Economic Development, Creative Destruction and Urban Dynamics

A Proposal for Rethinking Developmental Agendas

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Abstract

This paper revisits the problem of economic development questioning the implicit premise that developing economies are nascent systems on their way to maturity. It is proposed that the developing countries should instead be viewed as mature systems in a low-welfare homeostasis reached under resource constraints. When seen as mature systems, the transformation of the existing mix of economic activity into one that can yield better lives for people takes precedence over the widely advocated objectives of growth, productivity improvement, structural transformation, specialization for export, privatization and other such agendas that will not change the tendency towards the low-welfare homeostasis. Viewing developing countries as mature economies also calls for seeking as a part of the development strategy the accelerated decay of the obsolete and irrelevant baggage that might fill the landscape, so room is created for replacing it with more appropriate infrastructure. Schumpeter's concept of creative destruction and Forester's Urban Dynamics model are explored as alternative frameworks for economic development.

Key words: economic development, economic growth, creative destruction, urban dynamics, sustainability, development policy, system dynamics, urban renewal, economic stagnation, economic recession

Introduction

Many years ago, I asked Professor Forrester in a casual conversation about his take on the developing countries. I was a bit surprised to learn that his perspective on where the developing countries stood (at a mature economy level) and where they were heading (stagnation/downward) was very different from what the contemporary literature on economic development assumed (at early stages of growth and heading upward). He also referred me to his Urban Dynamics model (Forrester 1969) as an appropriate policy framework for economic development even though this model originally addressed urban issues in the United States rather than in any developing country.

I have to admit I did not immediately understand Forrester's perspective and in my mind even called his familiarity with the issues faced by the under-developed world to question. However, although it has been over a decade since we had this conversation, I have not been able to put it to rest. In fact, the more I have thought about it, the more I have come to appreciate Forrester's unusual view of economic development and the appropriateness of his Urban Dynamics model as a policy framework for it.

I am also beginning to see a link between Forrester's Urban Dynamics and Joseph Schumpeter's concept of creative destruction (Schumpeter 1962). I think both capture the developmental problem more precisely than the growth models widely used in development economics. In this paper, I'll attempt to outline my understanding of Schumpeter's model and its conceptual links with Urban Dynamics to outline a proposal for rethinking developmental agendas so the focus of economic policy is shifted from growth to achieving a sustainable future for both the so-called developing countries and the mature industrialized economies experiencing stagnation or recession.

Contemporary approaches to economic development

The contemporary literature often views underdevelopment as a gap between the developing and the developed countries that the development policy should endeavor to overcome through economic growth (Van den Berg 2001). The key growth models used for designing growth

policies are variants of the Harrod-Domar model and the Solow model, although Lewis's model of structural transformation is often subsumed in defining the various stages in the growth process (Lewis 1958). All three models exclude any constraints created by workforce or natural resource endowments. There additionally exist several revisionist perspectives that add income distribution, social development and affirmative action policies to the growth agendas (Todaro and Smith 2006, Perkins et al. 2001). In most cases, the suggested policies have also implicitly favored authoritarian governance systems (Morawetz 1977, Saeed 1990) as they require a strong hand to intervene. An exception to this is Amartya Sen's libertarian perspective on the importance of rights and freedoms that has de-emphasized authoritarian governance and drawn attention to the importance of a democratic process (Sen 1999). In fact, earlier in Saeed (1986) and Saeed (1990), I have used system dynamics models to also emphasize the importance of civil liberties on the commitment of a government to allocate national resources to public welfare and I greatly respect Sen's perspective.

Arthur Lewis received the first Nobel Prize given for work in the field of economic development in 1979, which he shared with Theodore Schultz. Lewis recognized a duality in economic systems as a divide between capital and labor driven production sectors although he saw this to be a dysfunction that should be mitigated (Lewis 1958). I have revisited Lewis's model in Saeed (1980) and Saeed (1994), again using a system dynamics framework, and have found that duality can take may forms, some of them quite benign, and this reality can be a basis for creating designs for poverty alleviation by mobilizing appropriate market forces within the duality framework (Saeed 2009).

Professor Lewis also introduced the remarkable analogy of the riders on an escalator to describe the relative positions of the various countries at various stages of development. Widespread economic growth might move all up, but not diminish the distance between them. Hence the development gap may continue to persist in a global economy (Lewis 1978). He later also advocated using different models for addressing economic development agendas in the developed and the developing countries since their respective economies were structurally different (Lewis 1984). While I have greatly admired Professor Lewis's recognition of duality in economic systems and have further explored this concept in my models, I am a bit perturbed at his last proposition as I view the various national economies as many manifestations of a

pervasive economic structure that he recognized and packaging them separately would compromise the policy space that might contain interventions for transforming one manifestation to another (Saeed 2002).

In all cases the implicit assumption in the contemporary models of economic development has been that the developing economies are nascent economic systems on their way up to become mature economies. The policy problem is seen to be to realize their growth potential as fast as possible by allocating resources to activities with the highest yield, speeding up structural transformation from traditional to modern subeconomies, and managing other dysfunctions like income distribution, governance problems, social conflict, corruption, and maintenance of personal freedoms encountered on way to maturity.

Professor Forrester, on the other hand seemed to view developing countries to have already grown to capacity and he saw their underdevelopment as a function of a low welfare homeostasis that had materialized from the growth of competing activities under capacity constraints. This homeostasis manifests in antiquated infrastructure, underemployed workforce, inefficient and decaying industrial organization, lack of innovation and entrepreneurship, and little room to grow – a scenario pretty much similar to the stagnation experienced at the end of the growth cycle in Urban Dynamics. Recovery from that state of stagnation to one with a healthy economy in this scenario would require destruction of old infrastructure and institutions to make room for the new ones.

Forrester's perspective seems also to be consistent with Schumpeter's premise of creative destruction, which is a means for recovery from stagnation resulting from over-investment in obsolescing infrastructure. In the following sections of this paper, I'll attempt to demonstrate the similarities between Schumpeter's model and Urban Dynamics. I see both seeking economic revival in a mature economy rather than economic growth in a nascent one, which is appropriate to the case of most developing countries as well as to industrialized economies seeking recovery in an economic recession.

Contemporary models of economic growth

Harrod-Domar model and Solow growth model and their variants are the most presented growth frameworks in the economic development texts. Structural transformation, income distribution, demography, education, resource constraints and sustainability are then discussed as additional topics. Governance and freedoms are mentioned in the passing in some of the texts and the macro-economic models of cyclical behavior often left out (Perkins et al 2001, Todaro and Smith 2006, Van den Berg 2001).

