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## **The Institutional Embeddedness of Production Systems and the New Partnership for Africa's Development (NEPAD)**

### *Lessons From East Asia*

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While still short of being entirely mainstream there does appear to be a growing recognition in both policy circles and academia that economic development is not brought about by autonomous profit-maximising agents interacting anonymously through equilibrium markets.<sup>1</sup> Rather, economic development is an inherently disequibric process involving interactive and institutionally embedded processes in broader systems of firms, governments, research centres, universities, consultants, and other entities. These systems can tap into stocks of global knowledge and technologies, assimilate and adapt it to local circumstances, and create new knowledge or technologies.

Such broader production systems are conceptualised in several different ways in the literature, e.g. Lundvall et al.'s 'national innovation systems', Richard Whitley's 'business systems', and Sanjaya Lall's concept of 'industrial technology development'. This paper identifies and outlines four different systemic approaches to economic development. All four approaches have primarily been developed to address nationally based institutional systems in advanced economies.

Both the ontological premises and the policy implications of these systemic approaches depart distinctly from the conventional orthodoxy on economic development as articulated in the 'Washington Consensus' and its later derivatives. The article goes on to explore which policy implications the adoption of such a systemic view might have for the New Partnership for Africa's Development (NEPAD).

## **Introduction**

NEPAD is a new continent-wide development programme with the long-term objectives of 'poverty eradication, sustainable development, demarginalisation of Africa in the globalisation process and promotion of the role of women in all activities'. Even though issues of political governance such as

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<sup>1</sup> A shorter version of this paper is published in (Muchie, Gammeltoft and Lundvall 2003).

peace and security, democratisation and human rights appears to dominate the rhetoric on NEPAD, the most concrete efforts and progress are so far concentrated in the more tractable domain of economic and corporate governance. Given that about half the population of Africa, or 340 million people, are living on less than one dollar a day and that life expectancy is only 47 years in sub-Saharan Africa, economic development is indeed an urgent task. Regional integration too is not an unreasonable aspiration: it makes little economic sense for an economy smaller than that of France to be divided into 54 separate states.

From an immediate observation, it might appear inappropriate to apply frameworks, which have predominantly been developed in the context of economically advanced countries and which identify themselves with *national* systems to a *regional* initiative in a *developing* region: NEPAD implies elevating the focus from national to regional and subregional systems and surely the concerns of countries in the South are different from those in the North.

However, historically, and in fact still, nation states have been the main political, economic and institutional vehicles of economic development. As such, the frameworks with a national focus have been tied to the principal institutional vehicle for development, not to the nation state *per se*, and might equally well be applied to a regional initiative were such an initiative to assume any primacy.

What the relevance to developing countries is concerned, it is common in developing countries for production systems to be fragmented. This originates in part from short-lived and alternating development strategies and in part from the selective and also impermanent penetration by global production chains of local production systems (Gammeltoft 2001; 2003). The studies, which have documented the all too predictable fragmentation of innovation systems in developing countries, are already legio. So in this respect there may be limits to the analytical value of the national institutional frameworks. But the frameworks' prescriptive value is only so much the greater: in most developing countries the further progress of production systems is contingent on increased institutional integration and diversification of production – of broader, deeper and tighter innovation systems.

NEPAD does in fact, at least in rhetoric, reflect the requisite perspective, resolve and long-term focus to accomplish this. African development is critically conditioned from outside the continent, e.g. by the unsustainable debt burden, stagnating or falling foreign investment, declining post-cold war aid budgets, and lingering protection and subsidies in Northern markets.<sup>2</sup> However, progress depends equally critically on the configuration and development of internal institutional systems and NEPAD endeavours to address exactly such internal issues: it is promoted as the African side of a new deal between aid recipients and donors under which donors, in return, are expected to alleviate the external constraints.

To properly understand economic development processes, a systemic framework needs to be applied and a range of well-developed economic approaches do offer such frameworks. In the following we will outline four such approaches. In the account here we will predominantly draw on to development experiences from the successful East Asian states. The paper goes on to account for the background and constitution of the NEPAD initiative, and finally the conclusion explores the potential policy implications for NEPAD of adopting a systemic approach to development.

## **The Institutional Embeddedness of Production Systems**

Even though enterprises are the primary drivers of growth, productivity and technological development, economic development involves much more than individual enterprises: enterprises do not emerge and succeed individually but in the context of wider production systems. Work in a

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<sup>2</sup> It is often argued that a major reason for Africa's predicament is its insufficient integration into world markets. However Amin (2002) observes that Africa is in fact more integrated into the global economy in terms of the share of its external trade in GDP than other regions. Accordingly, it is not the extent but the modality of integration, which should be of concern. Measures to improve it would include upgrading beyond agricultural produce and extraction industries strengthening and diversifying manufacturing production.

wide range of disciplines such as economic sociology, economic geography, economic history, industrial organisation, business studies, and development studies informs us of the many ways in which economic activities take place within and are structured by various humanly-constituted and devised structures. In a profound way, these approaches challenge the neoclassical perception of perfectly informed individual agents interacting instantly and costlessly through perfect markets and address the various ways in which economic activities are embedded in and influenced by a wider social context. There is also an implication that these issues significantly influence the *performance* of firms, beyond efficient markets, a stable and predictable legal system, macroeconomic stability, *etc.* Accordingly, there are two different sides to embeddedness: one is embeddedness as a basic and insurmountable structural fact of economic life; the other is the utilitarian side of embeddedness as a source of competitiveness.<sup>3</sup> With respect to the latter, Hollingsworth et al. (1994) maintain that the effect of domestic institutions on the international performance of a sector or economy often seems paradoxical, difficult to predict, and unintended. Yet, based on a selection of country studies, they conclude the following:

[...] the chapters in this volume offer strong evidence that institutionally rich domestic regimes capable of overriding or supplementing the logic of markets and hierarchies may help 'their' firms prevail over competitors based in institutionally impoverished, neoclassical, market and hierarchy-driven governance systems. (ibid: 282)

Michael Porter (1990) convincingly argues for the importance of considering *industries* rather than individual firms and observes that countries usually succeed only in a limited number of industries, and internationally each industry tends to be dominated by players from only a few countries, which have grown out of a strong home base.<sup>4</sup>

To properly understand economic development processes, a holistic framework needs to be applied. A range of well-developed economic approaches do offer such frameworks and we will outline and summarise four of them in the following: the national innovation system and the business system approaches, Sanjaya Lall's concept of 'industrial technology development' and a body of literature on industrial policy.

Applying a holistic perspective also has implications for the role of policy in development: the need for government intervention in the presence of certain market failures is generally accepted. More contested is the need for broader government activism to bring various markets and actors operating in them into existence and guide their development. There is also a general consensus as to the significance of macroeconomic stability, human resource development, high savings and investment rates, and export orientation, but if we consider government policies and programmes targeted more specifically at economic, industrial and technological advance, we move into highly contested grounds.

Evolutionary economists and authors within the capability tradition convincingly argue that the complexities of economic development take policy far beyond the generally accepted market failures. Even if one accepts that interventions are warranted in order to remedy information failures and co-ordination problems between whatever activities may already be present in an economy, economic *development* goes beyond this and depends on uncertain, long-term, and complex learning processes of a cumulative and path-dependent nature on the part of a diverse range of economic actors. In mature and developed economies, marginalist preoccupations with attaining productive efficiency, i.e. appropriate composition of inputs given relative scarcities/prices, and

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<sup>3</sup> Of course, economic efficiency is not the universal performance measure it is sometimes taken to be. Non-economic goals aside, a variety of economic ones may be pursued, e.g. maximum profitability, growth, technological advance, or market share. Additionally, dominant goals vary between social contexts.

<sup>4</sup> Among the criticisms made against Porter's work has been that he downplays the role of transnational companies, places too much emphasis on the role of the domestic *vis-à-vis* foreign markets, and relatively neglects the role of governments and the wider institutional framework in which industries operate; arguments which are particularly warranted in the context of developing countries. A likely reason for these shortcomings is that Porter bases his analysis on developed economies and pays only marginal attention to developing countries.

allocative efficiency, i.e. appropriate allocation across activities, may to a wide extent be warranted. Dynamic investment and growth processes, on the other hand, are fundamentally different and associated with complicated structural problems. Agents, markets, and prices are not given but may be absent, weak and inadequate, and highly variable and contingent on the specific course of the development process. The distribution of resources between different activities in firms and between different firms, sectors, and even countries needs to take account of linkage and spill-over effects, social benefits, and learning costs and effects. Different benefits may be associated with different sectors or technologies at different points in time; the viability of a sector may depend on a wider 'cluster' of activities (Porter 1990); and clustering may require learning processes to be collective and coordinated between firms (Lall and Teubal (1998) introduce the concept of 'collective learning'). Technological development in firms and nations depends not only on well-functioning markets but on a wider institutional framework. Gereffi (1995), for instance, maintains that for newly industrialised countries to continue to prosper, they need to '[...] devise strategies that emphasize the creation of a local institutional environment conducive to technological upgrading and the integration of industrial production with modern services' (p. 101), and according to Mowery and Oxley (1995), the countries which benefit most from access to foreign technology are those with public policies strengthening their 'national absorptive capacity'. Yet, as pointed out by Nelson (1993), efforts by government and institutions can support but not substitute the technological efforts of firms. If one accepts that these fundamental differences exist between processes of dynamic growth and static allocation, this strongly influences the extent and type of policy intervention conceivable.

