

FROM BIOECONOMICS TO DEGROWTH

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The first part of this essay recalls some basic characteristics of complex systems that, in moving from physical organisations to human socio-cultural ones, show the reductionism that characterises standard economic science.

The second part attempts to identify a few fundamental long-term processes (on the economic, ecological, social and cultural levels), in which growth is the common denominator, and which may explain the reasons for the multidimensional crisis we are facing. The analysis starts from the growth/accumulation/innovation process which characterized industrial capitalism first, and financial capitalism later, pointing out its self-pursuing, multi-scale character with its main consequences for ecological equilibrium. The effects of growth on inequality (S. Latouche, 1991; S. Amin, 2002,), on the transformation of consumer patterns (Hirsh, 1976), on the progressive dissolution of social relationships (K. Polanyi, 1944, Godbout Caillé, 1998; Z. Bauman, 2005, 2007) and on the fragmentation of the collective imaginary (Lyotard, 1979; Castoriadis, 2005, D. Harvey, 1990) are examined, with a view to offering a systemic interpretation of the relationships among these processes. This framework may also offer a general explanation of the paradox of happiness that contemporary society reveals (Easterlin, 1974, 2001). Moreover, these processes may also be considered an introduction to “degrowth” in its different dimensions.

PART ONE: EIGHT THESES CONCERNING COMPLEX SYSTEMS

1) *The economic process has an entropic nature*

As we have seen, Georgescu-Roegen’s bioeconomic theory represents a radical criticism of neo-classical theory. He pointed out the limitations, which are basically of an entropic nature, to which the process of economic growth is subject. According to the law of entropy, every productive activity involves the irreversible degradation of increasing amounts of energy and, in certain conditions, of matter. Since the biosphere is a closed system, exchanging energy but not matter with the environment, two important conclusions may be drawn as far as economics is concerned.

The first conclusion is that the basic objective of the economic process, i.e. the unlimited growth of production and consumption, in being founded on the use of non-renewable sources of matter/energy, contradicts the fundamental laws of thermodynamics. This objective must, therefore, be radically reconsidered. Furthermore, the empirical evidence concerning the effects of unlimited growth that has been accumulated over the last thirty years is well-founded and consonant. Data can, undoubtedly, always be contested, but looking at them impartially as a whole they show quite evidently how the biosphere is already unable to sustain the global system of production.

The second conclusion is of a methodological nature: the pendular representation of the economic process, found in the opening pages of any handbook on economics, according to which demand stimulates production, and the latter provides the income necessary to create new demand, in a reversible process that is apparently capable of reproducing itself *ad infinitum*, must be replaced by an evolutionary view in which the economic process is seen to follow the arrow of time, and is thus irreversible. In general, this bioeconomic viewpoint recalls the inevitably physical and material

nature of every economic process, bringing economic science back from the rarefied atmosphere of mathematics to the real world.

2) *Complex systems exhibit feedback relationships*

Feedback relationships are very common in complex systems. This is an extremely important aspect. According to whether the feedback has the effect of strengthening or weakening the original input, we shall have respectively systems with positive or negative feedback. As is known, the evolutionary dynamics of these two typologies are diametrically opposed. While systems with negative feedback are self-correcting, systems having positive feedback present self-increasing/exponential trends. Undisturbed biological and ecological systems are examples of self-correcting (homeostatic) systems. Something similar occurs in the organism of warm-blooded animals, whose body temperature is kept constant thanks to the variation in several other parameters. In negative feedback systems, variations always occur in order to ensure the constancy of some fundamental function, such as the “survival of the species”. It is perhaps interesting to note that complex organisations, such as enterprises, churches or environmentalist associations, may also have quite similar ways of behaving. Variations in the external environment, for example a new regulation or a technological innovation, will cause changes in the internal structure in order to ensure the complex aim that is the “survival of the organisation”.

In contrast, systems endowed with positive feedback present explosive characteristics. Exponential population growth or spiralling violence are good examples of positive feedback. Numerous loops of this type operate within the economic system. Long-term economic growth, sustained and extended by the recent processes of globalisation, probably represents the most striking case. A positive feedback seems to lie at the root of today’s indisputable phenomenon whereby the rich get richer and the poor poorer.

A process of the self-increasing type can be alleviated in two radically different ways, which must be considered carefully. The first by activating homeostatic processes (negative feedbacks) *internal* to the system. In this case, the system gradually converges on certain equilibria without destructive effects. The second way, called *overshooting*, restricts the growth of the process by the pressure exerted on other systems, which, in being incapable of offering the necessary resources, or more generally reaching a critical state, restrict any further development of the main system. In the latter case, the fundamental variables of the system will reveal the characteristic bell-shaped trend, with exponential growth followed by an equally sudden drop, or collapse. In general, it is clear that a process of gradual transition towards “sustainable patterns,” requires the intervention of negative feedbacks of the first kind.