The macroeconomics texts on the other hand often present models of business cycles, salient among which are the interaction of multiplier effects and acceleration process formalized by Samuelson (1939); the inventory changes and their effect on production and investment proposed by Metzler (1941); the monetary policy and its influences on investment and savings proposed by Keynes (Keynes 1936) and further elaborated by Hicks (Hicks 1937), and the aggregate demand and aggregate supply imbalances and delays in adjustment of the general price level as discussed in Barro (1984) and other texts on macroeconomics.

Growth models are typically applied to determine economic development policies for the developing countries. The cyclical behavior models on the other hand are applied to understanding the behavior of the industrialized economies. The main difference between the two types of models is that the former assume the growth to occur in a presumably empty landscape to be constrained only by factors like savings, technology, demand, export potential, risk, etc., whereas the later see market forces to work with delays to generate overshoot and cycles. Neither type has been concerned with resource constraints. My own economic development models presented in Saeed (1994) have separately focused on reforming the institutions that determine income distribution, civil liberties, and resource use, but without calling for clearing the existing infrastructure that might crowd a mature economy and how this might affect the patterns of welfare when such an economy is forced to grow in a resource constrained environment.

An interesting set of growth theories reside in the classical economics models that were built on the empirical evidence of the specific periods their respective architects carefully observed in order to construct them (Robinson 1955). Adam Smith saw economic growth in a relatively

empty economic landscape to be driven by population growth (Smith 1776, reprinted 1977), Ricardo conceived his iron law of wages and the law of diminishing rents from a feudal system settling at subsistence wage rates in a crowded agricultural sector (Ricardo 1817). Marx postulated the failure of capitalist systems from his observation of a divide between workers and capitalists that plagued the industrial economies of his time (Marx 1906). Albeit, economic development policy has rarely utilized the insights delivered by these classical models.

The implicit assumption that the developing economies are in a nascent rather than a mature stage and there exists room for the growth of capital infrastructure sought by the economic development policies seems to prevail in the economic development models most applied to the developing countries. The implications for dealing with a mature economy filled with obsolete infrastructure to the limit is also not factored into the macroeconomic models most applied to the design of interventions for breaking out of stagnation and recessions in the developed countries. These models mostly focus on fiscal and financial instruments to maintain demand and employment without recognizing the need to clear obsolete infrastructure.

Schumpeter's work appears as an exception to the general thinking on economic growth prevalent in his time. He was perhaps the first to recognize that resurgence in a stagnant mature economy would require what he called creative destruction (Saeed 2008a). He suggested that this renewal was a self-driven cyclical process, but he did not get into devising a policy framework to facilitate resurgence, nor did he see the stagnation as a complex homeostasis achieved under capacity constraints whose composition could be influenced without causing growth to improve the general welfare, which Forrester seems to have addressed in his Urban Dynamics model. It seems to me that Forrester's work represents a natural progression of Schumpeter 's concept of creative destruction applied to economic development in a mature economy, which is relevant both to the developed and the developing countries, since growth in both is constrained by physical and institutional limits.

In the following sections, I'll first attempt to construct a model of Schumpeter's concept of creative destruction and then revisit Forrester's Urban Dynamics to illustrate their conceptual similarities and their relevance to outlining agendas for sustainable economic development both for the developed and the developing countries.

A system dynamics model of Schumpeter's concept of entrepreneurship and creative destruction

While Marx's model of overgrowth of capitalism through exploitation of the proletariat and its eventual decline was based on a class system that locked capitalists and proletariat in separate compartments, Schumpeter saw the possibility that entrepreneurship could exist across all social classes. Thus new entrepreneurs could emerge from the ruins of a fallen capitalist system. They could create a resurgence of capitalism from an environment in which cheap labor and the possibility of profiting from it would allow them to mobilize idle capital resources and create new and marketable goods and services from them. In my observation, Schumpeter saw the possibility of social mobility between classes arising from entrepreneurship that would rejuvenate a declining capitalist economy, while Marx had ruled out such mobility. Schumpeter pointed out that entrepreneurs innovate, not just by figuring out how to use inventions, but also by introducing new means of production, new products, and new forms of organization that are built in the ruins of the old means of production and old organizations.

I have attempted to represent Schumpeter's view of social mobility by constructing a conservative system consisting of labor, unemployed and potential entrepreneurs in my system dynamics model of the qualitative relationships he posited. This model is shown in Figure 1. The flows connecting the various stocks represent the social mobility that Marx ignored and Forrester built into his Urban Dynamics model. This mobility allows both employed labor and unemployed workers to become the potential entrepreneurs who after a delay become working entrepreneurs - new capitalists mobilizing financial resources and developing new technologies for new investments that resurge the economy. In equilibrium, there exist balancing flows between unemployed and potential entrepreneurs meaning some potential entrepreneurs fail and return to the unemployed pool while some of the unemployed consider entrepreneurial roles. A similar exchange between the potential entrepreneurs and labor implies that some of the labor attempt entrepreneurial roles. Some of those considering such roles fail and return to wage work.

Figure 1 also shows the investment structure and the role of technology implicit in Schumpeter's descriptive model (Higgins 1968, pp 88-105). Schumpeter distinguished between two types of investment that he called *induced* and *autonomous*. He also introduced a concept of "*saving up*"

which is different from saving in the neoclassical growth models. Saving up constituted the part of output that is withheld from investment and consumption.