### ***National Systems of Innovation***

The 'national systems of innovation' (NSI) approach can be seen as a subapproach within a broader neo-Schumpeterian tradition, which along with other heterodox perspectives has flourished since the 1970s. At that time, the slowdown of growth in the advanced industrial nations, the economic and technological rise of Japan and later the NICs, along with the inability of mainstream economics to account for these new developments, caused academic and policy efforts to branch off into new directions, in part to maintain growth, employment and competitiveness. Furthermore, the progress of the NICs raised the question of how that progress came about and whether and how it might be emulated by other nations through national policies. Within the neo-Schumpeterian literature, two different lines of enquiry can in turn be discerned: one is based on and expands the work of Schumpeter and deals with the role of technology as the force underlying and shaping long-run economic development (e.g. Freeman 1982; Dosi et al. 1988; Nelson and Winter 1982). The aim seems to be a general theory of economic development, and accordingly the focus is on innovations at the technological frontier, radical innovations with the potential to transform companies and economies at large. The focus is on the technological change process itself, the inherent characteristics of technology, innovation, and firms and how these phenomena are related. Accordingly, it deals more with the advancement of the technological frontier than with the process of catching-up, which is more central to the concerns of developing countries. The other line of enquiry, the NSI-approach, focuses more on the institutional context in which technological development takes place, and the factors which impede or promote it (e.g. Freeman 1987; Lundvall 1992a; Nelson 1993). It is more policy oriented and operates with a wider conception of innovation, including changes new to the innovator rather than to the world. More weight is placed on incremental innovations and diffusion.<sup>5</sup> With a focus on micro-level phenomena, institutions and

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<sup>5</sup> This is in accordance with the increasing recognition since the 1960s that incremental technical change and diffusion is more important to economic growth than radical changes, and that social innovations are as important as technical ones (Freeman 1994). The issue has also become prominent in the World Development Reports, with the 1991 report (World Bank 1991) concluding that intangible investment in knowledge accumulation has become more important than physical capital investment, and with the 1998 report (World Bank 1998) dedicated to the subject 'knowledge for development'.

change processes rather than equilibrium, it shares commonalities with development economics. Individual studies and scholars often relate to both these lines of neo-schumpeterian enquiry, but they are nevertheless analytically distinct. In addition to the NIS literature we will here also consider Sanjaya Lall's two related concepts of 'national technological capabilities' and 'industrial technology development'.

A variety of definitions of NSI can be found in the literature, for example: ' [...] the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies' (Freeman 1987). ' [...] a set of institutions whose interactions determine the innovative performance [...] of national firms' (Nelson 1993). ' [...] the national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change-generating activities) in a country' (Patel and Pavitt 1994). ' [...] that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies' (Metcalf 1995). ' [...] the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge [...] and are either located within or rooted inside the borders of a nation state' (Lundvall 1992a). Lundvall further proposes a narrow and a broad definition: the narrow one would include organisations and institutions involved in searching and exploring, such as R&D departments, technological institutes and universities, whereas the broad definition includes 'all parts and aspects of the economic structure and the institutional set-up affecting learning as well as searching and exploring – the production system, the marketing system and the system of finance [...]' (p.12) and stresses that the way the different elements of the NSI interact is as important as their individual characteristics. In fact, NSI is usually quite fuzzily defined, and definitions seem to mainly be deduced from the three core words 'national', 'system', and 'innovation'.

Innovation and change requires knowledge, which is acquired through learning. Learning is considered an interactive and socially embedded process, which must be considered in its institutional and cultural context. A particularly important part of that context is the modern nation state, today just as it was it during the industrialisation of the western world. The literature emphasises that change and learning do not come about only, or even predominantly, through purposive activities such as R&D. They also take place as part of every-day activities in and between firms: in firms, experience from everyday activities determines the direction of innovation and produces the necessary knowledge and insights for it. As an example, studies have documented that the proximity between R&D, production, and marketing is critical for the innovative capability of firms, and that this is an area in which American and Japanese companies differ, with Japanese companies being more integrated (Freeman 1994: 472). Since innovation also emanates from routine activities it follows that technical advance is likely to take place in areas in which a nation is already engaged in routine activities (Lundvall 1992a: 9).

Between firms, the importance of interactions between users and producers in change processes has been particularly emphasised (Lundvall 1992b; Fagerberg 1993, 1995; Porter 1990). A basic premise is the fact that the modern economy is characterised by ubiquitous innovation and a highly developed vertical division of labour. Much innovation occurs in the form of product innovation as a result of interactions between users and producers, rather than as process innovations internal to firms. Exchange of information and perhaps direct cooperation is necessary to reconcile the needs of users with the technical opportunities of producers. Such interactions are often of a longer-term nature and at odds with the neo-classical depiction of anonymous agents interacting at arms length through the market. Furthermore, given that such processes may be characterised by a high degree of uncertainty both in terms of outcome and of the process of interacting itself, transaction cost theory (Williamson 1985) predicts that vertical integration would occur, transforming product innovation into process innovation. This, however, does not seem to be the case, among the reasons being that vertically integrated units would become less able to interact with other organisational

units than the one with which they integrated, and that integration tends to increase efficiency but decrease flexibility (Lundvall 1992b). Geographic and particularly cultural proximity affects these processes of interactive learning, supporting the relevance of a national focus.

Besides the activities of firms themselves, *institutions*, in firms, between firms and at the national level, are the second important dimension of innovation systems. Lundvall regards them as essential because they provide a stability, which is perceived as necessary for innovative efforts to take place and to be successful. 'Technological trajectories' or 'paradigms' are regarded as one special kind of institution, which focuses on the innovative activities of scientists, engineers and technicians. Innovation often involves 'interactive learning' between multiple agents and it can occur between firms and supporting institutions. This is, in fact, a very important observation which one may expand into the requirement that learning occurs in the form of mutual and complementary processes in productive firms and other institutions: much of the literature focuses more one-sidedly on learning processes in firms and how these should and may or may not be institutionally supported. Much less explored is the requirement that supporting institutions themselves learn and how such learning occurs. An important source of institutional learning is the interactions with the firms those institutions support. Through such learning, institutions may serve as repositories of knowledge for firms interacting with them or, differently phrased, as mediators of externalities.

While his primary focus is firm-level technological capabilities, Lall (1992) introduces an alternative holistic concept, viz. 'national technological capabilities' (NTC), closely related to that of NSI. National technological capabilities are reflected in countries' different performance in productivity, growth and trade, and consist of the interplay between *capabilities*, *incentives* and *institutions*. The capabilities of a country define the best that can be achieved, whereas the incentives guide the use of the capabilities. Both capabilities and incentives operate within and are influenced by an institutional framework. Capabilities encompass physical investment, human capital and technological effort, which are strongly interlinked: investments are useless if the skills and knowledge ('human capital') to operate the facilities is not developed, and so is the formation of formal skills without conscious efforts ('technological effort') to utilise them. National technological effort comprises efforts on the part of firms to assimilate and improve upon technology, backed up by a technological infrastructure that provides information, standards, basic scientific knowledge and various facilities.

Incentives arising from market forces, institutional functioning and government functioning affect the pace of accumulation of capital and skills; the types of capital purchased and the kinds of skills learned; and the extent to which existing endowments are exploited in production. Needless to say, government policies are central in shaping incentives, but may do so either positively as when remedying structural and market failures, or negatively as when interventions are ill conceived or implemented. Incentives are subdivided into macroeconomic incentives, incentives from competition, and incentives from factor markets. Capabilities are formed and incentives asserted through institutions. Even though this makes them central to the formation of NTC, Lall does not address them in much detail, probably because they are not easily dealt with within an economic framework. He merely notes that they encompass the legal framework, industrial institutions, training institutions and technology institutions without being more specific. Fortunately, precisely institutions are at the forefront of the NSI-literature, in line with its more conceptual rather than formal approach.

In a later article, Lall (1993) operates with a different but overlapping concept: firm-level technological capabilities are developed through the process of 'industrial technology development' (ITD), which in turns consists of (1) the incentive structure facing firms; (2) the availability of the right quantity and quality of skills; (3) the availability of technical information and support services; (4) finance for ITD investments; and (5) the technology policies of the government. There are possible market failures and government remedies associated with each of the ITD components, which leads to the role and form of government intervention. Lall (1992) maintains that competition is the most basic incentive affecting capability development but adds that government intervention in a wide variety of areas is necessary. If a country chooses to rely on foreign investors for all

difficult technological work, the learning process will be curtailed and industrialisation remain in less dynamic paths (Lall 1993). He clarifies the circumstances under which intervention is justified: if the source of market failure lies outside the firm (e.g. lack of skills, infrastructure, institutions) intervention to protect the firm will be ineffective. If failures arise from firms' own lack of investment in capability building, due to externalities (loss of skills or technology, or interdependencies between firms), risk aversion, or lack of information, intervention may improve resource allocation. But under such circumstances, subsidies are preferable to tariffs due to lower consumption costs, even though more difficult to administer. It should be noted that this last recommendation runs counter to conventional economic orthodoxy.

## **Business Systems**

In his research programme on 'business systems', Richard Whitley (1992, 1996, 1998, 1999) deals with how economic activities are organised, controlled and coordinated differently in different institutional contexts, resulting in a variety of distinct 'capitalisms'. Whitley's agenda is dual: first, he wants to explain how and why different ways of organising capitalist economies have developed and continue to be distinct, by reference to variations in particular societal institutions. Second, he wants to develop a comprehensive framework for comparing and contrasting 'systems of economic coordination and control', a framework which '[...] attempts to identify the critical processes by which they become established, reproduced, and changed as relatively integrated and distinctive business systems' (Whitley 1999: 15).<sup>6</sup> Such an approach can potentially bring more empirical and analytical detail to the study of the embeddedness of economic life, while remaining abstract enough to be broadly applicable.

