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Modes of Innovation and the Evolution of the South African National System of Innovation

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Modes of Innovation and the Evolution of the South African National System of Innovation Restrictions

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This paper uses the concepts of means of innovation and modes of innovation to introduce an alternative approach to the understanding of the evolution of the South African system of innovation. Modes of innovation are defined in terms of ownership and control patterns of the means of innovation, as well as the role played by human capital. The relationship between ideology and modes of innovation is briefly examined. This paper lays the basis for an alternative approach to the analysis of the transition of South Africa's economic structure from apartheid to democracy and of the rifts and continuities in that transition.

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**Modes of Innovation and the Evolution of the South African National System of
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The history of the political economy of South Africa is for the most part one of colonialism and the post-colonial system of apartheid. It is certainly a history that is fundamentally undemocratic and this has formed the essential shape of the South African system of innovation. It is a shape that has not significantly changed since the advent of democracy, primarily because of the adoption of the neoliberal paradigm as the conceptual base for the first economic plan of the new democracy, the *Growth, Employment and Reconstruction* programme (GEAR). Even though there is now a widespread disillusionment with that paradigm, both locally and globally, economic planning in South Africa is still caught up in a neoliberal language framework. The various attempts to address the recognised shortfalls of GEAR have been fragmented and sorely lacking in an alternative unifying informing conceptual framework. In this paper I propose an approach to recent South African economic historiography that may provide an alternative look at the evolution of its national system of innovation.

Modes of innovation

If we start of with a definition of innovation broad enough to encompass all alterations in human activity which represent within specific contexts a real, or perceived, "better practice", we may talk about an innovation theory of value. From the premise of this definition of innovation the value of all production and economic activity may be seen as the embodiment of past streams of innovation. This is closely linked to human capital from which all innovation ultimately derives and its counterpart would be a human capital theory of value. The means of innovation include human capital, machines, tools, plant and equipment, and infrastructure which are combined in production and economic activity and reflect current and past streams of innovation. As a stock and a flow concept, they capture both the innovation embodied in economic activity and the streams of innovation which are at the heart of dynamic systems. The distinction between the human and the non-human means of innovation is crucial because it directly affects the patterns of the ownership of and the control over the means of innovation. The patterns of control over the means of innovation normally derive from three sources. These are control over one's own human capital, control of the non-human means of innovation and control of the coordinating mechanisms and institutions that determine the "innovation production function". In neither case does control necessarily equate to ownership. The possible combinations of the means of innovation and the ownership and control structures which bring them together define the modes of innovation. This concept can be used to classify shifts in the evolution and the "development stages" of systems of innovation.

Within the context of the national system of innovation, the different modes of innovation are defined by the combination of two core characteristics. These are the patterns of ownership and control of the means of innovation, and the rates, spread and types of human capital investment that are required to reproduce the specific mode. The combination of these two categories of parameters determines the power configuration of different modes of innovation. The evolutionary forces inherent in dynamic systems would be the source of the shift from one mode of innovation to another, but different modes of innovation can exist

within the same system of innovation and the relationship between them would provide another defining feature of the national system of innovation. Modes of innovation are fundamentally dynamic and can be further defined by the institutional tension between innovation and conservation. Systems are thus in a perpetual state of flux and apparently static systems are those where the forces for innovation and conservation are temporarily balanced, giving the appearance of stability.

Within this approach, the concept of an innovation theory of value proposes that the value of output is defined by the streams of innovation that have gone into its production and into all inputs that are used in production. This concept differs from that of a labour theory of value in that it shifts the notion of value away from the general category of labour to that of human capital and the innovative capacity of labour. The second distinction is the shift of emphasis away from production to knowledge. Moreover, the object of the analysis of control and ownership also shifts from tangibles to knowledge. The means of innovation are closely related to technological capabilities, defined as the ability to absorb, adapt and create innovation but they also include the determinants of technological capabilities, those institutional factors that promote, shape and deploy technological capabilities. In terms of classification, the post-Enlightenment period can be divided into three stages which are associated with different predominant modes of innovation. However, although these stages are presented as chronological, any of the associated modes can and do exist simultaneously within most systems.