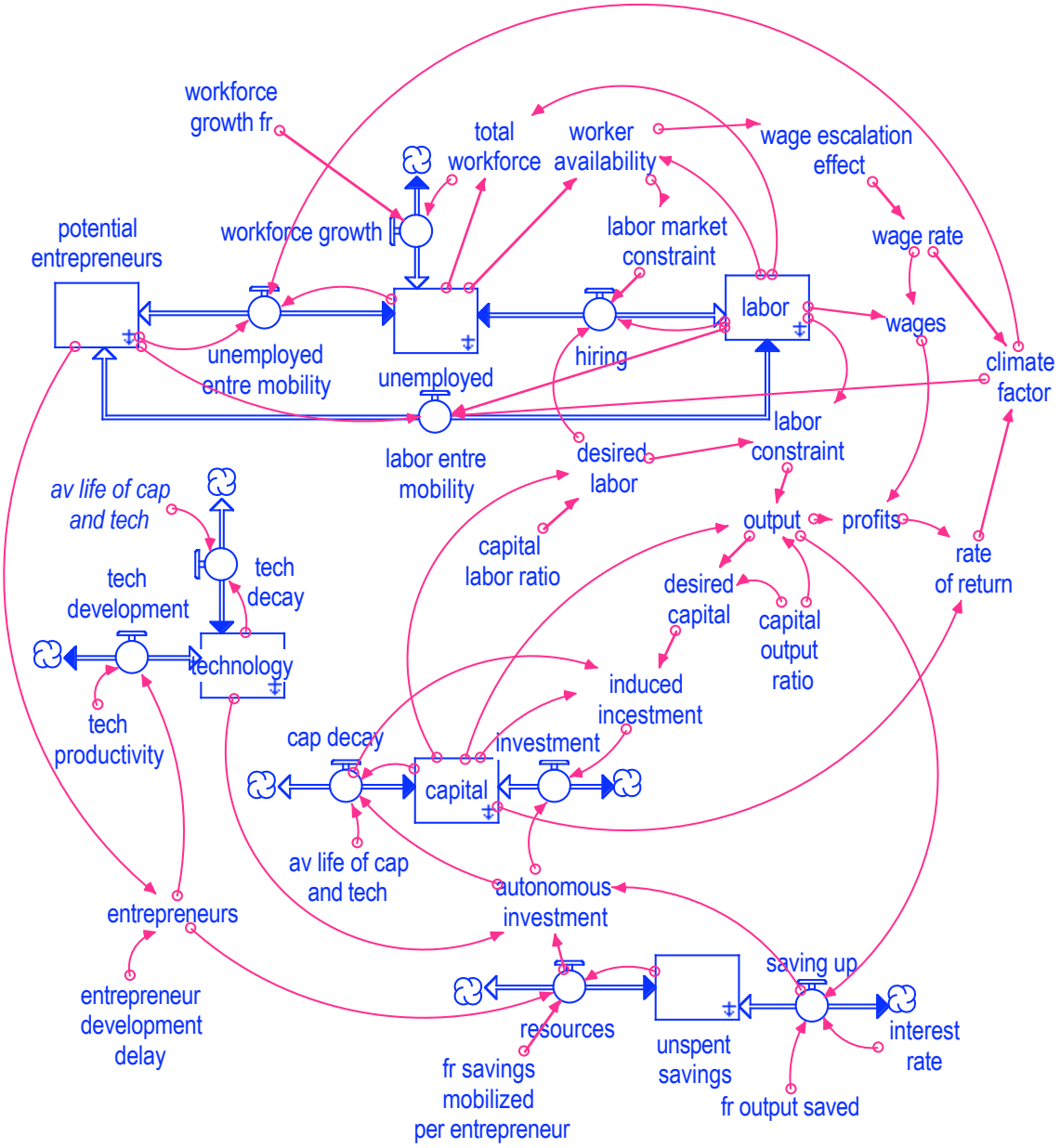

Figure 1 **Stock and flow structure representing Schumpeter's concept of creative destruction**

Induced investment arose from the discrepancy between supply and demand and autonomous investment from resources and technology created by the entrepreneurs. Saving up possibly extended across social classes and fueled entrepreneurial activity leading to autonomous investment hence it is computed as a fraction of the output modified by interest rate, which is taken as a simplification.

I would make a small amendment to Schumpeter's concept of entrepreneurs creating resources; I would call it mobilizing resources accumulated through saving up, mainly to designate a source of these resources in a formal model. I have therefore accumulated the difference between the saving up and the mobilized resources in a stock of unspent savings that supply the venture capital for the entrepreneurs. This also allows the model to have a hypothetical equilibrium in which the autonomous investment is zero and saving up balances replacement investment.

Entrepreneurs also create new technologies and the blend of mobilized resources and new technologies lead to autonomous investments. Technology is represented in the model as a stock that is increased by technological development created by the entrepreneurs and drained by obsolescence. Please note that I have used the same average life both for capital and technology, implying that technology is embodied in capital. Output is produced by capital and labor, but desired labor depends on capital and capital labor ratio. Wage rate is determined by labor market conditions and profit is output less the wage bill. The average rate of return is given by dividing profit by the stock of capital and, together with wage rate, it yields a climate factor that may encourage or discourage entrepreneurship. It should be noted that while capital can be created through investment in this model, the workforce is fixed and creates a capacity constraint. Model equations are placed at Annex 1.

This system is provided a parameter set for initial equilibrium. Any disturbance in this system, including interventions to create growth will lead to oscillations and a new homeostasis. The disturbance can be introduced by injecting into or taking away agents/units from any stock or changing a parameter that unbalances flows connected to any stock. The oscillations arising from a variety of disturbances will be comparable, but the new equilibriums reached will vary. For example, growth as well as oscillation will occur in this system when the technological

productivity of the entrepreneurs is stepped up thus fueling autonomous investment. This is shown in the simulation of Figure 2.

Growth of course creates an overshot due to the delays in the system, which is followed by oscillation that Schumpeter explained as cycles of creative destruction. A rise in technological productivity upgrades technology, increasing autonomous investment and raising output and profits that initially draws more entrepreneurs into the system. Growth however also raises wage rate thus deteriorating entrepreneurial climate and prompting some of the entrepreneurs to exit to join the labor force or the ranks of the unemployed. This process continues until the wage bill also squeezes profits, hence more potential entrepreneurs exit and autonomous investment further declines. This leads to labor attritions and a decay of the wage rate that improves climate factor creating conditions appropriate for another growth cycle.

An important thing to note additionally is that these cycles under the workforce capacity constraint lead to a new homeostasis in which there is a larger proportion of unemployed and a smaller proportion of entrepreneurs compared to the initial conditions. Clearly growth effort in the face of capacity constraints has led to a higher output along with an inferior social mix of vocations in which more people are wage-employed or without jobs and fewer innovators. Interestingly, these conditions are similar to the urban malaise that Forrester attempted to remedy through his Urban Dynamics modeling effort.