Economic activities and relationships are considered as socially constituted and institutionally variable, so that competitive processes, economic agents engaging in them, and their outcomes vary between societal contexts. Consequently, the approach dissolves the conventional market/hierarchy dichotomy and shows that 'firms' and 'markets' in fact refer to different institutional entities in different societies, depending on how economic activities are actually conducted and organised. Authoritative coordination may penetrate unequally within firms as well as span over different firms, e.g. through cartels, profit-pooling associations, obligational contracting, business groups, and various inter-firm networks. Business systems are distinguished on the basis of the organisation of ownership and control, particularly the relationship between owners and managers, and vertical and horizontal integration of production; relationships between separate firms such as forms of coordination with suppliers, customers, and competitors; and employer-employee relationships in firms, e.g. adversarial vs. collaborative. Whitley conceives of business systems as follows:

Business systems are conceived here, then, as distinctive patterns of economic organization that vary in their degree and mode of authoritative coordination of economic activities, and in the organization of, and interconnections between, owners, managers, experts, and other employees. Differences in the nature of relationships between five broad kinds of economic actors are particularly important in contrasting business systems: (a) providers and users of capital, (b) customers and suppliers, (c) competitors, (d) firms in different sectors, and, finally, (e) employers and different kinds of employees. These vary in both the extent of organizational integration and whether this is achieved primarily through ownership-based hierarchies, formal agreements, personal obligations, informal commitments, etc. (Whitley 1999:33)

Thus the nature of firms as quasi-autonomous economic actors, their internal structures and their interdependencies are all interrelated and differ significantly between institutional contexts. (Whitley 1992: 10)

Business systems are characterised in terms of a range of specific properties, but even though the

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<sup>6</sup> Other researchers pursue similar agendas but without aspiring to construct as systematic a framework as Whitley: Herrigel (1996, 1994) on 'industrial orders'; Hollingsworth and Boyer (1997) on 'social systems of production'; and Orrù, Biggart, and Hamilton (1997) on East Asian business groups.

arithmetical combination of properties results in a large number of conceivable business systems, the fact that these properties are determined and restricted by underlying institutions and the fact that particular institutions will tend to have the same kind of impact on different business system properties, the number of business systems which become established and are stable is limited. For example, in a setting in which market competition is encouraged and relations between firms are arms-length and adversarial, employer-employee relationships will tend to share those properties. Furthermore, particular combinations of institutions may not be stable but result in conflicts between different social groupings. These various constraints leads to the identification of six major ideal types of business systems: (1) fragmented (e.g. Hong Kong); (2) coordinated industrial district (e.g. 'Third Italy', Baden-Württemberg); (3) compartmentalised (e.g. Anglo-Saxon economies); (4) state-organised (e.g. South Korea); (5) collaborative (e.g. continental European); and (6) highly coordinated (e.g. Japan).

Business systems have typically come into being during the process of industrialisation, shaped by prevailing institutions dealing with the constitution and control of resources such as skills, capital and legitimacy. These underlying institutions, which vary across societal contexts, account for the constitution, change, relative persistency, and variability of business systems. Institutions may be more or less coherent, integrated, and mutually reinforcing. If very much so, distinctive business systems will develop, if less so multiple contending principles of economic organisation may co-exist. Japan and Germany, for instance, are taken to represent more coherent and distinct business systems than the U.S.. The most important institutions are those associated with the state and its policies; with the financial system; with the labour market; and with trust and authority relations. It is the close relationship between underlying institutions and economic activities which accounts for the observed uniformity of organisational forms within societies. Societal institutions, in turn, come about through struggles between different economic interest groups and industrial sectors and their political equivalents. Since such political struggles are continuously ongoing, institutions and the business systems they give rise to are subject to changes. Whitley proposes a number of relationships between societal institutions and business system characteristics, but it is only if the institutional features in question are sufficiently 'strong' and possibly in accordance with other institutional features that the particular business system characteristic arises.

Whitley's approach is primarily developed on the basis of relatively advanced economies with strong and distinct institutions in which industrialisation has either to a large extent been relatively endogenous to the countries in question (Europe, U.S.) or progressed under considerable state guidance (East Asia). Countries in other regions such as Latin America, with states penetrated by landed aristocracy; Africa, where the economy is under state control to a much more modest extent than in the East Asian developmental states; and Southeast Asia, which also tends to be characterised by relatively weak states, are only peripherally addressed. Generally, it seems that the framework may be less applicable to developing countries: Whitley himself argues that coherent and mutually reinforcing national institutions are a precondition for a distinct business system to develop, and this requirement is rarely fulfilled in developing countries where states tend to be weak, both in terms of competencies and insulation; labour markets fragmented and unorganised; and financial systems immature. In developing countries where TNCs may control the most dynamic sectors, and local institutions are not 'distinct and integrated', if one can speak of national business systems at all they will have developed under considerable foreign influence and not result from local institutions to the extent Whitley assumes. These objections relate to Whitley's general focus on developed economies. Less developed economies are not systematically dealt with but he does speculate that foreign investment into less industrialised economies may result in the transfer of business system characteristics to the host. If foreign firms dominate an economy or particular sectors in it, that economy is unlikely to develop its own distinctive pattern of economic coordination and control, particularly if the foreign firms tend to originate from the same country and that country has a strongly articulated business system. Furthermore, the more independently foreign firms can operate from domestic organisations, agencies, and practices, the more likely it is that business system properties will be transferred. Japanese companies, for example, linked to

Japanese suppliers and banks, can be more independent from local practices than US companies, which tend to become more entangled with local organisations. The weaker the local business system, the greater the potential impact. But Whitley retains the primacy of national systems by stating that ‘even in industrializing countries where a particular system of capitalist organization is in the process of being established, foreign investment does not necessarily determine the shape of the emergent economy, especially where the state plays a dominating role in organizing economic development and effectively controls the degree and nature of that investment’.

Regardless of these issues, Whitley’s basic contention that different and relatively stable business systems exist at the national level, particularly in developed economies, and do not converge in the short run, and in the long run only if certain institutional conditions are fulfilled; and that the constitution and development of these business systems are institutionally determined remains very enlightening and pertinent and testifies to as well as elucidates the embeddedness of economic activities.

## ***Industrial Policy***

A third and distinct debate, which shares the national focus, yet with its own history, focus, and agenda, is the one concerning industrial policy. The current section deals with this question through the following series of subquestions: what is the rationale for government intervention in relation to economic development? Are there any general requirements for policies? Which specific areas are candidates for interventions, and which techniques may be applied?

The activism of governments of the successful East Asian states has been amply documented in the literature and we will illustrate the issues involved in industrial policy by drawing on the East Asian experiences.<sup>7</sup> In the following sections, we will consider four broad areas of industrial policy and the techniques associated with them: the creation and nurturing of markets and agents, industrial organisation, the institutional infrastructure, and the regulatory framework.

## ***Agents and markets***

Markets are not universal, spatially and temporally uniform entities but are institutionally constituted and vary between contexts. Both markets and the economic agents operating in them may need to be created and nurtured. The Korean government’s promotion of the *chaebol* is a prominent case in point. The large domestic business groups were a means to economise on limited local entrepreneurial and financial resources and to internalise deficient markets for capital, skills, information, and entrepreneurship. Their size allowed economies of scale to be attained and they were used to enter ‘strategic industries’. By design a symbiotic relationship between government and the chaebol was created in which government was able to generate investment opportunities and the chaebol subsequently responded to them. Government ‘led the market’, as Wade (1990) has put it.

At an early stage, an industry’s activities may be confined to assembly of imported parts and

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<sup>7</sup> Yet, while state interventions have apparently not seriously impeded economic development, actually documenting the effect of such interventions is virtually impossible and a vivid dispute has flourished around the issue. According to various neoclassicists, there is nothing remarkable, let alone ‘miraculous’, about the economic growth of the East Asian states (Krugman 1994; Young 1989, 1994): through econometric analyses they claim to have demonstrated that economic growth has been the result of a massive but unsustainable growth in the mobilisation of conventional resources, capital and labour, and human resource development, not activist policies. On the other side of the fence, a group of ‘statist’ writers argue that industrial policies and selective interventions have been pivotal, and that states have ‘led the market’ in the face of widespread market failure (Skocpol et al. 1985; Evans et al. 1985; Amsden 1989; Wade 1990; Kim & Dahlman 1992; Evans 1995; Amsden 1997). Where neo-classicists attribute part of the success of the East Asian states to the absence of price controls and other ‘distortionary policies’, Amsden (1989), for instance, maintains that government deliberately ‘got the prices wrong’ to direct investments into industries which would generate the highest overall growth for the economy.

components on the basis of foreign technology and know-how. Once assembly activities reach sufficient scale, and as technical, organisational, and managerial learning progress, a broader range of related and specialised activities may be undertaken locally. If assembly industries are locally owned and managed, the capabilities necessary to branch into new activities may to a considerable extent be acquired through the assembly activity; if they are foreign owned and managed, more of the capabilities must be acquired elsewhere. *Specialised technological agents* such as engineering firms, intermediate-goods producers, and capital goods suppliers, may act as repositories of technological capabilities and diffuse technology between firms. Flows through such intermediaries are often far more important than those directly between competing firms (Dahlman et al. 1987). Close interactions between these agents and their customers also ensure the development of local capabilities which match local needs. To nurture such complementary activities, governments have in the past set specific targets for machinery, parts, and raw materials that should be localised but such 'local content' policies have become disallowed under the WTO TRIMS agreements. Other possible measures are tax incentives, preferential financing, loan guarantees, and R&D subsidies. In Korea, some local activities were supported by requiring by law that projects should be given to local firms, possibly with foreign minority partners whenever possible; and quantitative import restrictions, import licensing, domestic content and other techniques were used to promote the development of local capital goods industries.<sup>8</sup> Besides promoting specific agents, government may also encourage companies to enter particular technologically demanding areas or target specific activities in firms such as R&D or training.

For various reasons, countries frequently target particular *infant industries* for certain periods, among the reasons being that advance in various 'base industries' such as information technology, new materials, and biotechnology may influence strength in downstream industries, so that countries cannot afford to let these sectors be exclusively controlled by foreign firms. A converse argument is that demand from strong downstream industries may be necessary to develop upstream component industries. More generally, technological linkages between firms may require that whole groups of activities are promoted as infant industries, since this will allow learning processes in individual companies to be co-ordinated. Furthermore, some groups of activities may be more beneficial to an economy than others at a given level of development. Lall (1993) observes that successful infant industry promotion in Korea targeted sectors with significant externalities and linkage potentials. Interventions were not directed at isolated products or technologies but based on a broader plan taking their interrelationships into account.<sup>9</sup> Complacency on the part of protected firms, which would be contradictory to the purpose of protection, was a real risk but could be addressed by limiting protection, imposing performance requirements, or enforcing early entry into export markets while maintaining domestic protection.

