies. Therefore, the interaction of technology and society in paradigm change, mediated by systems of innovation, is politically shaped, for in moments of radical technological shifts political choice can exert some control over technology (Dosi et al., 1989, p.26n). In developmental states, these political choices may address related opportunities for catch-up growth such as the expansion of microelectronics since the 1970s, which was facilitated by government leadership in promoting the concentration of investment ventures and the socialisation of their risks (Wade, 1990, p.357n). Given the possibility that state bureaucracies may serve as institutional homes to entrepreneurial initiatives, then, the foreseeable closing of the technology gap in East Asia does not equal the demise of the developmental state (Evans, 1995, p.250). Rather, its transitory character and the renovation of the related national innovation systems imply a reorientation of policy strategies towards an entrepreneurial direction.

Accordingly, the decisive problem of industrial policy in achieving catch-up growth is about the uncertainty associated with the move to technology generation, as government and private sector engage in communicative interaction to identify promising technological trends and learning externalities (Chang, 2001, pp.73–75). Rodrik's social learning approach to industrial policy pinpoints policy experimentation in coping with the uncertainty of market failures, while the collaboration of public and private sector communicates knowledge on externalities. Industrial policy as a discovery process involves government and enterprises as learning agents: thus the structuration of indeterminate policy processes becomes decisive (Rodrik, 2004, pp.2–4).

The institutional architecture of that entrepreneurial-experimental governance type entails political leadership, mechanisms of accountability and transparency, and policy coordination in deliberation councils (Rodrik, 2004, pp.18–21). Outstandingly, as government-sponsored intermediary institutions for private sector coordination, deliberation councils address lacking knowledge on coordination failures in the assessment of technological opportunities (Aoki et al., 1997, p.8n). An example is the governmental establishment of technological standards that becomes problematic owing to the uncertainty surrounding technological opportunities (Aoki et al., 1997, p.22n). Deliberation councils facilitate knowledge flows that stabilise expectations and reduce transaction costs, as demonstrated by the Japanese debates on the prospects of selected technologies. Although this practice may be vulnerable to rent-seeking, it delineates social compromises in institutionalised deliberation (Odagiri and Goto, 1996, p.262n). Crucially, policy responsiveness to market signals is mediated, so that government serves as cooperative organiser of technological search (Gerybadze, 1992, p.170n). Nonetheless, the evolutionary character of institutional change implies a non-intended fit between designed and spontaneously evolving institutions. For instance, Japanese corporate structures and the related frameworks of industrial policy reflect institutional complementarity as an unintended outcome of co-evolutionary processes (Aoki, 1997, p.235n).

Evolutionary perceptions of industrial policy thus invoke knowledge and learning as key components, confirming its embeddedness in the institutional interactions of the coevolving innovation systems. However, in addressing the primary policy dynamism in the co-evolution of state, public sector and private sector, it is necessary to recognise the specificity of state functions in the transition from technology assimilation within an established techno-economic paradigm towards the potential for technology generation in driving a new paradigm. Indeed, as the perspective of the developmental state covers only a fraction of state functions in catch-up growth, it may be argued that the concern with entrepreneurship in the creation, modification and adaptation of techno-economic paradigms resembles a distinct set of state functions, which requires a conceptual framework of its own: the entrepreneurial state. The underlying reasoning suggests that entrepreneurial aspects of state activity that had been already prevalent with the East Asian developmental states currently turn out as dominant policy features, thus changing the dominant rationale of government towards an entrepreneurial direction that implies a shift from the developmental assimilation of techno-economic paradigms to their entrepreneurial creation. This perspective is informed by a reconsideration of the political economy of innovation. It addresses the policy impact on technological trajectories and developmental opportunities – involving the restructuring of innovation systems whose institutional networks co-evolve with the transition from developmental states to entrepreneurial states.