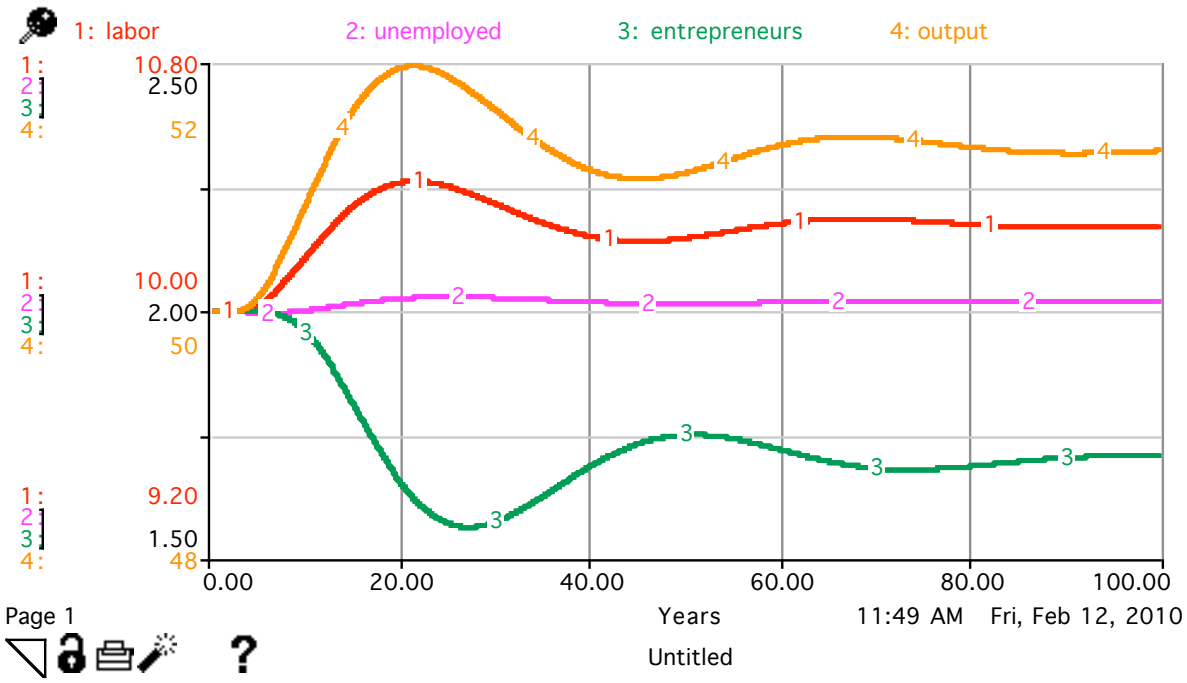

Figure 2 **Growth, oscillation and the new homeostasis in response to productivity increase in Schumpeter's model of creative destruction**

Reducing the average life of capital in the new homeostasis, meaning some of the dated infrastructure is removed, will reduce output but at the same time create room for entrepreneurial activity. Thus, it also increases the proportion of entrepreneurs at the new equilibrium as shown in Figure 3. This means that an accelerated removal of obsolete infrastructure in a resource-constrained economy will free up resources for the formation of innovative new enterprises and achieve a homeostasis with a better composition of businesses even though it may initially reduce output, which is also the message Forrester conveyed in his Urban Dynamics discussed in the next section.

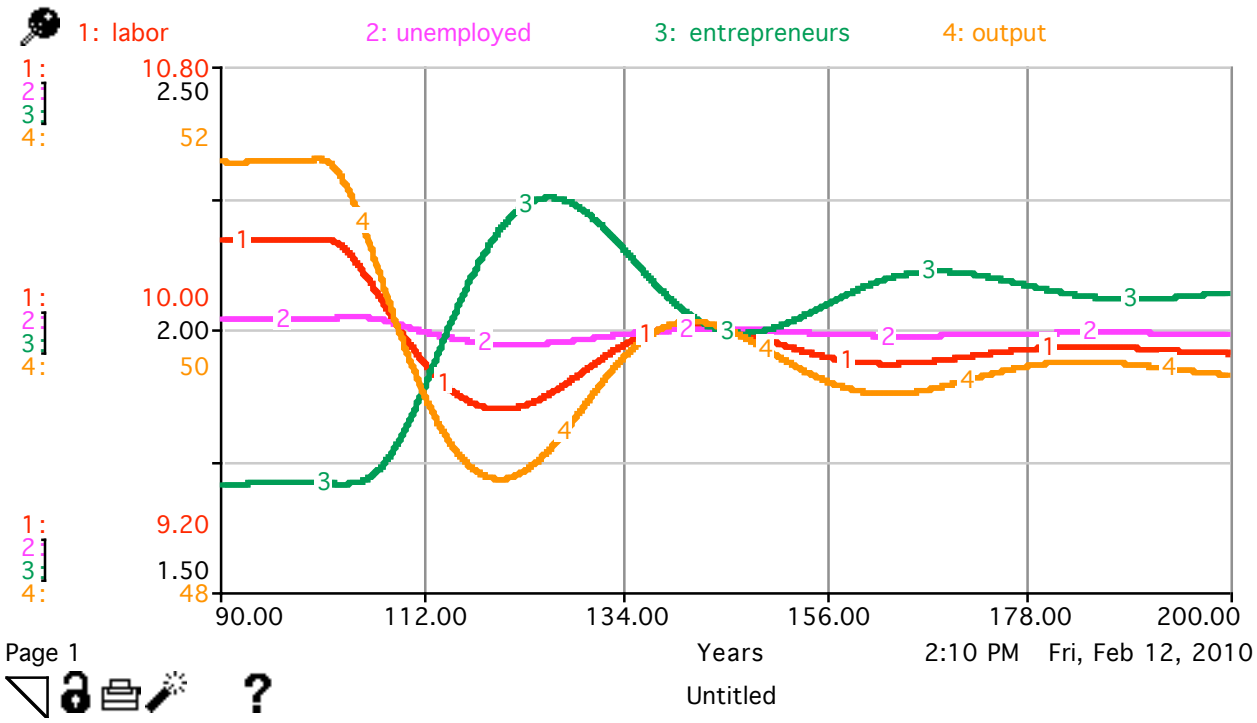

Figure 3 **Reduction in output with concomitant improvement in workforce composition in Schumpeter's model in response to speeding up capital decay.**

Forrester's Urban Dynamics Model

Forrester's Urban Dynamics model attempted to explain the growth and stagnation of major urban metropolises in the United States. It was developed in collaboration with John Collins, who joined MIT as a senior lecturer after serving for four consecutive terms as mayor of Boston. The model examines growth of an urban economy from a small town with no apparent physical constraints to a large city whose growth is constrained by land area, which can be seen as a proxy for a variety of physical resource constraints on an economy including travel time, infrastructure, water, energy, etc. in addition to land. Forrester's model also disaggregates industry, housing and workforce into various categories whose composition radically differs over the course of growth from after the economy reaches a balance under its resource constraints.

Figure 4 shows the various business categories in the Urban Dynamics model, which are new enterprises, mature businesses and declining industry.

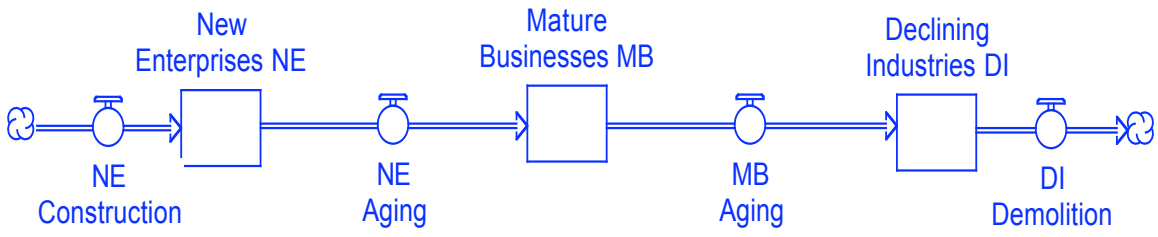

Figure 4 Business infrastructure aging chain in Urban Dynamics

New enterprise creation is facilitated by low wage rate, presence of professionals, labor availability, land availability and a bandwagon effect of sorts driven by the growth impetus – factors Schumpeter would have subsumed into his description of what he called entrepreneurial climate. New enterprises introduce innovative new products and services into the market and have a higher proportion of professionals (entrepreneurs in Schumpeter's model) than the other types of businesses. New enterprises age into mature businesses that eventually transform into declining industry. The aging process of businesses is affected by a multitude of factors that determine the business climate of the economy.