*Public enterprises* have been common in activities where social benefits considerably outweigh private, in capital and technology intensive areas, and areas, which for one reason or another are considered nationally 'strategic'. Beyond the capabilities developed in these enterprises themselves, technology may be diffused into private industry through the linkages they form and through labour mobility. In Taiwan, which did not have Korea's large business groups, public enterprises were used to enter particularly difficult or capital-intensive activities. Public procurement policies and localisation schemes have been applied to initiate local production of goods, intermediate goods, and production equipment. In Korea, the government announced procurement plans under which contracts were granted based on both cost and quality considerations. Such contracts induced activities in particular areas and at the same time provided secure income to companies in the

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<sup>8</sup> Selective techniques are generally no longer permitted under the WTO. However what subsidies is concerned, countries with less than \$1,000 per capita GNP are exempted from the prohibition on export subsidies and have a time-bound exemption from other prohibited subsidies.

<sup>9</sup> More specifically, he finds that the following requirements must be fulfilled for interventions to be likely to succeed: (1) targeted industries must realistically be able to reach world level of efficiency in the foreseeable future; (2) only a few infants should be promoted at any given time due to scarcity of resources; (3) performance requirements, such as exports, must be made to avoid promotion leading to complacency rather than upgrading; (4) complementarities to the industry, supporting industries, skill base, finance, must be dealt with concurrently.

process of undertaking risky investments in other areas, such as semiconductors.<sup>10</sup>

### *Industrial organisation*

Besides promoting particular markets and agents there may also be a role for government in shaping the way agents interact and the way industrial activities are organised. As a production system develops, more and more advanced activities will be undertaken locally, and linkages between activities become more complex. In some instances, firms may not initiate activities even though they would be socially beneficial because of externalities, inability to appropriate the benefits, or information or coordination failures. One can also envision instances in which incentives may encourage firms to undertake activities, which would be socially undesirable because they diverted resources away from other activities, which were more appropriate with respect to a wider development strategy. Government may need to encourage the establishment and use of various *supporting industries*, as referred to above. Even neoclassical economists who recognise that products and technology are not perfectly tradable emphasise the need to facilitate the flow of information and to coordinate investment decisions. Based on case studies of fifteen countries, Nelson (1996) finds that many countries encourage cooperation between private firms in *R&D*. Pack and Westphal (1986) address the issue that previously transferred technology may be incompletely mastered and productivity therefore reduced due to insufficient diffusion of knowledge about production engineering, inadequate product specialisation among firms making similar products, and an insufficient extent of subcontracting. They assess that increasing technical efficiency by addressing these issues can lead to benefits in the range from 30 to 50 percent of existing production. The absence of *subcontracting* is likely to result in different firms internalising the same activity, all operating it below full utilisation. If too many firms produce the same product, the advantages of specialisation may be foregone, a risk which may be reduced by government intervention, e.g. by encouraging rationalisation cartels among private industries. In the later stages of Korean industrialisation, various curbs were placed on the *chaebol* to avoid collusive practices and excessive vertical and horizontal integration. Government also responded to an imbalance between large and small business sectors and promoted *small and medium industries* (SMIs), particularly technology-based firms. Export processing zones and industrial districts have been important in providing companies with physical and institutional infrastructure and facilitating cooperation between foreign and local companies, and among local companies themselves.

### *Institutional infrastructure*

Beyond extending support to individual firms, the institutional infrastructure may also function as a repository for accumulation of capabilities, and a channel through which information and also manpower can diffuse between firms. Here we consider the following parts of the institutional infrastructure: *human resource development*, the *science and technology (S&T) infrastructure*, *industrial extension*, *government-business deliberation*, and *finance*.

The heavy investment in *human resources* in general and technical training in particular is usually highlighted as one of the most important prerequisites for the rapid economic development in East Asian nations. Obviously, the composition and level of skills required varies as industrialisation proceeds. The overseas training and hiring of returnees are also frequently cited as important. Based on a fifteen-country case study, Nelson (1996) finds that the education of the workforce is one of the factors that has the most profound impact on innovation, and more specifically that a major determinant of the success of infant industry protection programmes is the quality of the education and training system and the extent to which it provides firms with the

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<sup>10</sup> Under the plurilateral agreement on government procurement administered by the WTO, local and foreign companies should be treated equally. However, so far only 28 out of the 146 WTO member countries are signatories to the agreement.

strong skills needed to make it on their own. On this backdrop, policy recommendations may be to encourage industrial training by subsidies to or levies on firms; to increase enrolment rates with a focus on technical fields; to gear training to emerging technological needs; and to get industry involved in the management of training and education institutions.

Besides human resource development, a well developed local *S&T infrastructure* can induce the choice of socially appropriate techniques, improve the terms of technology imports, and stimulate capability development in local productive enterprises and specialised technological agents. Nelson (1996) finds that the relationship between public R&D efforts and industrial success differs from case to case, but generally benefits seem to depend on tight linkages between the public programmes and the industry involved, linkages between specific firms or group of firms and specific laboratories, research programmes or individuals. Government laboratories may spearhead the development of new technologies, but generally policies directed at the diffusion and application of technology, bringing industries up to world practice or spreading knowledge about new developments, can be more effective than the subsidisation of major breakthroughs. Since individual companies may not be able to appropriate the benefits of information gathering related to technology acquisition and absorption, and since such gathering is associated with large fixed costs, government may induce industry-wide efforts, possible with some compulsion to curb free riding. In Korea, public research institutions played an important role in identifying technology sources and disseminating information to local firms, strengthening their bargaining position, and in Taiwan, public research institutions were active in importing technologies and diffusing them into SMEs. Experienced researchers also migrated from public institutions into budding corporate R&D centres, and studies suggest that the main economic benefit from research activities is not the formal output as such but the resulting supply of scientists and engineers, their skills and network engagements (Bell & Pavitt 1993). Public research institutions played a limited role in the early stages of Korean industrialisation, partly because their services were not in high demand, and partly because they did not have the requisite know-how and experience, but they took on increasing importance as manufacturers moved into less mature technologies and then various agencies were established to help industries acquire technology.<sup>11</sup> As domestic demand rose, a number of specialised research institutes spun off from the original one, KAIST, pioneered new products and processes and adapted and improved foreign technologies in areas such as shipbuilding, marine resources, electronics, telecommunications, energy, machinery, chemicals, and standardisation.

A common problem with publicly provided R&D and extension services seems to be that they are often supply-driven, do not correspond to industry needs, and are of inadequate quality. Various mechanisms can be applied to secure the relevance and reach of such efforts, e.g. requiring them to be more demand-driven, requiring that part of the budget is covered by fees; conducting joint public/private projects to secure relevance and reach; securing private sector input in management and operations; and conducting applied technological work rather than basic science.

The rationales for more mundane *industrial extension services* are the same as those for the more specialised activities related to science and technology. A well-functioning metrology, standards, testing, and quality assurance (MSTQ) system is central to the upgrading of local firms and to facilitating both local co-operation and international marketability. An electronics working group was formed in Taiwan in the mid-1960s to assist companies in such areas as marketing, co-ordinating production with the demands of foreign buyers, procuring raw materials, training personnel, improving quality, and speeding up bureaucratic approval procedures. In Korea, the setting of industrial standards increased the local diffusion of technology (Kim & Dahlman 1992).

It has been argued that *government-business deliberation councils* contributed significantly to the economic success of some of the East Asian countries (World Bank 1993). They are fora which

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<sup>11</sup> (1) a technology transfer centre provided industries with information regarding alternative technologies available abroad and their suppliers, and assisted in preparation of contracts; (2) technical information centres collected and disseminated scientific technical information; (3) technical extension service agencies assisted firms in improving product quality, training, factory automation, etc.; and (4) public R&D institutes undertook joint research with industries, and supplied information on technology sources which enhanced the bargaining position of local firms

bring together various stakeholders, government, business, labour, consumers, academia, and the press to discuss policy, market trends, exchange information in general, and formulate visions for future development. The organisation of industries into associations was particularly encouraged in Japan and smoothed these kinds of deliberations. Additionally, industry associations can support their constituencies in various ways, strengthen intra-industry co-operation, and provide services for their members. This corresponds to the more general arguments of the ‘institutionalists’ referred to in section 2.3.2.

Due to the inherent uncertain and long-term nature of scientific and technological activities, *finance* poses a special problem. ‘Anglo-Saxon’ capital market-based financial systems are usually taken to favour short-term profit-oriented investments, whereas in credit-based financial systems, often associated with Germany and Japan, creditors tend to be more engaged in long-term growth-oriented investments and there are closer associations between financial institutions and firms (Whitley 1999). In Korea, the government established various funds aimed at supporting activities, which traditionally have difficulties raising capital, such as technological development, small technology start-ups, R&D, equipment modernisation, and plant automation. It also took steps to create financial institutions specifically catering to the needs of new technology-based firms and to establish a venture capital industry, primarily based on public firms. The Singaporean government has also actively nurtured venture capital institutions. Even though financial market interventions were common in the East Asian NICs, they are risky and less feasible today, but if properly targeted and monitored a case for such interventions can still be made (Lall 1998).

### **Regulatory framework**

Various features of the regulatory framework, beyond the basic ‘rules of the game’ recognised in the market-friendly view, have a bearing on processes of technological development. Here we consider regulations related to *technology transfer*, the encouragement of *export activities*, *competition*, *foreign investment*, *intellectual property right protection*, and *development plans*.

