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Great Surges of development and alternative forms of globalization

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The present understanding of globalization is inextricably tied to the free market ideology for both proponents and opponents. This paper will argue that globalization has many potential forms of which the neo-liberal recipe, applied up to now, is only one.

The need to recognize the whole planet as the economic space is an inherent feature of the present technological revolution and its techno-economic paradigm. However, just as national State intervention in the economy took several different forms in the previous *mass production* (or "Fordist") *paradigm*, so globalization can be socially and politically shaped in order to favor truly global development and support the full deployment of the current *flexible production* (or Information technology) *paradigm*.

Simply put: globalization need not be neo-liberal. A pro-development version of globalization has not yet been designed or defended as such.¹ It will be argued that, without it, not only would it be very difficult to relaunch development in the South but also to overcome the present instabilities, imbalances and recessionary trends in the economies of the North.

These propositions stem from an historically-based model of the way in which successive technological revolutions are assimilated in the economic and social system, generating great surges of development that follow a recurring sequence and involve major readjustments in both the economic and the socio-institutional spheres.²

In terms of this model, the present period, after the collapse of the major technology bubble, would be at the mid-point of the current great surge, right when the structural tensions that underlie the ensuing instability and recessionary trends require a fundamental institutional recomposition. Among other tasks, income needs to be re-channeled towards new layers of consumers in order to help overcome the *premature market saturation* that results from the polarization of income in the top band of the spectrum in each country and in the world. This paper will argue that the present is, for that reason, the most appropriate time to put forth bold proposals for a profound redesign of global regulation and institutions.

The argument is developed beginning with a general summary of the model, in section 1. Then, Section 2 focuses on the recurrence of great financial bubbles, a decade or two after the irruption of each technological revolution, and examines their role in facilitating paradigm shifts and in concentrating investment in the installation of the new infrastructures. Section 3

¹ Though it could be held that the European Union has some important features of such a version

² This paper is largely based on Perez (2002) [Spanish edition 2004]

analyzes the post-bubble recessions and the structural distortions inherited from the "casino" economy, while Section 4 discusses the need to overcome those tensions by means of appropriate regulation and institutional changes. Section 5 analyzes the globalizing nature of the Information Technology paradigm followed in section 6 by a discussion of the features of that paradigm that could lead to a positive-sum game between North and South. Finally, section 7 looks at the institutional challenges involved in such a post-neo-liberal form of globalization taking into account some of the present world trends and their possible outcomes.

Great Surges in economic development: Recurrence and uniqueness

Beginning with *The Industrial Revolution* in England, towards the end of the 18th Century, the capitalist economy has been transformed by five great surges of development fuelled by successive technological revolutions. Each of these Schumpeterian 'gales of creative destruction' has articulated a constellation of new inputs, products and industries, one or more new infrastructures –usually involving novel means of transport of goods, people and information– and alternative sources of energy or ways of getting access to it. Table 1 shows the composition of the five revolutions, each identified by their most prevalent technologies.

The countries indicated in the first column are those that served as leaders of the surge and that were at the core of the world economy at the time. The dates refer to the initial *big-bang* or first public introduction of the most emblematic and significant technology of that revolution. It is the moment when its enormous innovation potential is made visible to would-be entrepreneurs and investors. It is Arkwright's Cromford mill in 1771, signaling the irruption of mechanization in the cotton textile industry. It is Stephenson's Rocket steam engine for the Liverpool-Manchester railway in 1829, which initiates the Age of Steam and Railways. It is Carnegie's huge Bessemer steel plant launching the world of heavy engineering in 1875; Henry Ford's first Model-T in 1908, inaugurating the Age of Mass Production and Intel's 1971 microprocessor opening the Age of Information Technology. Each showed a wealth of possible innovations and ushered in the corresponding technological –and later financial!– 'gold rush'.³ These dates do not follow the usual Schumpeterian dating of 'long waves' because they do not represent the beginning of an economic upswing, as in Schumpeter's model, but rather the

³ No "ending date" is shown for the surges, because the spread of each revolution continues after maturity in a process of decline and migration to further and further peripheries, while already the next revolution is taking off. Thus, there is a long overlap between surges. In fact, the big bang is a conceptual construct to indicate the highly visible innovation that facilitates the articulation of the whole revolution and its early propagation. But, before irruption, the set of technologies involved has undergone a long *period of gestation* in the midst of the previous paradigm.

irruption of a technological revolution, precisely when the previous one has reached maturity and the bulk of the economy enters a period of decline and stagnation. It thus captures the seed of future change before it can be registered in economic aggregates. The author has proposed the term *Great Surge of Development* to refer to the whole process of diffusion and social assimilation of each technological revolution, from big-bang to maturity.⁴

Table 1. Five technological revolutions in 230 years: Main industries and infrastructures

<i>Technological revolution</i>	<i>New technologies and new or redefined industries</i>	<i>New or redefined infrastructures</i>
FIRST: From 1771 <i>The 'Industrial Revolution'</i> Britain	Mechanized cotton industry Wrought iron Machinery	Canals and waterways Turnpike roads Water power (highly improved water wheels)
SECOND: From 1829 <i>Age of Steam and Railways</i> In Britain and spreading to Continent and USA	Steam engines and machinery (made of iron; fuelled by coal) Iron and coal mining (now playing a central role in growth)* Railway construction Rolling stock production Steam power for many industries (including textiles)	Railways (Use of steam engine) Universal postal service Telegraph (mainly nationally along railway lines) Great ports, great depots and worldwide sailing ships City gas
THIRD: From 1875 <i>Age of Steel, Electricity and Heavy Engineering</i> USA and Germany overtaking Britain	Cheap steel (especially Bessemer) Full development of steam engine for steel ships Heavy chemistry and civil engineering Electrical equipment industry Copper and cables Canned and bottled food Paper and packaging	Worldwide shipping in rapid steel steamships (use of Suez Canal) Worldwide railways (use of cheap steel rails and bolts in standard sizes). Great bridges and tunnels Worldwide Telegraph Telephone (mainly nationally) Electrical networks (for illumination and industrial use)
FOURTH: From 1908 <i>Age of Oil, the Automobile and Mass Production</i> In USA and spreading to Europe	Mass-produced automobiles Cheap oil and oil fuels Petrochemicals (synthetics) Internal combustion engine for automobiles, transport, tractors, airplanes, war tanks and electricity Home electrical appliances Radio and Television Refrigerated and frozen foods	Networks of roads, highways, ports and airports Networks of oil ducts Universal electricity (industry and homes) Worldwide analog telecommunications (telephone, telex and cablegram) wire and wireless National broadcasting networks
FIFTH: From 1971 <i>Age of Information and Telecommunications</i> In USA, spreading to Europe and Asia	The information revolution: Cheap microelectronics. Computers, software Telecommunications Control instruments Computer-aided biotechnology and new materials	World digital telecommunications (cable, fiber optics, radio and satellite) Internet/ Electronic mail and other e-services Multiple source, flexible use, electricity networks High-speed physical transport links (by land, air and water) Global 'narrow-casting' networks