Housing is likewise divided into three categories as shown in Figure 5: premium housing, worker housing and under-employed housing. While the aging process drives the transformation of one type of housing into other, their autonomous construction rates are driven by their respective demands, the expectations of the builders to profit from their construction and public policy.

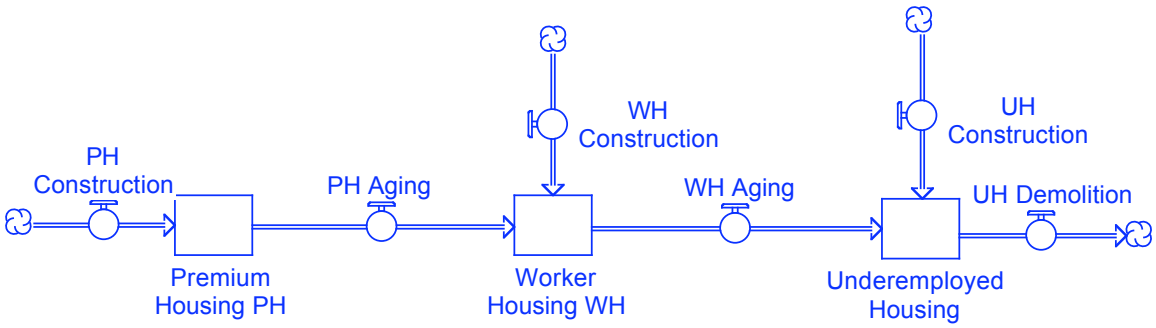

Figure 5 Housing infrastructure aging chain in Urban Dynamics

Workers are divided into three categories too as shown in Figure 6, managerial/professionals, workers, and the underemployed. Transfers between underemployed and workers categories are driven by jobs availability and social mobility. Transfers from workers to managerial/professional category are one way and depend also on social mobility. Departures and arrivals into each category are driven by demographic as well as migratory considerations. Figures 7 and 8 show the baseline behavior of this model.

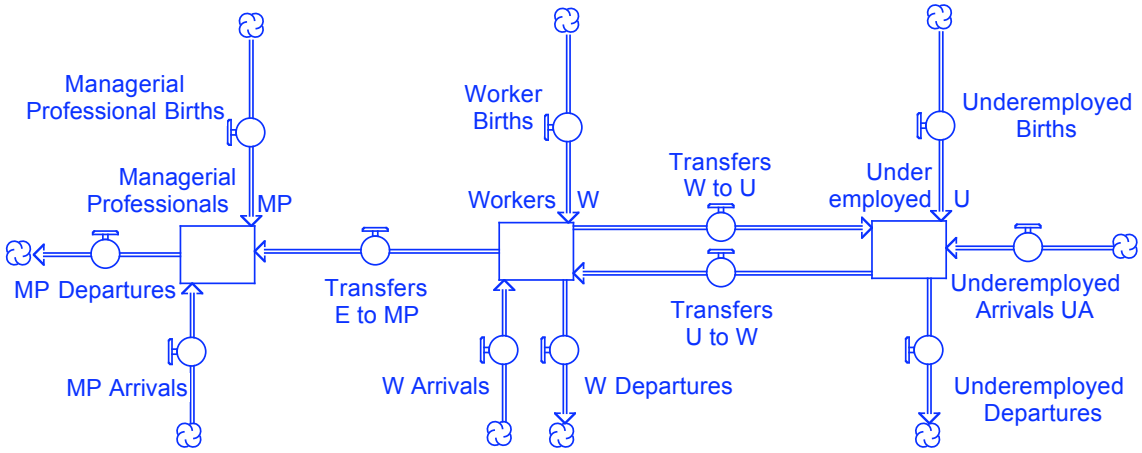

Figure 6 Workforce mobility in Urban Dynamics

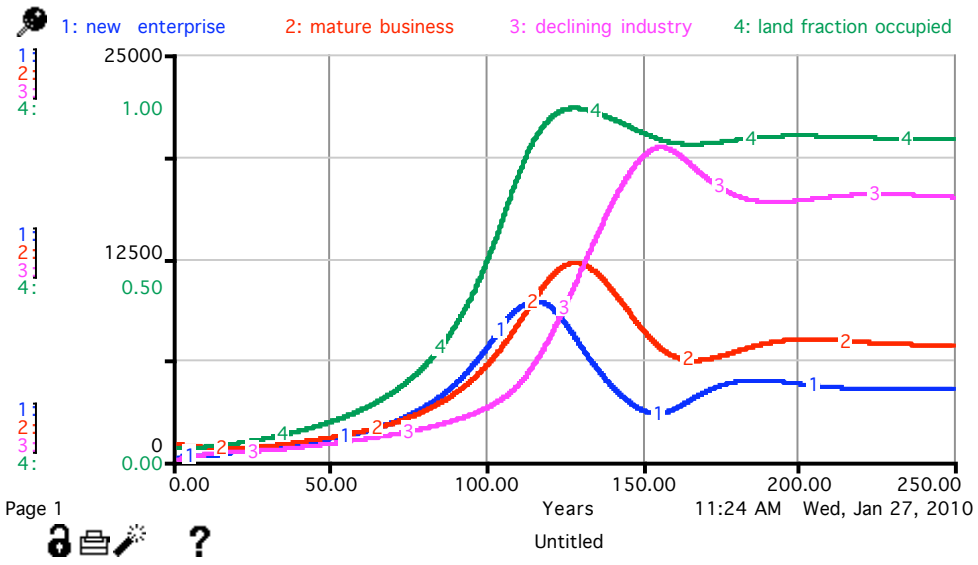

Figure 7 **The creation of an unhealthy infrastructure composition as the urban economy matures**