Government may intervene to increase *technology transfer* or improve the terms under which it is conducted. Government may stimulate the participation of local agents in the transfer and absorption of imported technological packages by providing subsidies and fiscal incentives for local involvement. An alternative strategy is to guide or subsidise TNCs to enter targeted activities or conduct R&D locally (Singapore). Today, FDI restrictions are less feasible, and an alternative strategy is to encourage TNCs to conduct higher value-added activities locally through large investments in education/training and through upgrading of local suppliers, infrastructure and support institutions. Developing countries licensees are often disadvantaged *vis-à-vis* foreign licensors. They may not be aware of alternative suppliers or be able to assess the commercial value of a license, possibly resulting in higher licensing fees or overly restrictive agreements, e.g. restrictions on local adaptations, requirements that the licensee informs the licensor about adaptations, or export restrictions. Governments may impose limits on royalty payments or be able to achieve favourable changes in the terms of licensing agreements, e.g. through information dissemination or through their ability to control the access of licensors to the domestic market. Korea and Japan carefully screened licensing agreements, particularly to avoid export restrictions. Korea’s restrictive policies towards FDI and foreign licenses induced companies to acquire foreign technology in the form of capital goods and turnkey plants. A slight overvaluation of the local currency and tariff exemptions on imported capital goods facilitated these forms of transfers. At a certain point, in the early 1980s, Korean government relaxed its policy on FDI and foreign licenses to facilitate advanced technology transfers, which were only possible if foreign partners could retain control. In Taiwan, the Electronics Research and Service Organisation (ERSO)<sup>12</sup> licensed technology from abroad and subsequently sub-licensed it to local firms to avoid price-raising

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<sup>12</sup> The publicly owned ERSO was set up in 1974 with the purpose of acquiring semiconductor design and production capability by recruiting a foreign partner to help develop and commercialise the technology.

competition among them.

Another universally recognised factor underpinning the economic growth of East Asian nations is their early push towards *exports*, which imposed dynamic incentives upon firms for upgrading and efficiency and provided them with various learning opportunities. Nelson (1996) finds that effective innovation depends on whether the combination of fiscal, monetary, and trade policies encourages exporting and, more specifically, that the extent to which firms quickly tried to compete on world markets was a major determinant of the success of infant industry protection programmes. In Korea, while the small domestic market was protected to foster infant industries, from early on government pushed and pulled companies to compete in export markets to obtain economies of scale. This also imposed stringent cost and quality requirements on the exporters, which required companies to acquire, master, and adapt/develop technology. Export activities also brought companies in contact with foreign OEM buyers from whom technology was transferred in the process of securing processes and products in accordance with buyer requirements. Korea applied export subsidies and suasion to push companies to export and to compensate for an overvalued exchange rate and protected domestic market. While export subsidies are inapplicable in the current international commercial climate, various forms of institutional support may be considered to attain export orientation.

In Korea and Taiwan, firms were not only required to compete in export markets. While the domestic market was protected from foreign imports and investments, this was combined with fierce *domestic competition*. Competition in the domestic market was gradually increased along with the liberalisation of imports and foreign investments. This increased the pressure on local firms to compete on the basis of innovation. A special non-market competitive mechanism discussed in the 'Miracle Study' was the conduction of 'contests': in Korea and Japan, firms were encouraged to cooperate and the number of competing firms was kept down to be able to attain scale. Instead of having a large number of independent firms compete in markets, 'contests' were instrumental in avoiding inefficiency and collusion: firms were required to compete for government-controlled scarce resources, particularly credit, foreign exchange, licenses to initiate or expand activities, and import protection. These favours were then granted according to export performance and international competitiveness. Thus, the East Asian experience suggests that it is important to combine protection with competition to prevent inefficient allocation of resources and to curb rent-seeking.

*Foreign direct investment* is an important source of technology, but there are risks inherent to relying too heavily on foreign technology, and industrial policy consequently needs to distinguish between enterprise ownership: TNCs can bring definite advantages to industrialisation processes with the capital, skills, technology, and market access they command, but since they tend to exploit static comparative advantages and retain advanced activities elsewhere, interventions may be needed to encourage them to 'deepen' local production and conduct more dynamic and complex activities locally. This might take the form of changing incentives to encourage local technological activity (as in Singapore) or restricting foreign entry and encouraging and supporting local companies to develop R&D and other technological capabilities themselves (Korea and Japan). In the short-term and to the individual company, simple import or licensing may appear cheaper, even though there may be long-term advantages associated with the adaptation of imported equipment, and even though the cost of such efforts is likely to decline as firms gradually learn how to perform them. Technological efforts on the part of firms can reduce the cost of technology imports, increase the ability to exploit new technological opportunities, and reduce dependence on imports. In Korea and Taiwan, restrictions on FDI were used as part of a strategy to build local capabilities. Although emerging industries did have to rely on foreign components, machinery and know-how, local entrepreneurial and managerial talent were nurtured. This, however, requires a considerable base of human resources and entrepreneurial talent to ensure that local efforts can actually substitute for technology imports.

At the early stages of development, lenient *intellectual property right laws* facilitate local imitation of foreign products and processes, but later on when local companies themselves become

able to undertake development work, lax laws may discourage local development efforts. More strict laws, on the other hand, make it imperative for firms to acquire foreign technology or step up their own R&D. Accordingly, one could envision systems of flexible and variable protection, contingent on the industry or activity in question and its state of development as being developmentally superior. But today, developing country governments have less leeway in this respect: intellectual property right protection with respect to patents, copyright, and brand-name laws is more diligently pursued globally through the WTO and other fora.

Governments commonly formulate *development plans* related to economic development and establish special bodies to devise them and oversee their implementation. The plans typically reflect ambitions to shift from a low to a high technology growth path by taking on more complex industrial activities, increasing local value added in production and design, increasing local innovative activities, etc. Besides determining areas of direct government activism, such plans constitute part of the incentive structure influencing the direction and intensity of private efforts. Plans commonly set growth targets, specify promoted activities, identify areas particularly suitable for local development or for joint local/foreign development, and co-ordinate efforts between different activities or sectors. In both Taiwan and Korea development plans were prominent. Quite early (1967), the Korean government created a Ministry of Science and Technology to coordinate the technology-related activities of other ministries.

## **The Four Approaches to Economic Embeddedness**

So, which specific entities and issues did these various approaches consider? The table below summarises their main focal points. The table brings out more clearly a deviation of the literature on business systems from the other perspectives: the business system approach is mainly analytical, while the other perspectives have a more prescriptive flavour.

Table 3.1: Main issues addressed in approaches to economic embeddedness

	NSI	Business systems	ITD	Industrial policy
General policies (incentives)	Policies towards - competition - intellectual property rights	Dominance of the state and its willingness to share risks with private owners State antagonism to collective intermediaries Extent of formal regulation of markets	Macroeconomic policies Foreign competition Domestic competition	Competition
Technology policies	Policies towards industrial innovation		Technology imports, FDI, promotion of local R&D, other interventions to strengthen ITD	Technology transfer Export push FDI regime IP protection Development plans Government-business deliberation
Labour and skills	Education and training system (including quality and attitudes instilled) Labour-management relations	Strength of public training system and of state-employer-union collaboration Strength of independent labour unions Strength of labour organisations based on certified expertise Centralisation of bargaining	Skills in the areas of - worker and supervisory - technical - production engineering - design and development - scientific and basic research - managerial, organisational, marketing	HR development
Information and technical support	Level and organisation of R&D activities and sources of its funding Roles of universities		Knowledge of the need for ITD effort Knowledge of kind of effort to promote ITD Access to information from other firms, institutions, universities, etc. Standards, metrology, testing facilities Technical extension services Contract research, design, training Information services on technical sources, trends Basic research support Access to technological information worldwide	S&T infrastructure Industrial extension
Economic agents				Capable firms 'Specialised technological agents' Infant industries Public enterprises
Industrial organisation	Characteristics of important firms and industries (internal organisation of firms; inter-firm relationships) Firm-internal R&D labs User-producer interaction			Supporting industries, subcontracting, SMIs Inter-firm cooperation, e.g. in R&D, rationalisation
Finance	Institutional set-up of the financial sector	Capital market vs. credit-based financial system	Availability of finance at appropriate rates and in sufficient quantity for R&D Equity-sharing finance for innovators Special finance for small and medium enterprises	Finance

## General Requirements to Industrial Policy

Industrial policy obviously needs to be tailored to its particular targets and their context. Consequently it is difficult to formulate policy requirements at a general level. However, experience shows and common sense dictates that government bureaucracy should be sufficiently *capable* to devise policies and carry them out; that policies need to be continuously *monitored and adjusted*; that policy focus in a given area should *gradually shift* from technology search, acquisition, and assimilation to indigenous improvements and innovation; that targeted activities should *only deviate incrementally* from the existing capability base; that targeted activities can gradually be performed with *greater reliance on markets*; that support should be tied to *performance requirements*; that policies should be *truly selective*; and that policies should be *wide and flexible*. We will expand on these points in the following.

Government support for technological activities is not a mere technical issue but is contingent on sufficient *government capacities* in both policy formulation and implementation and on socio-political issues related to the economy in question. History is littered with examples of governments intervening in counterproductive ways retarding technological development, efficiency, export growth, and structural change (Lall 1992; World Bank 1991), and Lall (1992) recognises that few governments possess the capacities to intervene on the scale it has been done in Korea. In the absence of such capacities, broader functional interventions at a subsectoral level may be preferable, leaving it to market forces to sort out the best enterprises and technologies. Pack and Westphal (1986), among others, prescribe that if the requisite government capacities are lacking, it is better to adhere to neoclassical prescriptions for a neutral policy regime. On the other hand, if there are indeed the benefits associated with selective interventions which a wide range of authors believe, a more reasonable recommendation would seem to be to initiate efforts directed at enhancing government capacities. Just as productivity and growth in manufacturing depend on the gradual and painstaking accumulation of technological capabilities, so does the effectiveness of government interventions depend on adequate administrative and organisational capacities. The acquisition of these capacities are subject to the same uncertainties, learning costs and economies, etc. as those associated with manufacturing technology.

Policies need to be continuously *monitored* and government needs to be able to respond in an effective and timely manner. Pack and Westphal (1986) assert that '[...] selective intervention can bring successful results only to the degree that it entails successive implementation and reformulation of detailed strategy through the accumulation of information relevant to judging progress toward an unambiguous objective' (p. 103). It has also been suggested that there are significant externalities associated with the information gathering during the course of monitoring from which private industry may benefit. The, by many accounts, failure of the Korean heavy and chemicals industry drive is usually ascribed to government being unusually unable or unwilling to respond to indications that projects were performing badly.