The notion of the entrepreneurial state entails the following propositions:

- The rationale of entrepreneurial states reflects the impact of an evolving techno-economic paradigm based on information and communication technologies that drives the structural, institutional and spatial pattern of globalisation – especially the combination of global production networks and local agglomerations of knowledge-intensive innovation activities that complement the territorial logic of national institutions.

- In coping with that techno-economic paradigm, the policy response of entrepreneurial states addresses the increasing openness of national economies by promoting a combined strategy of international competitiveness, technological capability-building and locational policy that addresses the entrepreneurial orientation of both local and foreign firms.
- The transition of policy patterns reflects a concern with the formation of entrepreneurial capacity in the generation and carrying out of innovations, which reflects a shift in policy efforts from catching up within an established paradigm to a rationale of paradigm creation and modification that involves a potential for technological leadership in an uncertain environment.
- The institutional architecture of the entrepreneurial state underlines the role of knowledge transfers and communication in state–society relations that shape reflexive policy modes in emerging multi-level governance structures – thus combining constellations that are specific for the East Asian region with general changes in the institutional set-up of industrialised economies.
- The corresponding transformation of national innovation systems towards a market-oriented emphasis on start-up ventures and knowledge-based interactions in sustaining competitiveness coevolves with the institutional emergence of entrepreneurial states, which becomes an internal factor in moulding the governance structures of their complex institutional networks.

In summary, the notion of the entrepreneurial state addresses the policy-related matter of technological innovation, institutional change and political leadership, set in the context of techno-economic paradigms. The innovation capacity of the entrepreneurial state addresses the potential for exercising policies that promote innovation as a socio-economic process on an economy-wide scale – both in terms of knowledge generation and assimilation. This innovation capacity determines the performance of the entrepreneurial state in the carrying out of the entrepreneurial function, namely introducing novelty in an economic system – either by direct interventions in the economic process or by its conditioning through institutional and physical infrastructures. It requires a combination of political leadership and socially embedded negotiation capabilities, covering a continuum of adaptive and creative responses to the challenge of technological and institutional restructuring. Thus, government and administration need to act as learning organisations. Governing innovation then implies the reconsideration of various institutional coordination mechanisms, involving context-specific ensembles of markets, hierarchies and networks. In this variety of governance structures, the entrepreneurial state becomes a rule-guided steering agent that, with governance denoting the coordination of public–private interactions, involving both formal rules and informal norms that mark the formulation and implementation of policy goals and instruments. This exercise of governance requires persistent knowledge flows as a condition for political experimentation and strategic interventions. Thus, in Schumpeterian terms, the institutional dynamism of the entrepreneurial state reflects the co-evolution of state and market (Ebner, 2006, p.511n).

These propositions may be illustrated by references to policy patterns in the East Asian economies, which have become subject to a strategic reorientation that gained in prominence at least since the financial crisis of the late 1990s. This applies to all the

East Asian economies, including Japan as the regional technology leader as well as the World Bank's "High-Performing Asian Economies" with South Korea, Taiwan, Hong Kong and Singapore as outstanding representatives. In this context, Japan as pioneering latecomer economy and Singapore as a city-state economy represent most promisingly the rise of the entrepreneurial state. Indeed, a restructuring of government and administration lies at the heart of the reorientation of the Japanese development pattern towards a more competitive and entrepreneurial setting (Aoki, 2002, p.2). According to Chalmers Johnson, the crisis of Japan's political system contributed decisively to that reorientation, combining the reform of government and administration (Johnson, 2001, pp.8–10). However, more fundamentally, it has been argued that the evolving Japanese economy with its internationally competitive and technologically advanced firms had simply outgrown the institutional and structural conditions of MITI's industrial policies (Callon, 1995, p.147n). Decisively, in the course of these policy reforms, the rationale of generating innovations through a flexibilisation, decentralisation and competitive reorientation of governance structures has become prominent (Whittaker, 2003, p.80n). MITI as a major player of Japanese industrial policy was even refurbished as Ministry of Economy, Trade and Industry – an institutional change that could be interpreted as a reflection of the branching out of industrial policies beyond catch-up patterns of the past, strategically turning towards economy-wide concerns with international competitiveness and technological innovation (Elder, 2000, p.5n). Indeed, this strategic reorientation in approaching the technological frontier should involve the restructuring of the Japanese innovation system towards an intensified cooperation between business, government and universities, augmented by the promotion of entrepreneurial start-up activities (Elder, 2000, pp.18–21). Moreover, Japan's METI is currently spearheading a set of entrepreneurship strategies that address the cluster aspects of innovation, thus allowing for both spatial and institutional components in industrial policy (Ibata-Arens, 2004, p.4n). The latter is also informed by the ongoing internationalisation of Japanese R&D operations with a view on shifts in the division of labour among the East Asian economies (Odagiri and Goto, 1996, p.268n).