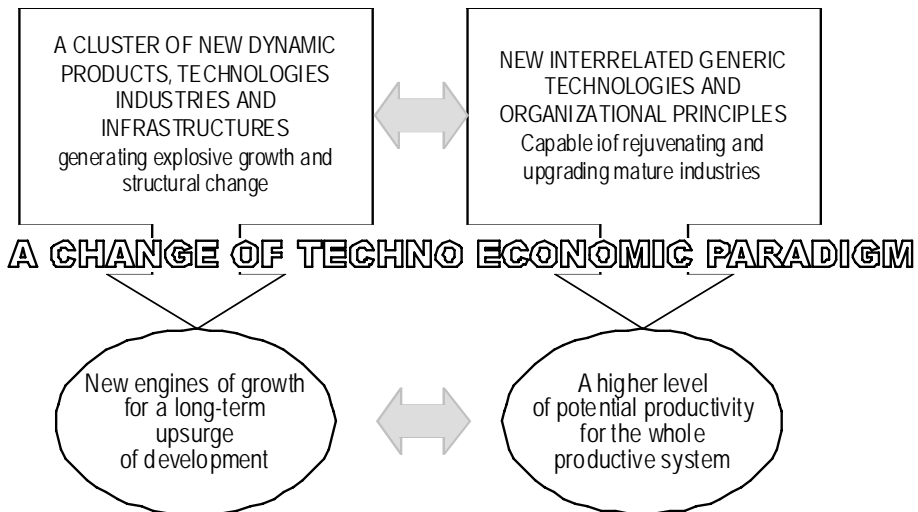
*Note:** These traditional industries acquire a new role and a new dynamism when serving as the material and the fuel of the world of railways and machinery

Source: Based on Perez (2002) p.14

⁴ In earlier work (see for example Freeman-Perez 1986), the author had kept the term long waves and respected the approximate Schumpeterian dating, even with much conceptual differentiation with regard to notions of equilibrium in the economy and to measurement of aggregate effects. For an explanation of the further break with the Schumpeterian tradition in this respect, see Perez (2002) Ch. 6.

Each of these great surges of development does not merely add the set of new industries of the technological revolution to the existing ones. On the contrary, these new technologies provide the potential for modernizing the whole productive structure and for raising the general level of productivity and quality to a higher plateau. This is due to the double nature of each technological revolution. As indicated in Figure 1, together with the new industries and infrastructures, each of these constellations generates a new best practice model or *techno-economic paradigm*, including all-pervasive generic technologies and organizational principles applicable both to the setting up of the new firms and industries and to the modernization of most of the existing economy.⁵

Figure 1. The double nature of technological revolutions



Source: Perez (2002) p.9

The process of paradigm shift takes place overcoming the resistance of the previous paradigm but, because of its clear superiority in terms of productivity, it ends up deeply transforming the ways of producing and the ways of living as well as reorganizing the productive structure and changing the institutional set up of the economy and society. It is a process as complex as that of cultural change and for that very reason it is difficult, painful, uneven and turbulent in both social and economic terms.

⁵ The term *techno-economic paradigm* was introduced by the author in 1984 replacing that of *technological style* used in 1983. It is conceived as an umbrella notion, referring to the economic and technological factors guiding the general direction of innovation and encompassing in a meta-concept what Dosi (1982) termed *technical paradigms* as the principles guiding change in each individual technology.

Table 2 gives a very general idea of the core concepts of each of the five techno-economic paradigms. The new principles are not as easy to identify as the new technologies. In fact, they only gradually surface into consciousness as the new technologies propagate and the engineers, managers, entrepreneurs, consumers and other agents experiencing the change discover the most compatible and effective ways of taking advantage of the new potential.⁶ Eventually, such principles are massively learned and adopted as generalized 'common sense', becoming almost imperceptible again. It is only in times of paradigm shift that both the old and the new criteria for best practice can be clearly discerned and compared.

Table 2. A different techno-economic paradigm for each great surge of development

Technological revolution Country of initial development	Techno-economic paradigm 'Common-sense' innovation principles
<i>FIRST</i> <i>The 'Industrial Revolution'</i> Britain	Factory production Mechanization Productivity/ time keeping and time saving Fluidity of movement (as ideal for machines with water-power and for transport through canals and other waterways) Local networks
<i>SECOND</i> <i>Age of Steam and Railways</i> In Britain and spreading to Continent and USA	Economies of agglomeration/ Industrial cities/ National markets Power centers with national networks Scale as progress Standard parts/ machine-made machines Energy where needed (steam) Interdependent movement (of machines and of means of transport)
<i>THIRD</i> <i>Age of Steel, Electricity and Heavy Engineering</i> USA and Germany overtaking Britain	Giant structures (steel) Economies of scale of plant/ vertical integration Distributed power for industry (electricity) Science as a productive force Worldwide networks and empires (including cartels) Universal standardization Cost accounting for control and efficiency Great scale for world market power/ 'small' is successful, if local
<i>FOURTH</i> <i>Age of Oil, the Automobile and Mass Production</i> In USA and spreading to Europe	Mass production/mass markets Economies of scale (product and market volume)/ horizontal integration Standardization of products Energy intensity (oil based) Synthetic materials Functional specialization/ hierarchical pyramids Centralization/ metropolitan centers—suburbanization National powers, world agreements and confrontations
<i>FIFTH</i> <i>Age of Information and Telecommunications</i> In USA spreading to Europe and Asia	Information-intensity (microelectronics-based ICT) Decentralized integration/ network structures Knowledge as capital / intangible value added Heterogeneity, diversity, adaptability Segmentation of markets/ proliferation of niches Economies of scope and specialization combined with scale Globalization/ interaction between the global and the local Inward and outward cooperation/ clusters Instant contact and action / instant global communications

Source: Perez (2002) p.18

⁶ For a wide-ranging analysis of the interrelated transformations brought about by each technological revolution and its associated paradigm see Freeman and Louçã (2001) Chapters 5-9

In the earlier surges in the 18th and 19th centuries, the spread was by word of mouth, imitation and texts written from personal experience. Later, in the 1910s and 1920s the Taylorist and Fordist principles of "Scientific Management" were published in widely read books and journals and spread by engineers and other professional consultants. This practice has been even more intensive in the present surge. During the 1980s and 1990s, thousands of consultants and management books have been spreading the gospel of the flexible organization of the ICT revolution. The contrast between the old rigid hierarchical pyramids and the new adaptable networks has been made in innumerable ways. The same can be said about the shift of accent from tangible to intangible value-added, from homogeneity to diversity and from energy-intensity in the old paradigm to information intensity in the emerging Knowledge Society.

But the changes do not stop at the door of the firm or at the edge of the market. Being the means for taking best advantage of the new wealth creating potential, paradigms end up involving criteria to shape the economic space and the institutional framework, both within countries and on the wider international arena, as suggested in Table 2.