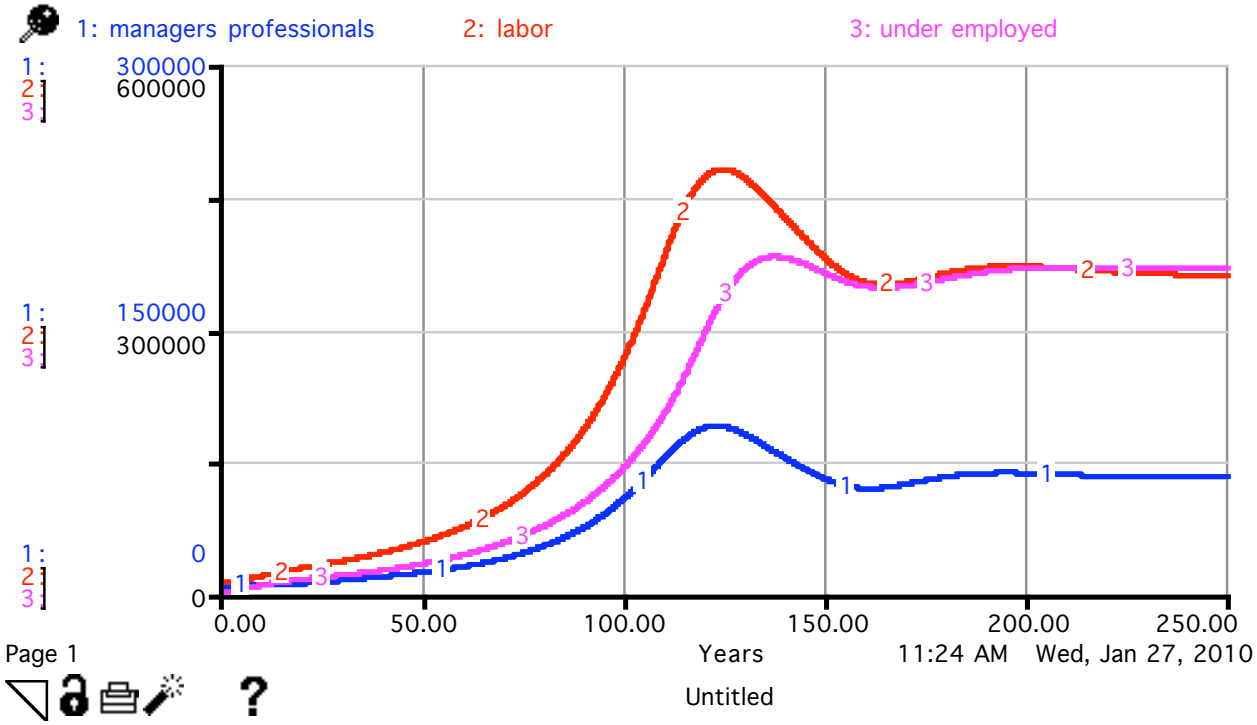

Figure 8 **The creation of an unhealthy workforce composition as the urban economy matures**

A high proportion of new enterprises and a low proportion of declining industry characterize the composition of economic activity in the growing metropolis with no resource constraints. This composition is created since new enterprises get a big growth impetus from resource munificence. Some of them age and become mature businesses and eventually transform into declining industry but the rate of formation of new enterprises is so high that the later two are maintained at a low proportion in the total mix. This composition starts changing when the resource constraint starts limiting new enterprise formation (land fraction occupied exceeds 50%). As the resource constraint becomes more binding, mature businesses and declining industry become the dominant enterprises in the economy.

The workforce composition over the initial period of growth with few resource constraints is likewise characterized by a high proportion of managers and professionals (Schumpeter would have called them entrepreneurs) that Forrester saw essential for creating and managing new enterprises. There is also a relatively small number of underemployed in the economy over the growth phase. The composition of the workforce in the homeostasis reached under the land constraint is however typified by a low proportion of managers/professionals and a high proportion of underemployed. Workforce is not limited in Forrester's model as it can change both through demographic and migratory flows.

Towards the end equilibrium, the economy of the metropolis is characterized by stagnating businesses, a lack of entrepreneurial activity, high unemployment and dilapidated housing – conditions pervasive in the developing country economies when economic development effort began as well as in mature urban areas in the industrialized countries over mid-twentieth century.

Forrester's model assumes that workforce can change through migration while capital changes only through investment and the natural decay processes, which may not be very different form what happens in reality in an aggregate economy. He also assumes higher rates of mobility for the managers/professionals and labor than for the underemployed, which is also consistent with the concept of poverty traps in the developing countries (Azariadis 1996).

Seeking growth of businesses in such a scenario in an effort to raise the standard of living of the populace may soon hit resource constraints again. The economic development agenda in such conditions is therefore not growth, but a change in the composition of the economy. Also, any

change in this composition is difficult to realize unless some of the antiquated infrastructure (and possibly also institutions) can be cleared for making room for the new ones.

Forrester proposed demolition of old housing and declining industry along with encouragement of new enterprise as a policy package for changing the problematic composition of the economy. Figure 9 shows a computer simulation of the model with these policies implemented when the urban economy is in a state of maturity and stagnation. Clearing of the obsolescing infrastructure on a continuing basis makes room for formation of new enterprises, which changes the problematic composition in the new equilibrium of the economy. In the new equilibrium, the economy has a much lower proportion of declining industry and a much higher proportion of new enterprises. The workforce composition also changes as shown in Figure 10. The proportion of managers/professionals rises and that of underemployed people declines considerably over the course of change. The total output of the economy is interestingly not tracked in Forrester's model; hence growth of output is not even an issue.

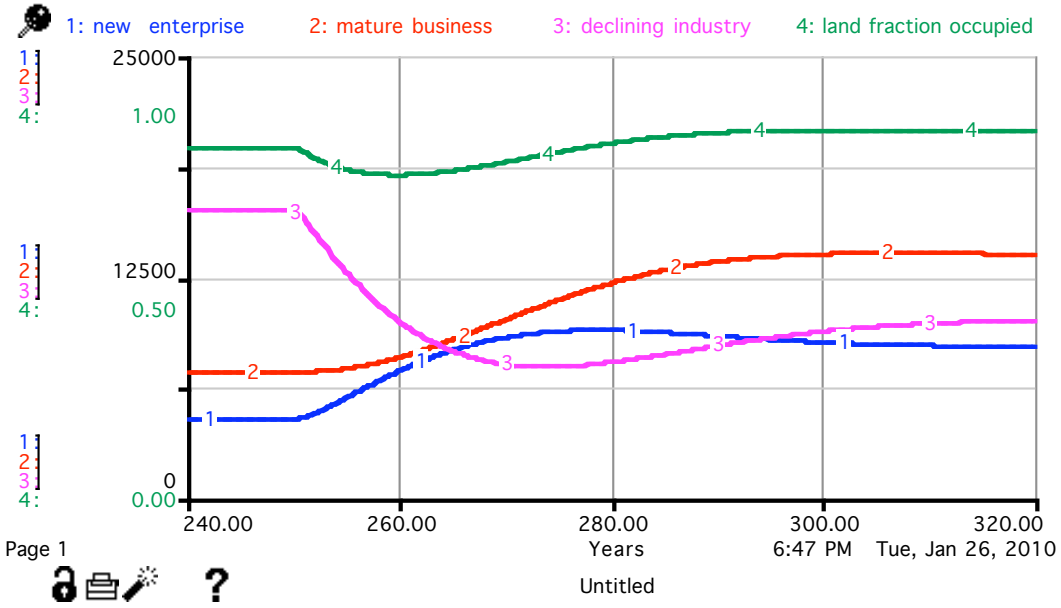

Figure 9 **Change in the composition of industry created by policies to clear aging infrastructure and to encourage new enterprises**