Since late industrialisers tend to advance from replication of mature products and technologies towards indigenous adaptations, improvements, and innovations, there is obviously a *sequencing* to interventions: at an early stage, focus is most appropriately placed on the acquisition and assimilation of proven technologies, and techniques such as capital goods imports, learning-by-doing, and reverse engineering are to a large extent sufficient. Later, indigenous development efforts become more relevant to maintain competitiveness in the face of rising local costs and increasing competition from low wage locations, more reluctant technology transfer from developed country competitors, pressures to tighten IP protection, and possibly protectionist counter measures in advanced markets.

Since learning is cumulative and incremental, interventions are more likely to succeed if they support activities that have *a base in existing skills and knowledge* in a country. New technological 'leaps' must be modest, based on realistic assessments of what is feasibly attainable within reasonable periods of time.

It is a sensible assumption that government intervention is more needed in the early stages of an industry's development and can subsequently be scaled down. The most significant feature of Korean, Taiwanese, and Japanese industrial policy, according to Pack and Westphal (1986), is a 'dual policy structure' between industries in which the countries already had comparative advantage and those in which they did not. In the former case, industries were subject to a neutral incentive regime, in the latter various forms of selective interventions were applied, e.g. credit rationing and preferences, import quotas and tariffs, licensing controls, tax preference on income from exporting and other tax inducements. They find that successful selective intervention in East Asian countries has been characterised by being exactly that, selective. The development of distinctly new capabilities for existing or new industries was only attempted in a few areas at a time, while at the same time, the use of already existing capabilities was left to market forces operating in response to largely neutral incentives.

The East Asian experiences show that promotion and protection should be limited, combined with competition in the domestic market, include a phasing-down schedule, and be conditional upon *performance requirements* such as export and productivity increase targets. To avoid spreading scarce resources too thinly, *selectivity* is at the heart of industrial policy.<sup>13</sup> An appropriate balance between reliance on imported technology and local efforts needs to be struck, and some areas, sectors, and activities promoted while others not. Finally, overly specific and narrow policies are inherently risky: if investments are associated with large sunk costs or specific assets, the costs of becoming locked into an inappropriate development path would be considerable. This implies that strategies should be based on *wide* search, variety, experimentation, and some slack and redundancy. *Flexibility*, the extent to which goals can be altered and strategies revised and adjusted with modest delay and cost, becomes a quality in its own right.

## NEPAD: Background and Purpose

The New Partnership for Africa's Development (NEPAD) is the latest grand attempt to set out a continent-wide development programme.<sup>14</sup> Its long-term objectives are poverty eradication, sustainable development, demarginalisation of Africa in the globalisation process and promotion of the role of women in all activities (NEPAD 2001).

Even though the initiative has met with a variety of criticism, it is nevertheless widely deemed as the best chance the continent has had for years of ensuring that its concerns are heard widely in the international community. It has the necessary boldness and simplicity to move African concerns up the agenda of the G8 and the OECD and has already succeeded in doing so.

NEPAD emerged at the joint conference of Africa's ministers of finance and economic planning in May 2001. It is strongly promoted as African in origin and Africa-driven, though this characterisation is questioned by some for reasons we will return to in the following.

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<sup>13</sup> It is a prominent theme in the debate on industrial policy whether interventions should be 'functional' or 'selective'. Selective interventions are interventions directed towards specific industries or clusters, generic technologies, regions, or even firms (Amsden 1989; Wade 1990; Pack & Westphal 1986; Lall 1996), such as the creation of particular types of skills, the setting up of institutions to promote particular 'strategic' technologies, the financing of 'mission oriented' research, the granting of infant industry protection or subsidies, the channelling of local or foreign investments into particular activities, or negotiating with and regulating international investment and technology transfers to achieve technological objectives. Functional interventions (World Bank 1993) are interventions with a more uniform effect in an economy, such as human resource development, general infrastructure provision, export promotion, and openness to international technology flows. Selective interventions are far more complicated to accomplish since they need to be highly context specific and evolve over time. Moreover, the highly different paths taken by the East Asian NICs suggests that there is no single package of interventions that will ensure success. Lall and Teubal (1998) introduce an intermediate policy category, 'horizontal policies'.

<sup>14</sup> But it is not the first: the Financial Times quotes a G7 official for saying that there have been some 18 Africa development initiatives in the last 20 years (Beattie&Lamont 2002). For brief reviews of some earlier initiatives, see (Stefański 2002; Akinrinade 2002). Proponents argue that leadership and African ownership as well as a new set of circumstances makes this initiative different.

The stated aim of NEPAD is to achieve the overall 7 per cent annual growth necessary for Africa to meet one of the Millennium Development Goals (MDGs): halving poverty by 2015.<sup>15</sup> It is estimated that Africa needs a yearly transfer of US\$64 billion to meet this target, a tall order compared to the current transfer of US\$10 billion. The envisioned sources of transfer are increased debt relief, aid, investment and market access.

NEPAD covers four broad areas which are defined as prerequisites for the success of the programme: Peace and Security; Democracy and Political Governance; Economic and Corporate Governance; and Sub-regional and Regional Approaches to Development.

## ***Genesis and Relations to the African Union***

NEPAD needs to be understood on the basis of its historical genesis and its relation to the parallel project of the African Union.

### ***The AU***

The Organisation of African Unity (OAU) was first created in 1963 by 32 independent African states to promote co-operation among African states towards self-government and social progress. Over the years however, the OAU acquired a reputation of not being very effective and with the end of apartheid and the rehabilitation of South Africa into regional politics, a need was perceived to start afresh with a new mandate. A further impetus came when the long-aspiring pan-Africanist, Colonel Muammar Gaddafi, proposed the immediate declaration of a politically unified 'United States of Africa' at the Extraordinary Session of the OAU in September 1999 in Sirte, Libya. This proposal was too dramatic for most governments and instead the Session decided to set up a committee of experts to design an African Union. A Constitutive Act was adopted a year later at the OAU Lome summit, and the African Union was officially launched in July 2002 in Durban, South Africa with a First Assembly of the Heads of States of the African Union.

The African Union encompasses 53 of the continent's 54 countries<sup>16</sup>. It is more ambitious than the OAU and envisions a faster and closer political and economic integration across the whole continent. It is to a large extent modelled on the EU and it plans seventeen Union institutions including a Commission, a Pan African Parliament, an African Court, an African Economic, Social and Cultural Council (ECOSOC), and various unitary financial institutions.

### ***The NEPAD***

Regional economic integration has long been an aspiration in Africa: the 'Lagos Plan of Action' for economic integration was adopted in 1977 and in 1991 the 'Abuja Treaty', which planned the gradual establishment of an African Economic Community over a period of 34 years. Subregional integration has also been proceeding, with moves towards monetary union in West Africa, the revitalisation of the East African Community of Kenya, Tanzania and Uganda, and other initiatives.

The primary champions behind the NEPAD have been the presidents of South Africa, Nigeria, Senegal, and Algeria:<sup>17</sup> Thabo Mbeki, Olusegun Obasanjo, Abdoulaye Wade, and Abdelaziz Bouteflika. The initiative emerged in Algiers in May 2001 when the joint conference of Africa's ministers of finance and economic planning decided to merge three preceding and similar initiatives

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<sup>15</sup> This would mean more than doubling the current yearly growth rate of 3.3 per cent. Since the early 1980, real GDP growth has averaged only 2.5 per cent (Funke&Nsouli 2003) and with population growth rates in excess of 2 per cent per annum real per capita growth rates in sub-Saharan Africa were negative on average throughout the whole period 1975-1999 (Loxley 2003).

<sup>16</sup> Morocco is not a member because of the organisation's recognition of the 'Sahrawi Arab Democratic Republic,' the self-proclaimed government of Western Sahara, which is under Moroccan administration.

<sup>17</sup> In addition to South Africa, Nigeria, Senegal and Algeria, Egypt is often included as a fifth country behind the initiation of NEPAD.

into one: The Millennium Partnership for Africa's Recovery Programme (MAP), the OMEGA Plan, and the Compact for African Recovery.<sup>18</sup> The new initiative was first named simply the 'New African Initiative'. The July 2001 OAU summit in Lusaka then mandated an implementation committee of 15 heads of state to manage it and in October the committee renamed it the New Partnership for Africa's Development (NEPAD) and established its secretariat in South Africa.

NEPAD is a compromise between the emphasis of each of the three preceding initiatives: the MAP and the OMEGA Plan especially focussed on investment in various forms of infrastructure. The ECA's Compact was the perhaps the most substantive of the initiatives but lacking strong government backing, it is less visible in the NEPAD documentation (de Waal 2002). However, the core NEPAD ideas of 'enhanced partnership', mutual accountability towards development outcomes and peer review, which we will return to below, were all developed in the Compact document.

### *The AU-NEPAD relationship*

NEPAD's relationship with the African Union is important, yet still unclear. Formally, NEPAD has been described both as a 'programme in support of the African Union' and as a 'mandated initiative of the African Union'. NEPAD is most commonly thought of as the economic and social programme of the AU. On the other hand, de Waal (2002) suggests that NEPAD is also an attempt to evade the slow and unruly process of the OAU/African Union: the key leaders of the initiative, especially President Mbeki, were wary of the dangers of it being derailed by the interference of small, ill-governed countries wanting to ensure that their voices were heard and their rulers paid off.

Even though Libyan influence on the process has diminished as the African Union has moved into the mainstream of regional institutional politics, Presidents Mbeki, Obasanjo and Bouteflika were also concerned that tying NEPAD into the OAU/African Union would expose it too much to Libyan influence, with immediate adverse consequences for the receptivity of OECD and G8 donors. Hence, the linkage between the OAU/AU and NEPAD has remained largely at the level of rhetoric and there is little convergence between the institutional structure of the two: there is no AU control, let alone veto, over NEPAD.