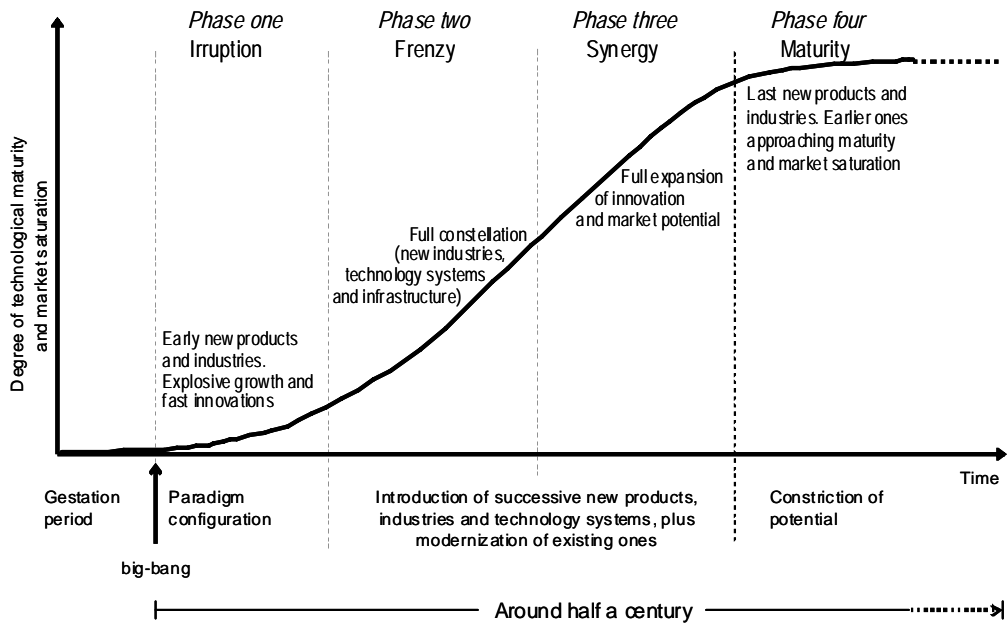
In that sense, globalization has been a part of the current change of paradigm. From different angles various authors and actors have announced the demise of the national State, its exit from economic intervention and the growth of a global economy with no trade barriers. In Section 5, below, it will be briefly argued that the globalizing trends in the economy, which are in the nature of the present paradigm, are likely to modify –but not deny– the role and means of action of government at several levels, from the local to the global through the national.

Such profound and widespread transformations cannot occur smoothly. The process of diffusion and social assimilation of revolutions and paradigms is economically turbulent and socially divisive.

As in the case of individual technologies, industries and technology systems,⁷ the theoretical life cycle of a technological revolution tends to follow a logistic S-curve. During its unfolding, it functions as a sort of envelope influencing the life cycles of all the component technology systems, industries and products.

⁷ Nelson and Winter (1982), Dosi (1982), Freeman (1974), Freeman and Soete (1997), Sahal (1985) and others

Figure 2. The life cycle of a technological revolution



Source: Perez (2002) p.30

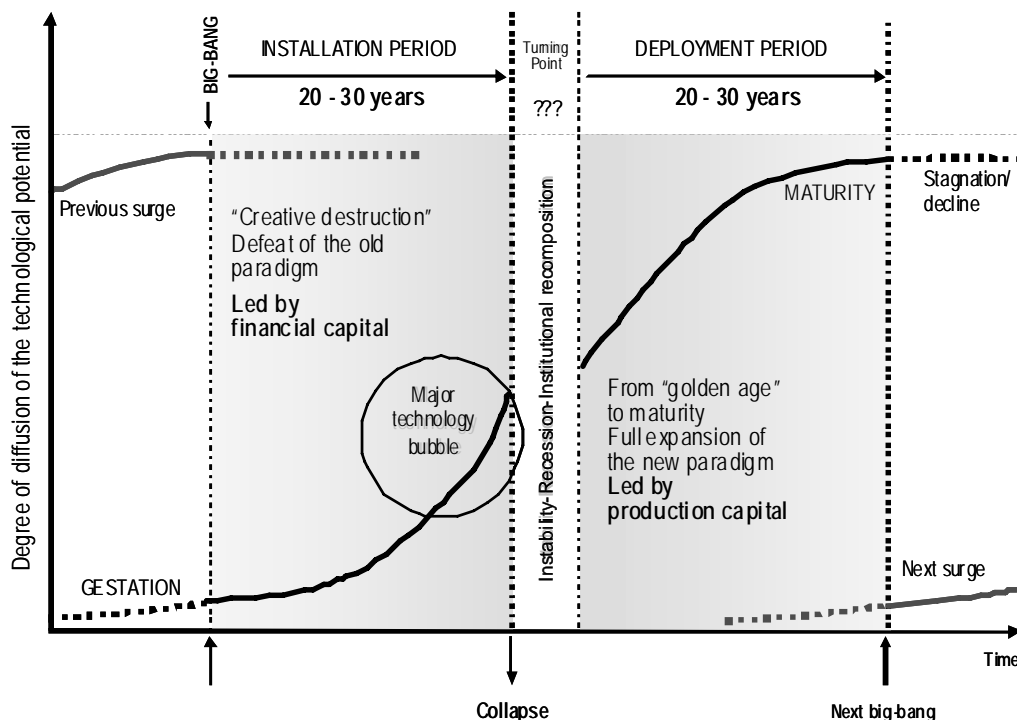
Inevitably, each technological revolution irrupts in the space shaped by the previous one and must confront old practices, criteria, habits, ideas and routines, deeply embedded in the minds and lives of the people involved as well as the general institutional framework, established to accommodate the old paradigm. This context, almost by definition, is inadequate for the new. For this reason the surge of development, which takes around half a century to propagate the new industries and their modernizing paradigm, has historically been broken into two distinct periods.

As shown in Figure 3, the first 20 to 30 years are historically characterized by the battle between the old and the new paradigm. It is the *Installation Period*, when there is an increasing process of decoupling between the new and the old industries, between the growing and the declining regions and countries, between the new economy and the old institutional framework. It is a time of economic and social polarization, when the rich get richer and the poor get poorer.⁸ It is during this period that the new paradigm is learned and the old one gradually unlearned; it is also when the new infrastructures, creating the main externalities to facilitate the application of the

⁸ It was during the Installation period of the second great surge that Engels (1844) wrote his indictment of the situation of the working class in England

new technologies, are installed. As will be discussed in Section 3, this whole period is increasingly led by financial capital submitting production capital to its short-term interests. This bias is intensified towards the latter part of this period, which is marked by the emergence of a major technology-related financial bubble, the collapse of which marks the end of the first half of the surge.

Figure 3. The social assimilation of technological revolutions breaks each great surge of development in half



Based on Perez (2002) p.37

What is defined here as the *Turning Point* is the uncertain time between the two periods, when the control of the economy tends to pass from financial to production capital. This is usually achieved through government intervention, with regulation curbing the many excesses of financial capital that are revealed after the collapse of each bubble, and with market-expanding policies of one sort or another. Both are spurred by the duration, depth and stubbornness of the recession and its consequences, as well as by the political pressure of the excluded.

When conditions have been made favorable, the second half of each great surge can begin. It is the *Deployment Period*, which also lasts two or three decades. These periods are the so-called "Golden Ages": the Victorian

boom of the second surge in the 1850s, the Belle Époque of the third surge at the turn of the Century and the Post WWII prosperity of the fourth surge. Those are the times when the full potential for wealth creation contained in the paradigm can be displayed. The rhythm of growth may not seem as intense as towards the end of Installation, but it is a steadier and more balanced prosperity, tending to spread to wider and wider portions of the population of the countries involved. It is a period ruled by the criteria of production capital, characterized by oligopolistic trends and tending towards greater levels of employment combined with increasing productivity, allowing greater security and rising standards of living.

However, in the latter phase of this period, many of the products and industries of the revolution are approaching maturity, restricting the growth of productivity, markets and profits. This creates the conditions for social and political unrest in the core countries, migration of markets and production activities to the peripheries, and the search for new technologies that leads to the next big-bang and a new great surge of development.