The first stage is the early industrial period characterised by the owner/manager “captain of industry”. This period, spanning from the beginning of the industrial revolution to the last part of the 19th century, was marked by radical innovations and techno-economic paradigm shifts which altered the foundations of the economy but which were still widely separated over time. Freeman and Perez (1988) show how different techno-economic paradigm shifts within this long period were linked to technological revolutions in core materials and transport. This period also marked the introduction of standardised production, division of labour and economies of large scale production. This was also the stage which, in a historically unprecedented manner, was marked by a heavy dependence on natural resources. The initial voyages of conquest and the start of the age of empire combined with the nascence of the industrial revolution were driven by the need to control the supply of natural resources across the globe. The proletarianisation of labour did require an investment in skills but the demand for broad based skills levels was generally low and static. Human capital formation and reproduction mostly occurred via non-formal institutions such as apprenticeships. In this stage the predominant means of innovation at any point were largely non-human and successive technological breakthroughs did not normally require an accompanying quantum leap in the skills base of the labour force or much of an increase in the rate of investment in human capital. Consequently, during this stage the combination of a high degree of lumpiness of capital and technology and relatively low requirements of broad based skills resulted in a high level of concentration of both the ownership and the control of the means of innovation. The early industrial mode of innovation is thus one where the principal-agent problem is not relevant due to the equivalence of ownership with management and control.

The second mode of innovation is that of mature industrialisation which reached its epitome after the Second World War. Its main distinguishing feature was the progressive separation between the ownership and the control of the means of innovation. With the diffusion of equity, control shifts to the new technocracy and the principal-agent problem with the possibility of divergent objectives arises. To a large extent this was caused by the increasing capital requirements of new technologies within a context of a growing frequency of radical innovations and techno-economic paradigm shifts. The demand for broad based technological capabilities and the necessary higher rates of human capital investment also

increased. Within this mode, the process of human capital formation and reproduction is formalised through schooling systems encompassing primary and secondary schools, technical colleges and higher education institutions. Simultaneously, with the separation of management from ownership, a new managerial class was developed and scientific management was introduced with Taylorism and Fordism in the early part of the twentieth century. This was the age of ever larger production runs in a global economy whose core feature was an apparently inexhaustible supply of cheap energy. This exerted an upward push on wages marked by a progressive shift in the global division of labour with heavy natural resource/low skills based industry moving out to the global periphery. The power of capital within this mode was tempered by organised labour and by heavily regulated political economies within a Keynesian macroeconomic policy framework. At the same time the war had ushered in big science with the initial public investments in R&D leading to the commercial applications and this heralded the emergence of the third stage.

The third mode of innovation is that of the post-industrial knowledge economy whose defining feature was the microelectronics revolution. This is characterised by the shift of the economy away from manufacturing to services and from long batch production to shorter lines with ICT enabled design pervading most manufactured product lines. The frequency of radical innovations and techno-economic paradigm shifts is historically unprecedented with the consequent rapidly changing requirements of new sets of technological capabilities. There is the dawn of new techno-economic paradigms with biotechnology and nanotechnology indicating coming structural shifts in production and cost structures and new economies of scale and scope. The global division of labour is further differentiated with economies being distinguished by the predominance of specific modes of innovation. This mode of innovation is also associated with globalisation and the integration of global markets in a manner dictated by the neoliberal/neoclassical ideal. However, globalisation is not a necessary condition for this mode to emerge.

The new human capital requirement of the post-industrial mode of innovation represents a radical shift from the relatively linear progression in the earlier two modes. This mode sees the disappearance of lifetime jobs or even careers, professions and trade. It requires an ongoing personal investment in own human capital, an ever expanding learning capacity and multi-skilling, translated as the requirement to shift skills bases rapidly in response to the ever accelerating rate of change, be it technological or institutional. There is also a shift in the onus of human capital investment away from the state to the individual as university subsidies are reduced in favour of student loans and industry increasingly demanding “job ready” graduates.

The implications for the ownership and control patterns of the means of innovation are complex. On the one hand, there is a quantum leap in own investment in human capital by individuals combined with a proliferation of economic sectors where the lumpiness of other means of innovation has been dramatically reduced. On the other hand, the global integration of markets has led to a high degree of concentration of employers engaging with globally competing “knowledge workers”. Thus, while the individual ownership of the means of innovation has increased substantially there is a countervailing increase in the monopsonistic power of international capitalism. This complexity is compounded by the fact that the ownership of the non-human means of production at any point in time is widely dispersed among a vast pool of anonymous shareholders, which also includes all knowledge workers. The control of the means of innovation is now totally divorced from ownership and lies with the new technocratic class. Globalisation and the emergence of neoliberalism due to the economic crises of the 1970s have also shifted the balance of power between capital and labour. As regulation, and the enforcement of regulation, withers away and capital becomes

internationally fluid and able to source cheap labour from across the globe, the power of nation based organised labour has been significantly eroded.