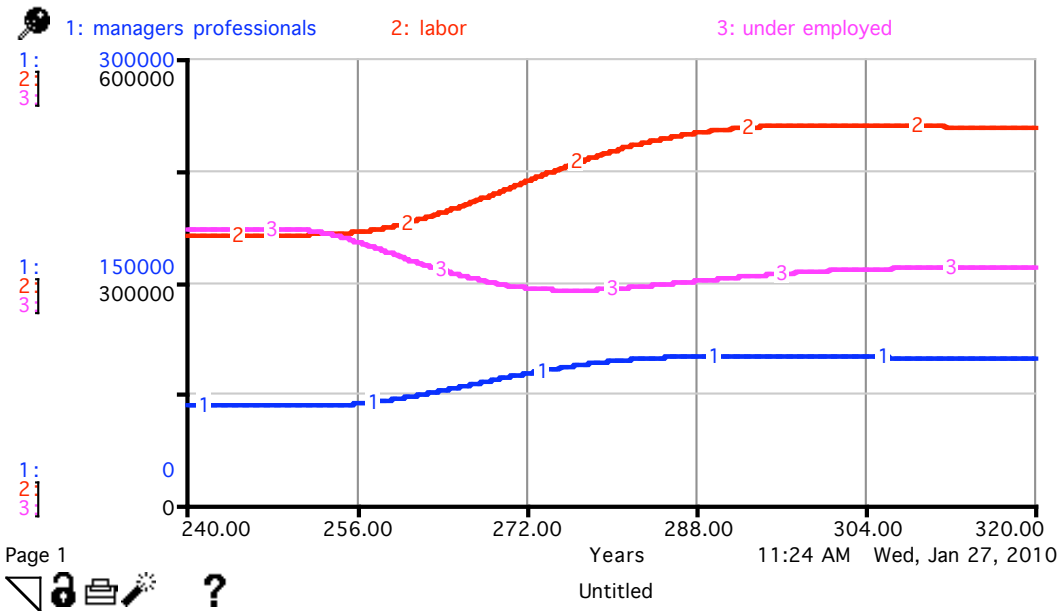

Figure 10 Change in workforce composition created by policies to clear aging infrastructure and to encourage new enterprises

Both Schumpeter's and Forrester's models of a mature economic system replicate the malaise afflicting the stagnating economies of both large cities and developing countries that have set into a low-welfare homeostasis due to environmental and institutional constraints. They also suggest that the stagnation in these economic systems can be transformed into a high welfare homeostasis through a policy set that speeds up the discard rate of old industry and household infrastructure while encouraging formation of new entrepreneurial businesses – a process Schumpeter called creative destruction and Forrester slum clearance. If the relevance of these models to the developing countries is accepted, sustainable economic development must be redefined to move away from the criteria of maximizing output growth, productivity and efficiency to subsume the concept of a transformation from a low welfare homeostasis to a high welfare homeostasis in a mature economy. This transformation cannot occur without clearing the obsolete infrastructure, which should be an important part of the development strategy.

A Proposal for Rethinking Developmental Agendas

Economic development policies to date seem to have taken the state of stagnation and low-welfare in the developing countries as given and have hastened to propose policies to increase investment and productivity to break out of it. An important mandate of the World Bank is poverty alleviation but it has invariably financed growth agendas instead of dwelling on understanding the root causes of poverty and addressing them. Economic development policy has likewise sprung into action to alleviate symptoms without recognizing their root causes. Over the past 50 years, there have appeared many fetish-like movements that sprung largely from conjecture rather from an understanding of the realities on ground.

1960s was a period of indiscriminate expansion in capital that exacerbated an already polarized income distribution pattern, fueling conflict between economic classes. 1970s called for public sector development, which not only created largely inefficient organizations, it also stymied entrepreneurship in the private sector. 1980s advocated export-based development, with disregard to the composition of the trade and its terms, which drained many developing economies and devastated their natural endowments while creating an output mix that penalizes indigenous consumption. 1990s witnessed the advocacy of free enterprise and free world trade with disregard to the polarized control of productive resources existing within as well as between nations. This was accompanied by a drive to privatize the public sector, with the question of sustaining welfare often swept under the rug (Saeed 1998). The 1990s also saw an emphasis on environmental issues, but these remained somewhat disconnected from the other policies (Saeed 1996). After the turn of the century, a preoccupation with global insurgency accompanied by a world wide recession seem to have placed most developmental agendas on hold.

What has been missing is a penetrating understanding of how a low-welfare homeostasis was caused in the first place in developing countries that should have preceded any policy intervention. Instead, economic development effort has largely been caught up in maximizing the rates of growth, productivity increase and economic efficiency. In my observation, both Forrester's Urban Dynamics model and Schumpeter's concept of creative destruction are relevant to understanding the developmental problem, which is not to create growth in a presumably nascent system but to change the composition of the economic activity in a mature

system. In fact growth in such a system can reduce welfare by making the composition of the economic activity worse.

The problematic composition includes both the physical activities and the social institutions. It subsumes the excessive production of the commodities created by colonial interests as well as by the past interventions emphasizing export and specialization that misallocated production resources to producing too much in crowded export niches and too little for the local needs. It includes the system of feudal institutions directing the production and distribution of income that leaves most households in abject poverty. It refers to the governance systems that deliver limited rights and freedoms to large cross-sections of the populace. Finally, it includes the infrastructure and the social services that fill the landscape and eat up maintenance budgets without serving the public. These are all candidates for accelerated demise that should free up resources for new entrepreneurial activity and for the infrastructure and the social institutions that support it.

New enterprises can of course not be created without the involvement of human agents. Theodore Schultz, who shared the Nobel prize in 1979 with Arthur Lewis, was probably the first scholar of economic sciences to point out that the potential of human agents has been under-rated in the design of economic development policies for the poor (Schultz 1961). Supporting human effort requires serious investment in education, health and social services, which have been deemed to yield high opportunity costs in the economic development strategies pursued in the developing countries. It also requires supporting personal liberties and freedoms as proposed by Amartya Sen (1999) that should help to tap large cross-sections of the populace for delivering the needed human agents.