It is important to mention, albeit briefly, the role of techno-economic paradigms in reinforcing the pattern of technical change by revolutions which has characterized capitalism for more than two centuries. The paradigm that accompanies each revolution becomes embedded in the minds, habits, routines and "common sense" of people, in their shared world view, in the norms, laws and regulations, in the relative cost-structures and in the form of occupation of the territory. It shapes the national systems of innovation, production, consumption, trade, transportation, education and even government. In the process, this embedded paradigm becomes a filter for inclusion and exclusion of potential innovations. Those that are compatible with the existing habits of production and consumption and with the existing network of suppliers and distributors will be more profitable than those that break the established innovation trajectories and cannot count upon externalities. Such incompatible innovations will be shaped, made to adapt or relatively marginalized. To give just one example, the semi-conductors that would eventually become the core of the information revolution were shaped in their early days to fit typical mass production: they served to make portable radios, record players and other electrical consumer products. This process of adaptive incorporation, together with the relative autonomy of science and technology, will create the pool from which the next revolution will emerge when conditions are favorable. Such conditions appear when the innovation potential of the current revolution approaches exhaustion and the search for new sources of profit relaxes the exclusion mechanism.

Obviously, this is a stylized narrative of a thread of recurrence extracted from the otherwise unwieldy mass of unique facts that characterizes real

history. There are no clean breaks; there are plenty of overlaps, many peculiar forms that rebel against a rigid interpretation of the model and much richness that begs recognition when concrete analyses of specific times and places are to be made. The claim is that, if the proper distance is maintained between the model and history, the regularities identified represent real fundamental forces and an underlying dynamics that help to understand the system and provide some criteria for anticipating possible futures and designing appropriate actions.

It must be noted that the model summarized here refers mainly to the core countries of each revolution, where the surge is fully experienced. Elsewhere there are lags and exclusions, linking and delinking of regions and countries. Propagation tends to go from core to near periphery and then, at maturity, to further and further peripheries. But the cases of the early diffusion of the third surge to Argentina and other Southern Hemisphere countries, in the Installation Period of the 1880s, and the parallel cases of the Asian Tigers, in 1980s and 90s as well as those of China and India in the 1990s and 2000s of the present fifth surge, show that -at least when the paradigm is globalizing by nature- there can be other patterns of propagation.

These peculiarities, associated with each specific paradigm will be an important element when it comes to discussing the viable options at this Turning Point, in the final section of this paper.

The ruthless role of the major technology bubbles

The set of routines acquired in order to flow easily with a particular paradigm can turn into very stubborn resistance when paradigm-changing innovations are made. As the maturity of each paradigm leads to market stagnation and profit constriction, the cooperation between financial and production capital that characterizes the Deployment period markedly deteriorates.

Incumbent *production capital* is tied down to the current paradigm by its investment in physical capital, the knowledge and experience of its management and personnel, its networks of suppliers, distributors and customers as well as by the confidence that previous successes have instilled in its leaders. *Financial capital*, by contrast, though it had been sharing the same mental habits, is free from any such ties in the real economy and is essentially mobile and footloose.⁹ This distinction between the nature and

⁹ See Ch. 7 and 14 in Perez 2002.

motives of production and financial capital is at the core of the model being presented and, in view of the author, is an important part of the explanation of the cyclical nature of the system.

When maturity arrives, idle money begins to accumulate without profitable outlets along the established trajectories; the reaction of financial capital will be to away in a search for novel investment directions. Production capital will continue tied to its technologies and its products and will search for faraway markets and even faraway production locations (as happened massively in the 1970s giving place to the idea of a New International Economic Order). Financial capital will accompany these forays, but will also go its own way taking risks with new creditors and with path breaking innovations. The new creditors are likely to end up in the debt crises in the periphery that recur every half Century;¹⁰ while the search for truly novel opportunities will lead to backing the next technological revolution.

Thus, financial capital becomes the routine breaker against incumbent production capital, which turns conservative at the end of each surge. The Installation of the next revolution will be characterized by the alliance between the new entrepreneurs and financial capital, probably represented more and more by bold new venture capitalists and rash financiers.

The initial general resistance to the new paradigm will require political strength to almost force the diffusion. Yet, the powerful circles of old production capital will be part of the resistance, while new production capital is still small and weak. The new entrepreneurs will often only have technical capabilities, drive and ambition, usually with little money of their own and no political power. This is one of the reasons why financial capital will gradually take over economic leadership during the Installation period.

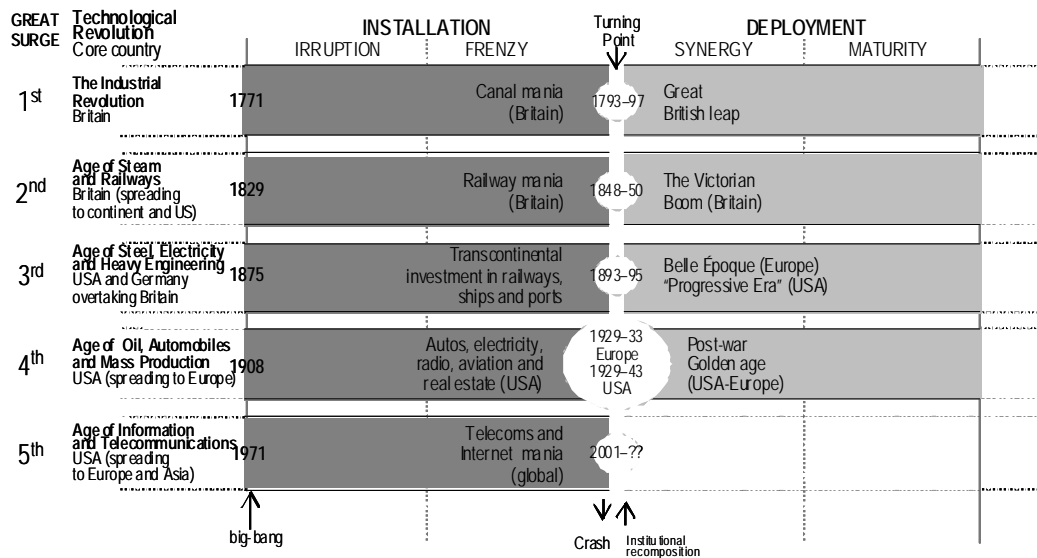
The other reason is the vicious circle associated with the creation of the new infrastructures. Without enough automobiles, a sufficiently large network of roads is not economically justifiable; without sufficient roads, enough automobile demand will not come forth. The same can be said about canals, railways, ports and ships for transcontinental routes, home electricity and digital telecommunications networks (see Table 1). Each of those infrastructural networks was absolutely necessary for the deployment of the technology systems of the corresponding technological revolution. Each grew in a *frenzy phase* of over-investment, which pulled in enormous

¹⁰ For the case of Latin America, Marichal (1988) provides the dates of the massive loans, which coincide with the maturity of each surge (the "Independence loans" in the 1820s during the maturity of the first surge, then 1860-73 in the second, 1904-14 in the third and 1960s and 70s in the mass production surge) See Perez (2002) figure 8.1 p.87, with the data organized by periods, and the original source: Marichal 1988.

sums of eager money from all quarters, only to frustrate most of those hopes with the ensuing collapse.