National systems of innovation can therefore be classified by identifying the dominant mode of innovation and by assessing the degree of convergence of modes of innovation within the system. The combination of these two factors determines the evolution path of national systems of innovation. In the process of this classification two interrelated questions arise that directly address the political economy foundations of the national system of innovation. The first issue is the relationship between ideology and specific modes of innovation. The second is the relationship between the national system of science and technology and the national system of innovation. Before we get into that, however, we need to examine further the pivotal role played by human capital in the shift from one mode of innovation to another. Skills and the more generalised, and possibly ephemeral, concept of human capital are the ultimate source of innovation and more than other factors determine the enabling factor and at the same time the major constraint in the transition from one mode of innovation to another. It is therefore opportune to look a bit more closely at the nature and determinants of human capital.

Human capital

Unlike skills, the precise definition of human capital is difficult since it tends to go to the essence of the human condition. More than problem solving abilities which are shared by a number of other creatures, especially primates, it refers to the ability to formulate problems, to invent new questions and in the process alter the human condition. Narrowly, it can be defined as knowledge, both tacit and codified, that is embedded in human beings and the ability to apply that knowledge to the production of goods and services. Tacit knowledge, the foundation of the propensity for learning, is developed primarily through specific cultural practices of problem solving and formulation. Its development is complex and long-term and it is specifically this aspect of human capital development that makes it such a costly long-term investment process. It is costly because it requires a large diversity of inputs whose supply must be guaranteed and secure over time. It is also a fragile process since human capital deteriorates unless there is continuous investment and it can disintegrate when the institutional underpinning of tacit knowledge is severely damaged, as is the case in times of political upheaval and war.

From a system of innovation perspective, human capital is possibly the foremost public good whose provision determines the evolutionary path of national systems of innovation. It is essentially a public good in that its returns cannot be appropriated entirely by any single individual, who owns it, buys it or rents it. It is subject to large potential externalities, where only a small portion of its returns that can be captured by the individual and is far outweighed by the returns to the economy as a whole. However, human capital formation without the corresponding institutional setting is not necessarily conducive to public welfare. The articulation between the human capital formation process and the skills requirements of the economy is essential to avoid the brain and skills drain from developing to industrialised economies that is endemic in a number of countries.¹ Secondly, without the appropriate employment conditions, human capital may translate into antisocial activity in the form of organised crime and widespread corruption. Finally, if human capital formation falls below specific thresholds it will be impossible to reproduce its base, let alone develop it. The

¹ South Africa has been experiencing a steady net skills drain since 1994 (Kraak, 2004).

returns on human capital will then mainly be private with little or no spillovers to the economy at large.

Human capital is a complex phenomenon. Its formation is the resultant of a convergence of various elements which include education, health, secure basic needs provision and a secure base of social capital. If we stray momentarily into neoclassical language we could say that human capital formation is a production process with several inputs that can be combined in different ways to produce a complex output. From within this language we can say that the productivity, or the effectiveness, of any single input is highly dependent on the other inputs. Thus, for example, the effectiveness of public spending on education, its marginal productivity, is positively correlated with the availability of the other inputs.

Human capital development is the result of a long term investment process requiring a stable guaranteed environment. The extent of the outlay on this long term investment, combined with its high externalities content requires state intervention on a wide front which covers much more than education. The long-term nature of this investment requires a set of stability conditions that would guarantee long term planning horizons. While the specifics of the location of human capital formation is often contingent on cultural, political and economic factors, it is generally the family unit, however that is defined, that is the main formative context for human capital. The stability conditions of the average family would therefore have to be guaranteed and protected from the vagaries of economic fluctuations in order to protect the source of this, the most important economic resource. From this perspective a welfare system that guarantees adequate housing, health care, food and education is not only a right but also a basic requirement for the country's development.