Conclusion

Economic development should not be seen as nurturing and growth in an imaginary infant economic system but as recovery from stagnation in a mature economy brought to a low-welfare homeostasis under resource constraints that prevail in reality. Most developing economies have existed for centuries and millennia and can hardly qualify as nascent systems. There is little room for growth in them as their landscape is filled with obsolete infrastructure and unsuitable political

and social institutions that create unequal entitlements and bar participation in the economic system for large cross-sections of potential entrepreneurs by limiting their civil liberties and freedoms. The quintessential economic development models addressing growth, structural transformation, productivity improvement, specialization and export etc., are therefore irrelevant to the mature economic systems on ground that have little room for growth unless some of their existing baggage is cleared. In this context, the developing country economies are similar to the industrialized economies coming to stagnation or recession as both represent manifestations of arrival at a low welfare homeostasis under resource constraints. Schumpeter was the first to recognize the process of creative destruction to rejuvenate such crowded economic systems. Forrester seems to have given that process a physical meaning and a policy framework in his Urban Dynamics model, which should be revisited for designing economic development agendas.

Using a short life for the infrastructure yields a better distribution in the homeostasis in both Forrester's and Schumpeter's models. This also points to the fact that high durability of capital goods may lead to stagnation and deep recessions in the long run. Economic development policies should therefore include ways to discard old infrastructure in addition to encouraging new entrepreneurial activity. This principle must also be extended to the metaphysical context. Thus, institutional reform transforming currently unequal entitlements to equitable ones as suggested in Saeed (2009) and political reform transforming authoritarian governance systems to those committed to civil liberties and freedoms as suggested in Saeed (1990) should replace the current agendas that are not cognizant of the root causes of poverty and low welfare.

Last, but not least, capital with short life also leads to a lower accumulation of the stock of capital, which might be environmentally friendly. Forrester has advocated reduction in population and capital stock for sustaining mankind in his World Development model (Forrester 1971). This proposition is borne out by the fact that medieval societies like the Native Americans have lived close to nature in sustainable equilibrium over an extended period of time with very little accumulation of man-made infrastructure while those vested in building durable infrastructure like the Mayas, the Egyptians and the Chinese have gone through dynastic cycles (Saeed and Pavlov 2008). This issue also merits further attention in future research on sustainable economic development.

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Annex 1

Equations for Schumpeter's model of creative destruction

capital(t) = capital(t - dt) + (investment - cap_decay) * dt
INIT capital = 100
INFLOWS:
investment = induced__incestment+autonomous__investment
OUTFLOWS:
cap_decay = capital/av_life_of_cap_and_tech+1*autonomous__investment
labor(t) = labor(t - dt) + (hiring - labor_entre_mobility) * dt
INIT labor = 10
INFLOWS:
hiring = ((desired__labor-labor)/2)*labor_market__constraint
OUTFLOWS:
labor_entre_mobility = (labor*.05*climate__factor-
potential_entrepreneurs*.25/climate__factor)*1
potential_entrepreneurs(t) = potential_entrepreneurs(t - dt) + (unemployed_entre_mobility +
labor_entre_mobility + autonomous_entre_growth) * dt
INIT potential_entrepreneurs = 2
INFLOWS:
unemployed_entre_mobility = unemployed*.1*climate__factor-potential_entrepreneurs*.1
labor_entre_mobility = (labor*.05*climate__factor-
potential_entrepreneurs*.25/climate__factor)*1
autonomous_entre_growth = 0+0*PULSE(.5,2,1000)
technology(t) = technology(t - dt) + (tech_development - tech_decay) * dt
INIT technology = 100
INFLOWS:
tech_development = entrepreneurs*tech_productivity
OUTFLOWS:
tech_decay = technology/av_life_of_cap_and_tech
unemployed(t) = unemployed(t - dt) + (workforce_growth - hiring -
unemployed_entre_mobility) * dt
INIT unemployed = 2
INFLOWS:
workforce_growth = total_workforce*workforce_growth_fr
OUTFLOWS:
hiring = ((desired__labor-labor)/2)*labor_market__constraint
unemployed_entre_mobility = unemployed*.1*climate__factor-potential_entrepreneurs*.1
unspent__savings(t) = unspent__savings(t - dt) + (saving_up - resources) * dt
INIT unspent__savings = 20
INFLOWS:
saving_up = output*fr_output_saved*interest_rate/.1
OUTFLOWS:
resources = entrepreneurs*fr_savings__mobilized__per_entrepreneur*unspent__savings
autonomous__investment = resources^.5*(technology/10)^.5-saving_up

av_life_of_cap_and_tech = 10+step(change_in__av_life_of__capital,100)
capital__labor_ratio = 10
capital__output__ratio = 2+0*step(-.2,2)
change_in__av_life_of__capital = -2
climate__factor = GRAPH((rate_of_return/.2)/(wage_rate/3))
(0.00, 0.00), (0.2, 0.06), (0.4, 0.18), (0.6, 0.35), (0.8, 0.67), (1.00, 1.00), (1.20, 1.49), (1.40, 1.75), (1.60, 1.89), (1.80, 1.96), (2.00, 2.00)
desired_capital = output*capital__output__ratio
desired__labor = capital/capital__labor_ratio
entrepreneur_development_delay = 5
entrepreneurs = SMTH3(potential_entrepreneurs,entrepreneur_development_delay)
fr_output_saved = .2
fr_savings__mobilized__per_entrepreneur = 0.25
induced__incestment = (desired_capital-capital)/2+cap_decay
interest_rate = .1
labor_constraint = GRAPH(labor/desired__labor)
(0.00, 0.00), (0.2, 0.45), (0.4, 0.69), (0.6, 0.83), (0.8, 0.92), (1.00, 1.00), (1.20, 1.06), (1.40, 1.11), (1.60, 1.14), (1.80, 1.17), (2.00, 1.19)
labor_market__constraint = GRAPH(worker__availability)
(0.00, 0.00), (0.1, 0.435), (0.2, 0.655), (0.3, 0.765), (0.4, 0.85), (0.5, 0.895), (0.6, 0.935), (0.7, 0.96), (0.8, 0.975), (0.9, 0.995), (1, 1.00)
output = (capital/capital__output__ratio)*labor_constraint*(1+0*step(.1,2))
profits = (output-wages)
rate_of_return = profits/capital
tech_productivity = 5+1*step(1,2)
total_workforce = labor+unemployed+potential_entrepreneurs
wage_escalation__effect = GRAPH(worker__availability)
(0.00, 4.00), (0.2, 2.76), (0.4, 2.04), (0.6, 1.62), (0.8, 1.28), (1.00, 1.00), (1.20, 0.74), (1.40, 0.54), (1.60, 0.4), (1.80, 0.28), (2.00, 0.22)
wages = labor*wage_rate
wage_rate = 3*wage_escalation__effect
worker__availability = (unemployed/labor)/(2/10)
workforce_growth_fr = 0+0*pulse(.1,2,1000)