### ***'Enhanced Partnerships' and the APRM***

At the core of the NEPAD lies two important and novel concepts: the notion of 'enhanced partnerships' and the African Peer Review Mechanism (APRM), which hold the potential to substantially transform the aid relationship. The 'enhanced partnership' is put forth as a principle of joint responsibility and mutual accountability: rather than donor-imposed conditionalities, which have proved ineffective and burdensome in the past, 'enhanced partnerships' are to represent common commitments by African countries and donors to a set of development outcomes defined by African countries, whereby donors pool funds, guarantee them for an extended period and channel them through budgetary processes, which are then jointly monitored on the basis of outcomes.

The notion of 'enhanced partnership' sets NEPAD apart from the AU: whereas the AU has no criterion for membership except being located in Africa, participation in 'enhanced partnerships' is

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<sup>18</sup> Then MAP began with a mandate given by OAU to President Mbeki along with President Olusegun Obasanjo of Nigeria and President Abdelaziz Bouteflika of Algeria, to investigate how Africa could overcome its debt crisis. It was inspired especially by President Thabo Mbeki of South Africa and his vision of the 'African Renaissance', which encompassed not just economic development, but cultural, social and political regeneration too. The second component, the OMEGA Plan of Senegal's president, Abdoulaye Wade, was initiated later, in the early months of 2001, and focussed on regional infrastructural and educational projects. The third, the Compact for African Recovery, was initiated by the executive secretary of the UN Economic Commission for Africa, K.Y. Amoako, under a mandate by African ministers of finance in late 2000.

contingent upon meeting certain standards of governance and economic management.<sup>19</sup> This introduces a politically very sensitive element of discrimination among African countries.

The African Peer Review Mechanism (APRM) is similar to the peer review in the OECD, which is regarded as a successful means of identifying and promoting appropriate practices: African countries are to monitor each other's progress according to a set of benchmarks and the scheme specifies an ambitious range of targets for conflict prevention, good governance, poverty reduction and disease control, including HIV/AIDS. The expectation is that this will introduce a pressure on badly performing countries to do better.

The aspiration is that the integrity and standard of the reviews will be sufficiently high for the donors to abandon their own monitoring process and accept the outcomes of the APRM. Reviews are not intended to be imposed on countries; rather countries should step forward for review themselves. One of the greatest incentives is the promise of debt relief. If the mechanism is implemented, a small group of well-performing countries are likely to step forward for review and the reward will be entry into 'enhanced partnerships' under which they will receive increased aid and investment.

## **NEPAD and the Donors**

The progress of the NEPAD is obviously critically dependent on its reception by the donor community, and it has generally been received with applause and enthusiasm. This is perhaps little surprising given that the ideas that underpin NEPAD, specifically that on 'enhanced partnership', were strongly influenced by emergent best practices on the part of a number of like-minded donors, e.g. the UK, Canada, the Netherlands and the Scandinavian countries.<sup>20</sup> By some, NEPAD is even seen as an excessive accommodation to donor preferences, as we will return to below.

NEPAD is also generally well-aligned with what was dubbed the 'Monterrey consensus' at the Financing for Development Conference in Monterrey in March 2002, which *inter alia* stresses that more aid should be channelled to the 'good performers'; that developing countries should assume more responsibility for their own development processes; and that international trade and foreign direct investment are the primary drivers of development.

In Monterrey an additional US\$12 billion per year were pledged for global development assistance by 2006. Shortly afterwards, at the G8 Summit in Kananaskis, Canada, the G8 agreed that half or more of this money *could* go to Africa, to those countries that 'govern justly, invest in their own people and promote economic freedom'. If implemented, this would represent an increase by almost 50 per cent of the US\$10 billion development assistance to Africa in 2002. But of course, as always in politics, formal policies and plans are not necessarily consistent with eventual implementation.

Also in Kananaskis, where African leaders were allowed to attend for the first time (Stefanski 2002), the G8 adopted an Africa Action Plan (AAP) in response to NEPAD, which spelled out how the G8 perceives the NEPAD and their role in it:

[NEPAD] is, first and foremost, a pledge by African Leaders to the people of Africa to consolidate democracy and sound economic management, and to promote peace, security and people-centred development [...] [African Leaders] have formally undertaken to hold each other accountable for its achievement. They have emphasized good governance and human rights as necessary preconditions for Africa's recovery. They focus on investment-driven economic growth and economic governance as the engine for poverty reduction [...]. (G8 2002)

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<sup>19</sup> Formally though, Article 30 of the Constitutive Act of the Union stipulates that only governments, which come to power through constitutional means, should be admitted to the AU.

<sup>20</sup> For example, Britain's Department for International Development (DfID) has been experimenting with guaranteeing long-term assistance flows through the budgetary process to Rwanda and has been supporting participatory Poverty Reduction Strategy Papers in a number of countries (de Wall 2002).

It is clear from the Africa Action Plan that the G8 countries will not decide *en-bloc* to transfer aid and other resources to African nations. Rather, each of the G8 countries reserves the right to decide with which African countries they want to partner and when and how. Individual G8 countries decide 'on the basis of measured results' which countries they would want to form partnerships with but in doing so they will be informed by the results of the peer review process NEPAD is putting into place. Yet, the G8 welcomes partnership based more on African priorities than on donor assumption of Africa's requirements.

Even though Jacques Chirac had announced that the 2003 G8 Summit in Evian, France, should focus on Africa and development, a plethora of other economic and political issues, including the war in Iraq, pushed development issues far down the agenda. Chirac did however call on fellow G8 members to make good on the pledge to provide an extra US\$6 billion a year in aid to Africa.

The United Nations and the OECD have adopted NEPAD as the basis upon which to build future relations with Africa.<sup>21</sup> But the US Millennium Challenge Account (MCA) set up in November 2002, may seem at odds with the thrust of NEPAD: the MCA is US\$ 5 billion of new aid money to be dispensed to those countries, which score highly on a specific benchmark system measuring good governance, economic liberties and delivery. By acquiring recipients to comply to a set of pre-specified criteria this appears to run counter to the principles of indigenous aid agendas and African peer reviews.<sup>22</sup>

### **Criticisms of the NEPAD**

NEPAD has already met with a variety of criticism from both within the continent and from outside: From outside, the willingness of observers from two of the main architects behind the NEPAD, South Africa and Nigeria, to endorse the outcome of the elections in Zimbabwe in March 2002, in spite of rigging and intimidation, met with stark criticism and was interpreted as questioning the sincerity of the NEPAD agenda of promoting good governance, democracy and the rule of law. Even though some argue that the Zimbabwe issue is outside the scope of NEPAD and that it should not be expected to pass judgement on it (de Waal 2002; African Business 2003), this may be too fine a distinction for some donors to make. More recently, in April 2003 President Olusegun Obasanjo of Nigeria, one of the architects of NEPAD, was declared the winner of an election described by European Union observers as 'marred by serious irregularities and fraud' (Peel 2003).

NEPAD has also been widely criticised from within the continent. NEPAD has been designed by experts and adopted by governments with little public consultation; there has been no involvement of Parliaments or consultations with civil society in the plan's construction. At least in the longer term, this impedes NEPAD's own agenda of strengthening popular ownership and promoting democracy.

In late 2001 and early 2002, virtually every major African civil society organisation, network and progressive personality attacked NEPAD's process, form and content (Bond 2003).<sup>23</sup>

According to Adebayo Olukoshi (2003), executive secretary of the Council for the Development

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<sup>21</sup> UN General Assembly resolution A/RES/57/2 adopted NEPAD as the general framework around which the international community including the United Nations system should concentrate its efforts for Africa's development.

<sup>22</sup> Instead of dispensing the yearly US\$5 billion MCA funds through international organisations and USAID, the Bush administration has set up a new organisation, the Millennium Challenge Corporation, which is envisioned to enter into business-like contracts with individual African states. Furthermore, the administration intended to only apply Congress for an initial allocation of US\$1.7 billion and it is likely that only US\$7-800 million will eventually be allocated.

<sup>23</sup> In April 2002 a number of African intellectuals and organisational representatives met at the Third World Network conference in Accra, Ghana and adopted a 'Declaration on Africa's Development Challenges' very critical of the NEPAD: NEPAD is characterised as being neo-liberal and perpetuating those structural adjustment principles, which proved negative to many constituencies on the continent. It also finds that the population has not been sufficiently consulted in its perception and that the plan is primarily designed to cater for 'the foreign donors'.

of Social Science Research in Africa (CODESRIA), the initiative represents a self-imposition of the tenets of neo-liberalism, structural adjustment and the donor conditionalities of the 1980s and 1990s, even though the orthodox structural adjustment framework is widely deemed as having had adverse effects for African development. It is designed to cater for donor interests rather than to reform the development agenda.

Based on an elaborate analysis of the neo-patrimonial underpinnings of African politics, Chabal (2002) seriously questions the prospects of both democratisation and the NEPAD. He finds that NEPAD reflects a continuation rather than a break from the type of relations that has guided the continent's engagement with the international community since independence and as a commitment on the part of African elites to secure the continued transfer of resources to Africa.

## **Recent Developments and Progress**

Which concrete progress has the NEPAD made then, in the two years it has been in existence? Too many words and not enough action many appears to feel (African Business 2003; Economist 2002). Trevor Manuel, South Africa's finance minister, has remarked: 'Ministers have been saying that they have talked about Nepad at more than seven meetings and they now want to move to some action. Implementation is the issue now' (Lamont 2002b). In his speech at the latest meeting of NEPAD's 20-member Heads of State and Government Implementation Committee meeting in May 2003, President Mbeki criticised the commitment of Africa leaders to the NEPAD: only seven or eight leaders were present at the meeting and only 10 governments had ratified the protocol to establish a peace and security council to intervene in conflicts on the continent. And at the AU Summit in Durban in July 2002, many rich countries were disappointed when NEPAD leaders presented exactly what the initiative was supposed not to: a shopping list of large infrastructure projects to be funded by donors (Beattie 2002; Lamont 2002a).