Such have been the *Major Technological Bubbles*: canal mania in the 1780s, railway mania in the 1840s, the rage of foreign investment in transcontinental railways and global markets for meat and wheat and copper from the South in the 1880s, the stock market bubble of the roaring twenties, with electricity, automobiles, radio, oil and the real estate boom creating the externalities for mass production and consumption and finally, in the 1990s, telecommunications and Internet mania. Huge quantities of money were poured into these processes and great mountains of paper wealth were wiped out at the end. Many fortunes were made in each case and many were lost, together with the destruction of the life savings of great numbers of naive participants.

Figure 4. Parallel surges with major bubbles, Golden Ages and approximate dates of Turning Points



Source: Based on Perez (2002) p.57

But, after the imaginary wealth is eliminated, the real new infrastructural networks remain and they generally achieve enough coverage during the frenzy to become positive externalities for the full deployment of the paradigm, after the ensuing recessions and instabilities are overcome.

Figure 4 sets the five great surges in parallel, showing the equivalent periods and indicating the dates of the big-bang, the main infrastructures set up in the Installation period, the dates of the Turning Point recessions and the Golden Ages that followed. The dates are approximate and the intention is indicative. There are several complexities that make the model less neat than the figure suggests. These are discussed in Perez 2002 [2004 Spanish], but cannot be addressed in this brief paper.

Financial bubbles are then a phenomenon leaving a very complex legacy. The negative side is the most obvious: the moral breakdown that leads to fraud and corruption, the polarizing effect on income distribution, which creates extreme wealth in one end and extreme poverty in the other, and the recession that follows and hurts the impoverished even more.

On the other hand, this ruthless way of concentrating available investment in the new technologies installs the platform that can facilitate the next "golden age". After the bubble, there is enough infrastructure for the needs of a decade or more; the new paradigm has been accepted as 'common sense'; the new production and consumption models have been established; the successful business models have been tested; the industries that will replace the previous engines of growth of the economy have been identified: the core firms of the technological revolution have become the new giants and possibly formed oligopolies. The economy of the core country or countries is ready for full expansion, but the institutional context is not.

The legacy of the bubble: three tensions at the Turning Point

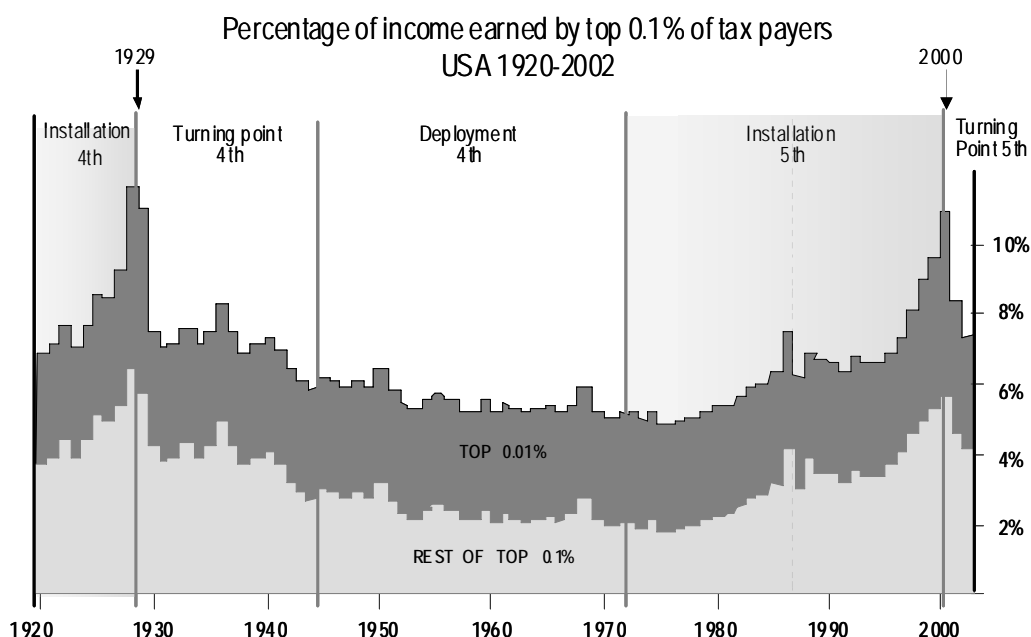
The Turning Point is the time when socio-institutional innovations determine the conditions for the Deployment period and define whether it will be a *Golden Age*, as the Victorian or the Post-World War II booms of the second and fourth surges or a *Gilded Age* as the *Belle Époque* in the third. The length of the Turning Point is indeterminate. It depends on the direction of political decisions and on the effectiveness of the policy measures. It can last as little as two years or as long as the whole of the 1930s plus WWII.

Three structural tensions constitute the main negative legacy of the *major technology bubbles* for the course of the economy. The first tension is between paper and real wealth, which is the mechanism that builds the bubble and is only partly resolved by the collapse. Regulation will be needed to finish the job.

The other two both arise from the deep polarizing distortion in income distribution that takes place during each Installation period, especially during the bubble, making the rich richer and the poor poorer. Much literature has

appeared registering and analyzing these trends within and between countries in the current period¹¹, though policies to counteract them are still scarce. Figure 5 shows how the top one-tenth of one percent of tax payers in the USA have received more than ten percent of (declared) income during the major technology bubbles, that of the 1920s for the fourth surge and that of the 1990s for the fifth. The proportion declines to 6% in the Deployment period.

Figure 5. Income polarization as one of the negative legacies of the Installation Period



Source: Johnston (2005) from US Treasury data and Piketty and Saez (2003), with period indications by the author

This income polarization becomes the source two serious tensions: One in the economic sphere and another in the socio-political sphere. The specific form given to their solution will influence the income distribution trends in the following decades.

The second tension, then, corresponds to the expression of income polarization in the economic sphere: It is that between the profile of potential supply and the profile of existing demand. The new industries that are capable of being the engines of growth have become ready to multiply their output many times and even to reduce prices significantly, but the adequate

¹¹ See for example Piketty and Saez (2003), Galbraith and Berner (2001) and, for a long term view of global inequality trends see Tylecote (1985)

solvent demand is not available. The top-of-the-pyramid incomes that had provided the dynamic market for the introduction of all the new exploratory products have saturated their consumption levels of the new technologies and now prefer to acquire rare luxury goods or rather search further opportunities to invest. They are thus no longer a suitable growth market for the new technologies. Yet, the potential markets in other segments of the pyramid or other parts of the world do not have enough income yet. The phenomenon can be called *premature market saturation*.

Finally, the third tension represents the socio-political expression of income polarization. The massive exclusion and the worsening of conditions for the poor lead to various forms of violence, political and social unrest and migratory pressures. The tension can become so acute that it creates serious problems of governance and is likely to turn the rich-poor divide into the rich-poor confrontation.

On this occasion the income polarization has occurred in each country but much more deeply between countries and continents. Thus, in this globalizing surge the conflicts, the acute poverty, the migrations and the violence inevitably present a global character too.

The other important element specific to this surge is the sudden entry into the market economy of the countries of the ex-Soviet bloc together with China and India. This seems to have provided a wide respite to the market saturation problem without solving the socio-political polarization.

These phenomena are likely to have a decisive impact on the character of the Deployment Period and will be briefly discussed in the final section.