If we analyse human capital formation from a reductionist economist's viewpoint, we may say that this public good is one whose production has been privatised in its location within the family unit. The focus then shifts to the degree of privatisation. In most countries the rights of parents over the rearing of children are severely circumscribed. Laws against child labour, mandatory education laws and laws against the sexual abuse of children are all limitations on the power of parents over children and these institutions determine the context within which the family performs its role as the producer of human capital. Furthermore, we can propose, again using the production analogy, that the less the fiscal support of the state, the more costly it is for the family to perform this function and hence the less likely it is to perform it. An "absent state" will result in human capital formation becoming more of a private good, belonging to the privileged few since human capital formation is too costly a process for all but the wealthiest families to bear and certainly much too costly, given the externalities, to be provided by the business sector. The responsibility for a country's human capital formation thus lies fundamentally with the state.

The ideological implications of modes of innovation

The relationship between the ideological base of any specific political economy and the dominant mode of innovation in that economy is to a large extent dependent on the diffusion patterns of the ownership and control of the means of innovation. These, as I have argued are closely and causally linked to the mode of innovation. Another factor that enters into the relationship between ideology and the mode of innovation is the relationship between systems of innovation and systems of science and technology. There is a body of theory and empirical research that indicates a positive relationship between democracy and technological innovation (see Coccia, 2008). However, a historical, rather than a cross-country, analysis of South Africa indicates that a non-democratic and overtly racist political economy may actually have promoted the development of a sophisticated system of science and technology

while at the same time seriously compromising the evolution of the national system of innovation. This apparent contradiction is the problematic that may be addressed by a modes of innovation approach.

In the case of the diffusion of ownership the post industrial mode of innovation with its heavy knowledge and learning requirements would be best served by a political economic base that is democratic, both legally and economically. The distinction between the two types of democracy is important since each can exist without the other. Constitutional democracies can, and frequently are, marked by high levels of inequalities in income, wealth and life opportunities. In such cases the ownership of the means of innovation is highly concentrated and path dependency can prove a major impediment to the transition from one system of innovation to another. On the other hand, some political economies which are constitutional one-party states can often exhibit a greater levelling of the access of individuals to the individual ownership of the means of production and the appropriation of the returns on such ownership.

The early industrialisation mode, with its relatively low broad based skills requirements, is often comfortably served by a political economy whose ideological base is, at least from an economic perspective, non-democratic. The shift to the late industrialisation mode puts a greater pressure for at least an economically democratic political economy since the increased requirement for a broad skills base implies a higher degree of the diffusion of the ownership of the means of production. This in turn implies a higher degree of equality in income, wealth and life chances.

The other relationship that has a bearing on the ideological base is the relationship between the system of science and technology and that of innovation. While the broad definition of innovation conceptually requires the necessity of the existence of systems of innovation, there is no such necessity for the existence of systems of science and technology. While systems of innovation exist, those of science and technology have to be created. It is therefore possible to think of the possibility of stable and healthy systems of innovation that have a poorly developed system of science and technology. The main requirement for this combination is the spread of the ownership of the means of innovation that is associated with a high degree of economic equality. The opposite is also true. One can have a strong system of science and technology within a poorly developed system of innovation with low evolutionary prospects. This is often the case in the case of predatory states where the oppressed form the majority of the population and which therefore have high concentrations of ownership and control of the means of innovation. In this case the historical context is also significant since the global acceptance or rejection of such regimes depends on the time and determines to some extent the national investment in science and technology.

The relationship between modes of innovation and ideologies is mediated through a discourse on power. This discourse is shaped by two main characteristics. The first is a two-way direction of causality between knowledge and power. Knowledge endows its owner or controller with power but power also determines the direction of emerging knowledge. Herein lies the imperative for institutions to reproduce, grow and perpetuate themselves. Secondly, *a lá* Marx and ironically Schumpeter, the innovation process is essentially dialectical in that every knowledge system and system of innovation with the associated political economy contains within itself the inherent contradictions which lead to the possibility of its eventual destruction. The main concern with the post-apartheid system of innovation is whether or not it constitutes a rupture with the pre-democratic system. That system, built as it was over forty odd years of an isolated siege economy not only gave rise to a sophisticated and idiosyncratic system of science and technology but also deeply entrenched an early industrial mode of innovation as the predominant one. The late industrial mode of innovation only started emerging towards the second half of the apartheid era but is

still placed within a context of low levels of human capital and high degrees of inequality. The proof of rupture can therefore only be found in evidence of a shift in the dominant mode of innovation.