During the first year of NEPAD's existence, the international financial community has met it with diplomatic enthusiasm but did not come up with any meaningful funding. At Evian however, a number of concrete targets for increase in donor funding were set (G8 2003), and commitments were made to a number of the infrastructure projects proposed by NEPAD (Battersby 2003). NEPAD must also be credited with having achieved to push Africa visibly up the international agenda, e.g. at Monterrey, Kananaskis, Evian, and the 2003 World Economic Forum Africa Summit in Durban in June.

When evaluating the progress it is also important to note that the different components of NEPAD are accorded different priority: the economic and corporate governance peer review mechanism is central in defining 'enhanced partnerships' and in unlocking increased development finance and is accorded the highest priority. The other governance and peace and security components of the initiative are still in preliminary stages of discussion (de Waal 2002). Peer reviews of *political* governance, when and if it is implemented, will be a wholly new practice that has not been tried anywhere in the world.<sup>24</sup>

In the past year, six prominent Africans have been appointed to the peer review unit, which is scheduled to start its work in July 2003. But with only 15 of the 53 member countries of the AU having signed up for peer review, the enthusiasm for what could be the core of the NEPAD concept may appear limited.<sup>25</sup>

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<sup>24</sup> The track record of democratisation is not altogether bad: if Nigeria is included, 17 of Africa's 54 nations are now considered fully fledged or emerging democracies, compared with around four at the end of the 1980s. In three years elected governments in three countries, Senegal, Ghana and Kenya, have handed over power peacefully after being voted out and this is a rare occurrence in Africa. But in Zimbabwe political repression has become worse, Ivory Coast is balancing on the verge of breakdown, and Africa's first military coup in more than three years took place in March in the Central African Republic (Peel&White 2003).

<sup>25</sup> South Africa, Algeria, Ethiopia, the Democratic Republic of Congo, Ghana, Kenya, Mozambique, Nigeria, Rwanda, Uganda, Mali, Cameroon, Gabon, Burkina Faso and Senegal.

## The NEPAD Strategy and the Role of S&T

Having accounted for the genesis and the general features of the NEPAD, we will now turn more to its specifics: which concrete areas does the strategy target and which measures does it propose to advance the political, economic, social and cultural progress of the continent?

### The NEPAD Strategy

The programme of action in the base document of NEPAD (NEPAD 2001) identifies the following priority areas:

Table 2 NEPAD priority areas

**A Conditions for Sustainable Development**

A1 The Peace, Security, Democracy and Political Governance Initiatives

A2 The Economic and Corporate Governance Initiative

A3 Sub-Regional and Regional Approaches to Development

**B Sectoral Priorities**

B1 Bridging the Infrastructure Gap

B2 Human Resource Development Initiative, Including Reversing the Brain Drain

B3 Agriculture

B4 The Environment Initiative

B5 Culture

B6 Science and Technology Platforms

**C Mobilising Resources**

C1 The Capital Flows Initiative

C2 The Market Access Initiative

In the implementation plan the initiative proposes that some programmes be fast-tracked due to the need to sequence and prioritise, *viz.* communicable diseases (HIV/AIDS, malaria and tuberculosis), information and communication technology, debt reduction, and market access. The strategy duly recognises the shortcomings of a project based approach to development but finds that a number of crucial individual projects need to be implemented, e.g. in agriculture, private sector development, and infrastructure and regional development.<sup>26</sup>

### The Role of Science, Technology and Innovation

We will now turn to looking more specifically on science, technology and innovation. Which role is it envisioned to play and which importance is it accorded with in the NEPAD process?

Academics and researchers, representatives of sub-regional bodies and government officials met to consider these exact issues at a NEPAD Workshop on Science and Technology in Johannesburg in February 2003. The aims of the workshop were to develop a NEPAD framework for science, technology and innovation, define priorities, align national strategies and strengthen co-operation.<sup>27</sup>

<sup>26</sup> These projects are further specified in a separate document (NEPAD 2002). By June 2003, 41 out of 124 project on a 'high-priority shortlist' had been initiated (Fabricius 2003). At the WEF Africa Economic Summit in Durban in June, a NEPAD 'e-schools' project was launched. The project aims to connect all African high schools to the Internet before year 2008 and all African primary schools before year 2013.

<sup>27</sup> The workshop followed shortly after a ministerial session of the Science and Technology Forum on Sustainable Development in September 2002. The session adopted an Ubuntu Minute on Science and Technology for Sustainable Development, which stated that science, research, technology and innovation are indispensable, fundamental engines of sustainable development and should not be seen as luxury items. It said research in developing countries should be based on these countries' self-identified needs and called for the utilisation of science and technology in poverty alleviation and job creation. Another related event was the setting-up by Kenya, Uganda and Tanzania of a joint Science and Technology Council under the auspices of the East African Community (EAC) in January 2003. The Council is charged with boosting science and technology in the region through sharing and exchange of skills, fund

The declaration adopted by the workshop spells out a number of agreed areas of concern related to the African science and technology system (NEPAD 2003): lack of information on research activities on the continent; insufficient co-operation across national boundaries; weak linkages between scientific institutions and industry; underestimation of the potential of science and technology to address poverty issues; outward mobility and loss of African scientists; low quality of science education; and R&D expenditures below one per cent of GDP for most African countries. A number of concrete measures are recommended to address these weaknesses, *e.g.* instituting a monitoring and evaluation system of S&T in Africa, *inter alia* to inform policy; ‘mainstreaming’ of science and technology into the existing NEPAD sectoral programmes, which include health, agriculture, education, environment, governance, infrastructure, security, and investment and trade; creation and strengthening of centres of excellence; establishment of regional research and innovation programmes focusing on human development needs in for example space science, desertification, biotechnology and information technology.

The declaration also recommends that a special Forum on Science and Technology be established within NEPAD to push science and technology up the political agenda. The Forum should be made up of African science ministers and presidential advisors and supported by a panel of experts from science and industry and charged with identifying priority areas for African S&T. The declaration appeared to shy away from more sensitive issues such as intellectual property rights.

## Conclusion and Recommendations

How do the industrial policy issues and lessons discussed in the preceding sections apply to NEPAD’s economic policies? First of all, when exploring the applicability of lessons from East Asia on the NEPAD we should not overlook the obvious: that the so far weakly institutionalised pan-African initiative is not a strong East Asian state. History is littered with examples of governments intervening in counterproductive ways retarding technological development, efficiency, export growth, and structural change (Lall 1992; World Bank 1991). Lacking of such capacities, it is safer to adhere to a neutral policy regime or apply broader functional interventions, leaving it to market forces to sort out the best enterprises and technologies (Lall 1992; Pack and Westphal 1986).

However this is not the same as saying that the requisite institutional capacity could not or should not be developed. The World Bank recognises that state activism under the right circumstances leads to faster and more equitable growth (World Bank 1993, 1998). Developing such capacity would have to take into account that the political culture in Africa is generally very different from that in Japan, Korea, Taiwan and Singapore. Peter Evans (1995) identified ‘embedded autonomy’, *i.e.* East Asian states’ concurrent embeddedness in and separation from the business community and wider society, as crucial for the success of their activist economic policies. African states generally function according to neopatrimonial principles and tend to be much less professionalised and less institutionally separated from society than their East Asian counterparts (Chabal 2002).

The most immediate and obvious recommendation is therefore that any success of NEPAD’s economic policies is contingent on further institution building and, based on what we saw concerning the initiative’s progress so far, broadening and deepening of political commitment.

If we assume that NEPAD was to develop as envisioned, which policy recommendations could our presentation imply? Among the most urgent issues in terms of African economic development are upgrading from agricultural produce and extraction industries and diversification of manufacturing production and this could be addressed by an array of the techniques discussed. Export orientation should be attempted from early on and techniques to encourage technology

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raising, co-ordination of training programmes and the possible establishment an East African University. Addressing the division of labour between the NEPAD and other existing regional organisations, Kanbur (2002) suggests that regional research capacity is perhaps better left to the African Development Bank.

transfer applied; any preferential treatment should be tied to performance requirements, e.g. export performance or productivity increases; attention should be paid to attaining scale economies, and subcontracting and specialisation promoted; the processes should be supported with appropriate demand-driven extension services, designed and managed with active business participation.

We saw that some techniques applied in the past are no longer permissible under the new international trade regime. It would be worthwhile then to evaluate more systematically how NEPAD might exploit the WTO provisions for 'special and preferential treatment' for the least developed countries. Export subsidies and selective government procurement are still permitted in most African countries. Furthermore, we discussed two specific institutional techniques which might also be applied in the context of NEPAD: 'government-business deliberation councils' to enhance the quality of policy deliberation and the commitment to their subsequent implementation, and the use of 'contests' in public procurement as a mechanism to combine co-operation and competition.

In the course of reviewing the four approaches to economic embeddedness and the East Asian development experiences, we identified a number of general requirements for industrial policies. It is reasonable to assume that these requirements may be extended as recommendations to the NEPAD process. The requirements were: a strong and capable bureaucracy; continual monitoring and adjustment of policies; a gradual upgrading of activities, e.g. from assimilation to innovation; an (only) incremental upgrade from base; imposition of performance requirements; true selectivity to avoid spreading scarce resources too thinly; and applying wide and flexible policies.

We saw that economic development in East Asia benefited from the externalities flowing from local planning, monitoring and evaluation of government policies. Short of leaving the administration of the new US aid initiative, the Millennium Challenge Account (MCA), entirely to African states, it is likely that the wider the reliance on local planning, monitoring and evaluation, the greater the benefit for African states. Such local reliance could very well work through the African Peer Review Mechanism (APRM) and the enhanced partnerships.

The APRM has the potential to become an important instrument to strengthen innovation systems on the continent: peer reviews of good practice can stimulate policy learning (Dalum, Johnson, and Lundvall 1992) and thus provide a stronger institutional foundation for the promotion of innovation, competence building and industrial upgrading.

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