The need for institutional recomposition to favor production over finance

The solutions to the structural problems left by the Installation Period and the bubble can take many forms, short-lived or longer lasting. In one way or another, the leading role in the economy needs to go from the hands of financial capital to those of production capital. Once the technological revolution has been installed, with its infrastructure in place, its paradigm accepted as best practice to take maximum advantage of the new wealth creating potential and its core industries established as the economic leaders, the time has come for expansion of production and markets. The short-term profit seeking behavior of financial capital becomes an obstacle to growth. Long-term investment decisions must be made without pressure from the stock market. The expansion in turn requires growing demand, which usually supposes income distribution and implies government policies

of a welfare sort. It is a shift from the individualist survival-of-the-fittest profit seeking of the Installation period to favoring collective well-being in order to profit from generalized growth. It is also a shift from ferocious free competition for survival to more stable industry structures formed through mergers and acquisitions and embodying a form of oligopolistic competition. Those shifts are the essence of the Turning Point between the two periods of each surge.

But resistance can be great, not only because the power acquired by financial capital during the Installation Period is difficult to curb, but also because even those who would benefit by the change are not necessarily conscious of how best to further their interests.

In the 1930s Turning Point, Franklin D. Roosevelt, apart from setting up the necessary regulation to curb the excesses of the financial world, tried to overcome the depression with several new policies and institutions. This *New Deal* was meant to provide masses of government funded employment, subsidies for the impoverished farmers and other measures to help the poor, as well as establishing State corporations, such as the Tennessee Valley Authority, that built a major hydroelectric dam and engaged in multiple other activities to pull up some of the most backward and poor regions of the country. These policies met with ferocious opposition from the whole business community in the USA, claiming that such forms of State intervention in the economy were leading to communism. It took the experience of World War II, which became a dress rehearsal for both mass production and the "Military-Industrial Complex", for business to discover that State intervention was compatible with capitalism and could be very profitable.

In 1943, with the war still raging, the Bretton Woods agreements established an orderly context for international exchanges, with the US dollar as the basis and with the IMF and the World Bank as enabling and balancing institutions. On the national level, various elements came together into the "Welfare State", providing a coherent framework for social peace and a steadily growing volume of demand for mass production.¹² Officially recognized labor unions, collective bargaining and unemployment insurance would provide an uninterrupted flow of rising wages and salaries. Increasing employment in government and private services and in the growing construction industry would absorb the active population that the high productivity manufacturing and agriculture could not occupy. (Farm subsidies and production cuts, would actually restrain such productivity from translating

¹² See the French Regulation School for a similar interpretation including a full theory and a very thorough analysis of US regulation during what they call the Fordist period (see Aglietta 1976, see also Coriat 1994, etc.),

into lower incomes for farmers)¹³. Government demand was to grow in several directions, civil and military, for capital and consumer goods and for all sorts of construction from highways and airports to schools and hospitals. Finally, the application of Keynesian forms of demand management by central government would try to maintain economic growth with restrained inflation and full employment. All this was deeply consistent with the requirements of the mass production paradigm.

In fact, that paradigm, with its economies of scale, based on very high volume and standardized demand for military and consumer goods, seemed to require some form of "national statism". The four political systems that were adopted for growth with that paradigm were: Soviet socialism, Nazi-Fascism, Keynesian democracy and State Developmentalism (as one could call the various versions of State-led growth in the Third World). In spite of their profound differences, these four systems were all coherent with the requirements of the growth potential provided by the paradigm. Hence, they shared many formal features, including centralized governments with huge demand and significant employment and mechanisms for controlling or 'overseeing' the national economies and the inter-national exchanges. They were established at different dates after the 1908 big-bang of the Age of mass production; they each exhibited a great variety; they lasted differing periods for different reasons; those that survived until the irruption of the Information Revolution have either collapsed and disappeared, as the Soviet Union, or been deeply modified, as the Keynesian democracies and Chinese socialism, or have lived a protracted period of deterioration, as continues to be the case for many countries of what was called the Third World.

Moreover, even though the term Golden age has been used here to refer to the early phase of the Deployment Period of each surge, it is possible, as happened in the third surge, that prosperity may be more like an ostentatious "gilded age" with a shiny golden veneer on the surface. Such can be the interpretation of the character of the *Belle Époque* in Europe and of the *Progressive Era* in the United States at the turn of the twentieth Century. The main core industries of that surge were in heavy engineering (metallurgical, industrial, chemical, civil, electrical). Hence the capital requirements were huge and the demand necessary for full deployment was in the equipment goods market for big business, in big shipping, railway and electrical companies, in the navies and other military agencies or imperial governments, rather than in consumer goods. This made it possible to proceed through the whole surge without an "economic" need for income re-distrib-

¹³ This was the case in the USA where agriculture was to be fully mechanized. In Europe the subsidies were given later to protect low productivity traditional farming.

bution. Welfare measures were indeed applied, though unevenly, in most of the advanced countries at the turn of the Century responding to socio-political pressures and governance needs. It also permitted finance capital to retain control of investment having its agents take over the boards of the production companies and guiding decisions directly. This fact led some authors to hold that the system had been transformed into "finance capitalism"¹⁴

Such specificities, but mainly the major differences between the social arrangements which proved adequate for mass production, are a reply to those who might misunderstand the model presented as a form of technological determinism. The wealth creating potential of a paradigm defines a very wide range of the possible, for societies to take best advantage of its possibilities. The various socio-political forces seize this potential and shape it towards their values and ends. How successfully they achieve them will depend on whether they have –consciously or intuitively– interpreted correctly the potential range and the requirements of that paradigm, as well as on a multitude of factors other than technology.

Why globalization?

The bottom row in Table 2, in section 1, briefly summarized the main features of the current paradigm, shaped by the requirements and the potential of the Age of Information and Telecommunications. As tends to be the case, they are a coherent set of mutually reinforcing principles. *Knowledge capital and intangible value added facilitate heterogeneity, diversity and adaptability*, which in turn lead to -and interact with- the *segmentation of markets and the proliferation of niches*. *Globalization* leads to the *interaction of the global and the local*, both in terms of comparative advantages for production and innovation decisions and in terms of adaptability of global products to local markets. Production is then conceived in a complex range that may go from "mass customization"¹⁵ achieving *economies of scope and scale* to multiple niches geared to attaining *economies of specialization*. These complex production and market profiles are achieved through *decentralized integration* and *network structures*, which characterize the organization of giant global firms across the planet. These principles are also typical of the structures of collaboration that have made many networks of small firms successful. The implicit complexity is made possible and efficient by the ease of *instant global communications*, allowing *instant contact and action*.

¹⁴ Hilferding (1910:1981)

¹⁵ Davis and Pine

Still, the question may arise as to why globalization should be inevitable. The answer is that reaching for giant global markets is a natural consequence of applying the potential of information and telecommunications technologies (ICT). Intangible products, not only recognize no physical frontiers by traveling instantly and invisibly through communications channels, they also have zero or negligible marginal cost and no structural limit to market growth. Yet they often have high research and development investment, hence the need to maximize markets.¹⁶ Moreover, the greater the number of users of a particular network or product the greater its value and the lower the prices can be, while maintaining growing profitability.¹⁷

In terms of the size of firm they can accommodate, ICTs go well beyond the maximum size that the old international or transnational corporations were able to achieve with their pyramidal structures. Not only is it possible to guide, monitor and control a truly giant organization when it is networked, but territorial coverage and organizational complexity are relatively easy to handle with ICT and are likely to become much more so with further adaptive innovation. The technology itself is all-pervasive and can be incorporated into the most sophisticated processes for biotechnology, nanotechnology or space travel as much as into the most traditional production systems, from global positioning of sheep to information about fishing conditions for small fishermen. The more varied the users the wider the innovation and wealth creating space.