The South African case

At the turn of the (20th) century the South African system of innovation was dominated by the early industrial mode. The economy was mostly based on mining and ancillary industries, and agriculture. The skilled labour requirements of the economy were those that were associated with mining and mostly quite specific to mining technology. Moreover, the ownership of most of the mining houses was British and foreign. The country's first Science and Technology plan was part of the initiative that was running through the Empire, driven by the crisis created by the First World War.²

The first concerted drive for industrialisation in the manufacturing sector came in the inter-war period and interestingly enough the foremost large scale initiative, in the steel industry was driven by a state established enterprise. The case made for this intervention was explicitly that of market failure (Scerri, 2009: Ch. 3). The state also set up an extensive rail transport network which added a further stimulus to the expansion of the manufacturing sector. One of the consequences of this drive was the increasingly diversified skills requirements, especially in engineering and tool making, away from those which were specific to mining. The Second World War provided a further massive stimulus to the expansion of the South African manufacturing sector. Until this period the political economy of South Africa was not markedly different from that of other, settler colonial economies within the Empire. It was overtly racist with ownership, employment and residential rights defined by race but this was the common feature of the colonies, even if the Union of South Africa with an Afrikaner dominated government had its specific characteristics. Within this context South Africa's system of innovation was evolving in line with the rest of the Empire.

However, the end of the war and the onset of apartheid shunted the evolution of the South African system of innovation on to a different path right at the dawn of the post colonial era. The two immediate concerns of the apartheid regime were the interpenetration, and hence the homogenisation, of Afrikaner and English capital and the institutionalisation of a unique type of racial capitalism. The simple fact that the disenfranchised made up the majority of the population froze the South African system of innovation into a particular mix of an early industrial mode of innovation alongside an emerging late industrialisation mode. This mix became entrenched, cumulative and path dependent to the extent that it formed the basis for the late post-apartheid presidential description of the South African economy fifty years later as the mix of two distinct and separate nations – the “first and the second economies”. It was also a system that lacked the basic prerequisite for the transition from a late industrial to the post industrial mode of innovation.

At the same time the increasing international isolation and the anti-apartheid movement promoted the emergence of a siege economy and the rapid growth of the military-industry-complex. This development was typically highly conducive to the development of the country's system of science and technology. The establishment of the Council for Scientific and Industrial Research (CSIR) in the mid-forties laid the basis for the institutional base for this system. Perceived military dictates pushed scientific and technological breakthroughs on a number of fronts, including synthetic fuels, nuclear and missile technology, electronics and

² This was the only national S&T plan ever drafted in South Africa before the 1996 White Paper on Science and Technology. The plan and the agencies that it established were abandoned shortly after the First World War (see Scerri, 2009).

guidance systems, and materials technologies. This development was against the backdrop of an unskilled and deskilled labour force and generally poor supplies of human capital. It was stamped by a structural and endemic inequality in income, wealth and life chances, a structure which was cumulative and path dependent and determined the fundamental nature of the national system of innovation inherited by the post-apartheid political economy. This particular evolution path of the South African system of innovation was in contrast to a global environment where the transition to the knowledge (and learning) economy was fundamentally predicated on the plentiful availability of highly skilled, and multi-skilled, labour which is in a perpetual learning and adaptive mode, ready to respond to the shifting demands of a rapidly accelerating technology environment.

The South African system of innovation had been built on the basis of an institutionalised (formal under apartheid and informal thereafter) deprivation of the vast majority of the population and the labour force of its ability to invest in its own human capital. This was the effect of numerous pieces of legislation which affected education, job access, and rights of residence. Not only were the direct determinants of education affected, but the integrity and the support for the family unit as the incubator of human capital were also seriously compromised. The ownership and control patterns of the means of innovation within the South African system of innovation were to be identified with the early industrial mode of innovation and the dominant industrial structure in the South African economy until the end of apartheid was still firmly set within this mode.

Wolpe (1980, 1989) argued that the group areas act which moved a substantial portion of the black³ population to townships, homelands and *bantustans* effectively shifted the responsibility of the reproduction of labour power, or, in terms of this paper, human capital away from the private sector and the state to the family unit. The fundamental structure of apartheid could not allow for the upward mobility of the black population and this entrenched the consequent dominant early industrial mode of innovation. The human capital reproduction system which was an integral part of apartheid was also fundamental to the reproduction of this mode. The ensuing preponderance of the non-human means of innovation within the national system of innovation also resulted in high concentrations of the ownership and control patterns of the means of innovation within the system.