The corresponding need for attracting globalised knowledge flows then requires that local and global resources are adequately recombined. The Singaporean development model illustrates this case by promoting the vision of a local knowledge agglomeration in a global knowledge-based economy. In this setting, multinational enterprises introduce novelty into the local economic system; yet included in the sample of entrepreneurial agents are also government-linked companies as well as government boards which may enforce and coordinate innovation-driven economic change (Ebner, 2004, pp.56–59). Singapore thus combines strength in state capacity with market institutions that support the dynamism of the private sector, while leveraging on foreign direct investment as a means of technological upgrading within the national innovation system (Wong, 2001, p.564). Current attempts of an entrepreneurial self-transformation then imply the promotion of technology-intensive start-ups with an international orientation (Low, 2004, p.166n). These tendencies are of course also prevalent in other East Asian economies. South Korea, for instance, is said to be challenged by the paradigm shift from an 'industrial learning paradigm' to a 'technology creation paradigm' – with policy-assisted innovation efforts in biotechnology as an outstanding example (Wong et al., 2004, p.46). Thus, an array of distinct responses to the technological challenges of economic development fuels the rise of the entrepreneurial state in East Asia.

5 Conclusion

For the East Asian economies, the developmental motive of technology assimilation in catch-up growth is currently replaced by a strategic concern with the generation of innovation in an internationalising competitive setting. Thus, in coping with the transition from technology assimilation within an established techno-economic paradigm towards technology generation in the context of an evolving new paradigm, the rationale of industrial policy shifts to the building of differentiated innovation systems with a crucial role for the state in moulding the related institutional networks. As the perspective of the developmental state covers only a fraction of state functions in catch-up growth, it may be argued that the concern with an entrepreneurial introduction of novelty, that is with Schumpeterian entrepreneurship in the creation, modification and adaptation of techno-economic paradigms, resembles a distinct set of state functions. It requires a conceptual framework of its own, namely the notion of the entrepreneurial state. The underlying reasoning suggests that entrepreneurial aspects of state activity that had been already prevalent with the East Asian developmental states currently turn out as dominant policy features, thus changing the rationale of government towards an entrepreneurial direction. The policy-related distinction of direct and indirect modes of exercising the entrepreneurial function addresses direct interventions in the economic process, for instance in the shape of public ventures, accompanied by indirect means through the provision of infrastructures and institutional incentives.

This perspective resounds recent accounts of the perspectives of innovation studies, which highlight the problem of co-evolutionary change in the domain of institutions and technology (Castellacci et al., 2005, p.110n). Accordingly, a decisive problem for research on innovation in economic development is the analysis of forging ahead as a pattern of innovation-driven growth, based on the co-evolution of the state and the various segments of the corresponding national innovation system. In this setting, the entrepreneurial state is viewed as an internal factor of socio-economic change. However, beyond the domain of industrial policy and state functions in economic development, the question of further institutional changes points to the matter democratisation and participatory governance structures as a means for mobilising decentralised knowledge in response to the challenge of cultivating sustainable innovation capabilities. Therefore, the rise of the entrepreneurial state is closely related with policy reforms that promote an inclusive governance pattern – in East Asia and elsewhere.

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