But the maximum size of market for the intangible products is defined by the possession of the hardware by the users and the existence of the communications links. This means that hardware and telecom networks penetration are the true market frontiers for the ICT industries, rather than the "invisible" territorial ones. Overcoming the digital divide within countries and between countries is thus fully in the best interest of the ICT sector.

Regarding the size and scope of global firms, the logic of the potential leads to assessing the whole planet for comparative advantages and estimating production and transaction costs "as if" the economic space were unlimited. The greater and more diversified the economic space for global firms, the better for the production networks.

¹⁶ The hyper-segmentation of markets and the ease with which business can handle innumerable variations, custom adaptability and complex price structures, gives a different meaning to scale and to maximum markets. But this is not the place to develop that discussion.

¹⁷ These changes are the real nature of the "new economy" and not an everlasting bull market. See Luc Soete about the new economics of the new economy and Kevin Kelly in a more managerial style on the "new rules".

Thus globalization in some form or other is inherent to the nature of the current paradigm, as much as national economies were to the previous. The specific form that it takes in the future and the institutional framework that will guide it will depend on a multitude of factors, political, social, ideological, economic and even climatic.

Some thoughts on the possibility of a positive-sum globalization

The mass production paradigm was best served by intensive growth in relatively closed national markets, with a homogenous language and culture (which is why separate nationalities were usually repressed in favor of the central one). A common energy-intensive style of living with as great a scale as possible was the basis for low cost high volume production. When Mao Tse Tung dressed all the Chinese in a single blue high collared uniform, he was applying the same principle enunciated by Henry Ford when he said about the Model-T: "you can have any color as long as it's black". Equally, the chairman of General Motors was right when he said that what was good for GM was good for the USA and vice versa. National growth and well being was good for mass production businesses.

Today that could be paraphrased by saying that what is good for the healthy growth of the whole world economy is good for the ICT industries and vice versa. The more countries and regions are incorporated into development and well being, the more the ICT industries will flourish and the larger their markets will be.

Foreign direct investment in the mass production surge consisted mainly of setting up protected manufacturing affiliates that mimicked in a truncated form the full structure of assembly and suppliers established in the originating country. The processes thus transferred were technologically mature and rarely required local innovation capacity beyond minor adaptations. Even in the later stages, when technological and brand licenses were sold to local investors and local production was meant to export back to the advanced country, the local plant was a carbon copy of the mature original and was not expected to change much. Both the imported parts and the products to manufacture were standardized. Dependence was intrinsic to that particular structure of production and it changed as the industries of the paradigm matured.

In the current flexible production surge, global networks imply intense interdependence and all parts, products and services are in continuous improvement mode. The whole value chain is broken up into multiple processes and sub-processes and each of these is located where it is most advantageous in terms of cost and/or in terms of innovation capacity or whatever the key

variables are in each specific case.¹⁸ It could even be that there is no "model" plant in the originating country, while technological capabilities can be very dispersed across the global network. Conditions vary depending on whether the particular part, product or service is "commoditized" or adaptable or specialized, but reliability and quality of supply to the network is crucial in all cases and improvements are expected to be generated by the local producer.

Consequently, off-shore manufacturing plants play a very different role –and are much more active–within the *global* corporation when compared with the foreign affiliates in the *international* corporations of the 1950s and 1960s or even those in a *transnational* one in the 1970s. Companies have a real stake in the economy of the countries where the nodes of their networks are located. They also will generally have a vested interest in enhancing the human capital they employ and the quality of the surrounding services.

Furthermore, the current paradigm is able to deal with diversity and actually thrives in it, and many differing identities and nationalities can be enhanced. However heretical this may sound for the ideologies shaped by the mass production paradigm, the objective of "equivalent satisfaction" with different ways of living may bring more welfare to more people than the traditional homogenizing goals of the recent past.

The typical structure of modern markets is hyper-segmented from the standard products and services to the most adapted and specialized niches. The wealth creating potential of the flexible production paradigm that accompanies the information and communications technology revolution would be best displayed through the spread of production across the whole planet and by multiple specializations and the definition of differentiated markets and lifestyles by regions and localities.

All this demands the design of an alternative mode of globalization, fully compatible with the paradigm and capable of unleashing a worldwide steady expansion of production, markets and well being. It would need to be production-centered and led; pro-growth and pro-development; with dynamic, locally differentiated markets, enhancing national and other identities and reaching towards optimum worldwide welfare. The immense wealth creating potential of this paradigm is capable of achieving such positive-sum goals under the appropriate enabling conditions.

¹⁸ Of the manufacturing facilities attracted by NAFTA to the North Mexico, those that initially moved to China were the most heavily dependent on labor cost. One could envisage, however, that when freight and energy prices change the relative cost equations, there will be another relocation process.

That is where the requirements of the paradigm for truly global market expansion and the interests of the developing world can join hands. This is the space where those that seek economic growth and those that seek a decent world with increasing global equity can find a common ground.

The Institutional Challenge

Unleashing all the growth potential of each technological revolution in the deployment period requires overcoming the basic tensions inherited from the installation period. A changeover of power would have to take place, turning over the helm of the economy from financial to production capital. In concrete terms this means favoring long-term over short term investment¹⁹; stimulating production investment and employment-creation rather than feeding the financial casino or housing bubbles; aiming at innovations for true market expansion and not for quick financial gains; inducing the search for profits from real production and not from manipulating money; in short, favoring the real economy over the paper economy at all levels: global, national and local.

The finance-led neo-liberal version of globalization applied up to now can be said to have accomplished the "destruction half" of institutional creative destruction. Perhaps that was unavoidable given the differences between the mass production paradigm and this one and the need to dismantle much of the institutional framework set up for the previous one.²⁰ But, if "State fundamentalism" could have been seen as an obstacle during the installation period of the ICT surge, "market fundamentalism" is now a major obstacle for unleashing the deployment period. The continuation of unrestrained and unregulated free markets will only worsen the tensions that are the direct result of the operation of those very markets. Governments must intervene to shift the tables, not by reversing into the old mode but by creating appropriate institutions (and/or transforming the existing ones) in order to foster the deployment of the current paradigm. That is the creative half of institutional modernization.

One of the challenges is the design of global institutions with real regulatory power, especially over finance. Historically, capitalism has managed to establish a regulatory framework enforceable over the same territory that is

¹⁹ Lou Gerstner, the CEO who modernized IBM, suggests in his book *Who Says Elephants can't dance* that introducing high taxes for capital gains from selling stocks in the short term and no taxes for those who sell them after five years would make investors act like owners again and worry about the future of the companies.

²⁰ Even the collapse of the Soviet System can be seen as partly a consequence of institutional rigidity in the face of paradigm change, if compared with the Chinese flexibility (or with the early Czech attempt in 1968, which foresaw the information society; see Richta 1968:1972)

occupied by the economic space. If the economic space overflows the range of action of the overseeing institutions, the most likely result is chaos.²¹ Sustainable regulation will need to be as supra-national as the financial flows.