The post apartheid system of innovation was determined, virtually at its inception by the neoliberal *Growth, Employment and Redistribution* (GEAR) economic plan that was put into legislation in 1996. This plan, drafted at the zenith of the global acceptance and advocacy of neoliberalism as the only viable model of economic coordination, was premised on the assumption that the growth of the private sector would, through the “trickle down” effect, benefit the whole economy and address the inequalities entrenched by apartheid. Its critics maintained that the withdrawal of the state from the option of strategic intervention meant that there would be a structural continuity with the apartheid economy.⁴ In fact, the old structure would be reinforced since its legitimacy would be established with the end of apartheid. Thirteen years after the plan was put into effect, there is no doubt that not only did the plan not deliver on its promised growth rates but that it dismally failed to address the employment and redistribution parts of its promise. In terms of the language used in this paper the plan failed to alter the dominant mode of innovation in South Africa. Indeed it could not do so, almost by definition.

The failure of post-apartheid economic planning to create a definitive break in the evolution of the national system of innovation was threefold. The first, which was a direct consequence of the informing economic paradigm, was the drive to the liberalisation of

³ The term “black” is here used in the political and not the biological sense to represent all population groups disenfranchised by apartheid.

⁴ See Adelzadeh (1996) for an orthodox economic critique of GEAR.

markets and the abjuration of strategic intervention. It is difficult to see how this could have altered the inherited economic structure since it is rarely the business of business to alter the overall economic structure within which it operates. It is rather the function of the state to alter structure and to change the rules of the game within which private enterprises operate. The inter-sectoral relations inherited from apartheid, based as they were on the assumption of a generally low skills base and relatively cheap capital could not possibly be changed without an informed programme of strategic intervention designed to alter inter-sectoral price ratios. The one systemic effect of the liberalisation programme was the impact of trade liberalisation which proceeded at a rate that was even faster than that required by the WTO.⁵

The second case of failure was in those areas of state intervention that were aimed at directly altering the inequities of apartheid. Within the context of GEAR, state intervention was to be neutral and restricted to the provision of basic needs, such as housing, water, energy, health and education to households, which would raise the human capital base of the economy but which, because of its high externalities content, would not be provided by the private sector. However, there is an acknowledgement that the state has largely failed to execute this mandate both in terms of the actual levels of provision of basic needs and because of the countervailing impact of the liberalisation of markets such as transport and staple food. This liberalisation has seen the costs of the privately owned transport sector and the cost of staple food items rocketing and in effect imposing a regressive form of effective tax on the poor.

The third failure was in the redress of the disastrous spatial economics of apartheid. The redrawing of the provincial map of South Africa after apartheid should have aimed at creating sound local systems of innovations which, while different because of different nodes of core competencies a competitive advantage would have laid a sound basis for a convergence within the national system of innovation. Instead the effect of history distorted the new economic geography to the extent that dramatic differences in the performance of the various provinces have led to a self-perpetuating and self-reinforcing path of divergence (see Scerri, 2008).

South Africa may now well be at the threshold of a possible break in the evolution of its system of innovation. This is due to a combination of three factors. The first is the long simmering and widening acceptance of the failure of the GEAR programme to achieve its stated goals. This forms the first basis of a policy equivalent of a Kuhnian paradigm shift. The second is the recent reconfiguration of the ruling party with organised labour and the South African Communist Party in the ascendance. The third is the global disillusionment with neoliberal economics which has spread dramatically with the onset of the global financial crisis. These are the preconditions for a definitive rupture in the evolution of the South African system of innovation. What is now needed for its coming into being is the introduction of an alternative planning coordination paradigm.

⁵ Lall (1993) argued that the tariff system under apartheid was perverted in that it protected mature industries with limited potential for technological advance while exposing emerging industries with a high technology potential to international competition. From this perspective, trade liberalisation would have removed the distortion effects of tariffs. However, the rapid removal of protection for labour intensive low skilled industries such as textiles and clothing caused the collapse of specific sectors and an increase in unemployment. Of course the more appropriate policy would have been to re-draw the tariff regime on the basis of some version of the “infant industry” argument.

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