That will require much institutional innovation. During the surge shaped by mass production, the typical pyramidal structure adopted by the major corporations with its many layers and compartments, its closed frontiers and its routinized procedures served also as the model for the organization of State institutions. The modern global corporation is a flatter open network with central strategic coordination and multiple semi-autonomous interactive units adapted to the differentiated conditions confronted at the various levels and locations and with increasing knowledge, innovation and decision making competences across the board. Such an organization was the result of learning to apply the new paradigm to best advantage. The same would again apply to the structure of government. Following the principles of the paradigm, it would need to include a highly competent multi-level governance framework going from the global and supra-national, through the national, to the local, recognizing a common regulatory framework at the world level and increasingly adaptive diversity in descending levels. In short, the modern State would need to evolve towards a complex combination of strong enforceable regulation and flexible coordination of diverse agents, including the private, the public and the emergent "third sector". The national states would perhaps become the brokers and negotiators between the supranational and the local levels, but most of all, they would need to design and establish institutional mechanisms for reaching and sustaining the vision and the social consensus that would guide a convergent growth and welfare effort.

If it all sounds utopian, the reader might try to imagine the situation in the previous Turning Point. In the midst of the 1930s Roosevelt was being accused of communism for wanting the State to intervene in the economy to create employment and introduce various social security measures to confront the depression. At that time, few would have been ready to give credence to someone proposing the design of a Welfare State with full employment and with workers' wages being sufficient to own a house full of electrical appliances and with an automobile at the door.

At the level of individual countries, or regions, opportunities are a moving target and action has to be designed for the conditions of tomorrow and not

²¹ Soros, a powerful player in the world of finance and a staunch defender of the open society and the market (though not of what he calls 'market fundamentalism'), maintains that global finance cannot function without global regulation and warns of the threat of a breakdown in the system. See Soros (2000).

those of yesterday. There are three tools that can help visualize possible future directions and help viable design:

- understanding the process of assimilation of technological revolutions;
- grasping the logic of the techno-economic paradigm and
- searching the world for successful experimentation already underway.

Contributing elements for the first two has been the object of this paper. In the realm of social experiments there is much to analyze and reflect upon in today's world.

The successful Asian countries are examples of what intelligent, dynamic and pragmatic policies can achieve in a catching up country within a globalized world by attracting foreign investment in production, while mobilizing massive domestic investment and learning processes, for the local and global markets. This is not to say that it is simple; the serious income distribution problems faced by countries such as China and India are testimony of the difficulty involved. Other regions of the world could confront even greater problems. Yet, catching up has definitely taken place in various countries of Asia in recent decades, in the context of production globalization. Of course, successful policies in one country in a particular period cannot be copied under different conditions and in a different phase of the surge.²² But there are general principles to extract, adopt and adapt and certain dangers to avoid. Underestimating the accumulation of human, intellectual and technological capital required to overcome underdevelopment is an ever present danger. This is even more so in the emerging *knowledge society*, which is shown by how much the levels of education and of purposeful technological learning have mattered in all the successful cases. The fact that the State has had a strong influence in shaping the markets in each case, in particular in protecting the learning efforts, is a crucial lesson to analyze without falling into simplistic dichotomies.

As to global institutions, the international criminal court, the WTO and some of the successful UN interventions in high conflict areas are beginning to show their viability, even in extremely thorny matters and with high resistance from one or another camp. The European Union and the successes achieved in some of its smaller member countries show what can happen when favorable conditions, income transfers and access to market boost an economy that is ready to flourish.²³ Some of the proposals made by the

²² For a discussion of how opportunities for development are a moving target, see Perez (2001) and for changing barriers to entry when catching-up see Perez and Soete (1888)

²³ Although the more recent accession countries have not benefited from the types of policies that helped boost Ireland and Spain (See Kattel and Reinert 2005)

Brandt Commission in 1980,²⁴ outlining the measures to promote global welfare, may still be resuscitated when the proper conditions arise.

But not all that is feasible and beneficial for all becomes a reality. Ideology and politics are in the end the guiding forces in the range of the possible. The neo-liberal forces today are involved in keeping the casino economy alive, while the neo-conservatives are trying to solve complex socio-political problems with war. Nationalism and various fundamentalisms are determining much of world politics. The left is resisting globalization in general, assuming it is necessarily neo-liberal. This is understandable given the catastrophic results in much of the world, where many countries have fallen back to their 1960 per capita income levels and where the very modest Millennium goals against poverty seem unattainable. There is a regrettable absence of alternative proposals beyond the false dichotomy of State or Market.

The contingencies of history have provided an unexpected solution to the market saturation problem. The sudden entry into the market economy of the countries of the ex-Soviet bloc together with China and India has given access to very large labor forces with an educational level equivalent to those of developed countries but at infinitely lower costs, to innumerable obsolete industries to replace or modernize and to huge territories with insufficient infrastructures. The massive outsourcing and off-shoring of production capacity to those countries has acted as a "miracle cure" for the more advanced world, especially for the United States. Not only do these practices reduce costs and lower prices to expand effective demand in the previously saturated markets at home, but also –and perhaps most importantly– these highly populated nations have become rapidly expanding markets in their own right. In addition, the reinvestment of the commercial surplus of China, Japan and others in the US has served as a driver of activity in the financial markets as well as sustaining consumption levels via the increase in house prices.

Even the concentration of foreign direct investment in Asia and Eastern Europe, marginalizing most of Africa, much of Latin America and the Middle East, has not resulted in what could have been a serious contraction in import demand from those countries. The growth of the Asian economies has benefited raw materials exporters through significant price increases. This has allowed the maintenance of reasonable levels of growth in spite of having lost much of their manufacturing capacity, first through trade globalization and recently through the price competition from minimum labor cost countries. By reversing much of the import substitution process under

²⁴ Brandt (1980)

conditions of high-price raw materials, there has been a revival of the demand for imports.

Thus the most important post-bubble tension, the one that would have brought to the fore the market limits imposed by the regressive income distribution has been, at least temporarily, overcome.

In the meantime, financial capital with its short-term interests is still in power regarding investment decisions; the stock market continues to be watched as the thermometer of economic health, and although the tensions and the underlying recessionary trends still surface in multiple imbalances, growth is taking place in much of the world economy. A change of course would seem unlikely. Are we then still at the Turning Point or are the dice cast and has a Gilded Age Deployment already begun? Perhaps only hindsight will tell. It is always easier to imagine the continuation of current trends than a radical shift away from them.

But the future is not the simple extrapolation of past and current trends. It is more likely to be about the response to the consequences of those trends as they reach limits. Hence, all these processes could have –and are likely to have– a boomerang effect. The virtuous cycle created by the financial flows between the economies of the US and Asia could turn vicious if something went wrong. The use of these funds for derivative mountains, hedge fund pyramids, housing bubbles and other unstable financial games could end in panics. Off-shoring could have a significant and unacceptable backlash in job losses and wage reductions and lead to serious social and political unrest in the more advanced countries; while the acute rich-poor divide can do the same in the emerging countries. Thus, even with what appears to be a solution to market saturation, the tensions stemming from the casino economy and from income polarization can re-emerge and continue to generate destabilizing pressures and create conditions for promoting institutional changes on a global scale.

It is, of course, impossible to predict the outcome of these processes, but that outcome and the actions or inactions of the various socio-political forces will define the shape of the coming decades as a golden or a gilded age. The future is not written and historical regularities have unique manifestations on each occasion. The world is undergoing massive transformations and is subjected to intense pressures and tensions. A program for a positive-sum globalization is an intelligent option for the socially progressive pro-development forces. It can influence decision making within each country, it can be on the table whenever international negotiations take place and, when and if the critical situations do arise, the existence of viable alternatives can make a real difference in the direction of truly global welfare.

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