Standard economic science does not consider feedback relationships because it tends to explain phenomena mechanically by means of linear chains based on the principle of cause and effect. However, it is essential to see the presence of these circular relationships if we are to interpret the evolutionary long-term dynamics between the socio-economic system and the biosphere, and above all to recognise the potentially self-destructive outcomes of economic growth.

3) *On being the right size: the question of scale and the principle of emergence*

Although the most obvious differences among living organisms are those of size, even natural scientists themselves have paid little attention to them. Yet it is not difficult to show that a mouse could not be as large as a hippopotamus, or a whale as small as a herring. At the beginning of the last century, in a remarkable text, the naturalist D’Arcy W. Thompson clearly expressed an idea that must be recalled here: *a variation in size normally involves a variation in structure*, that is to say that, as far as biological structures are concerned, a variation in size involves a modification in the form of the organism.¹

¹ D’Arcy W. Thompson, *On Growth and Form*, Cambridge University Press, 1961, First Edition, 1917.

The silence that has enveloped the question of scale in economic science is even more striking. While in the economic world there are micro firms composed of one person and giants capable of making a profit that surpasses the GDP of various countries, in economic textbooks the structure of firms is described as if their size were irrelevant. Notwithstanding GR's criticisms², for standard economics, it poses no problem "in order to double production, it is enough to double the quantity of inputs."³

Even ecologists have not paid enough attention to the question of scale despite the fact that influential scholars have pointed it out. In the 1970s, authors such as Ivan Illich (1973), Ernest Schumacher (1973) and Gregory Bateson (1979) clearly stated the idea that, once a certain threshold is crossed, social structures also generally undergo structural changes from which unforeseen negative consequences may derive.⁴ The great biologist and geneticist J. B. S. Haldane (1892-1964) is to be credited with the intuition that growth in size may involve alterations in the form of the organism and that this principle can also be transferred to the level of social organizations. In a short essay written in the years between the wars, Haldane (1956) reached the lucid conclusion that in nature every animal is of the *right size*, and he also intuited that, just as whales do not have the same structure as herrings, similarly it was not possible to reconcile the socialist ideals of equity and emancipation with the scale of the Soviet or British empires.⁵

It is, however, only with the development of the sciences of complexity that this idea, more generally defined as the *principle of emergence*, is given a more rigorous formulation, along with the recognition of its vast hermeneutic consequences in many different research field (Holland, 1998).

The question was clearly posed by the physicist Phil Anderson in a classic article that appeared in 1972 in "Science": *More is different*. Anderson starts by affirming that no serious scientist would question the fact that "the same set of fundamental laws" is valid for the whole domain of matter, both living and not. The important question is, however, another: is it possible to "reconstruct the universe" starting from these basic laws? Anderson's answer is clearly not: "The more the elementary particles physicists tell us about the nature of the fundamental laws, the less relevance they seem to have to the rest of science, much less to those of society".⁶ A new type of property emerges for every new "level of complexity" and these emergent properties are "as fundamental as the others". We may conclude from this that the laws of physics are applicable to all domains of matter, hence also to those social processes which involve matter and energy (such as productive processes), but, in general, laws emerging on higher levels of complexity are precisely "new laws" that cannot be deduced from the "fundamental laws" of the previous level.

In the same way, most biologists today maintain that living organisms, while formed from structures that respect chemical and physical laws, present qualitative characteristics, the outcome of that particular association of molecules and of those particular reactions rendered possible thanks to these molecules (metabolism), which is why biology cannot be reduced to a branch of physics or

² For a criticism of neoclassical statements on this point see: Georgescu-Roegen, 1971, pp. 105-107.

³ If any mention is made about the question of scale on the part of economists, it is only as far as the so-called economies of scale are concerned. According to this principle, average costs are reduced by increasing production. The "U" shaped curve of average cost undoubtedly reflects, as is known, the decreasing trend of marginal productivity. From the neo-classical viewpoint, however, the problem of decreasing marginal productivity is usually solved by means of technological progress, which "transposes the function of production to a higher level" with a consequent shift downwards of the functions of cost. There is, therefore, generally speaking, no true pinpointing of the *structural changes* connected to scale.

⁴ Ivan Illich (1973) emphasised the importance of this concept, in particular as far as social institutions are concerned. It is the fulcrum of many of his books, especially of the theory of "two thresholds of change", presented at the beginning of *Tools for Conviviality*. It is not merely by chance that Illich drew inspiration from D'Arcy Thompson's morphology, from Haldane's *On Being the Right Size* and from the work of Leopold Kohr, Schumacher's teacher.

⁵ See J. B. S. Haldane, *On Being the Right Size*, in J.R. Newman, *The World of Mathematics*, Vol. 2, Simon and Schuster, New York, 1956.

⁶ Quoted in D. Lane, *Hierarchy, Complexity and Society*, 2006.

chemistry and why a living organism is not equivalent to any man-built machine. As levels of complexity slowly rise in the hierarchy of the atom, the molecule, the gene, the cell, the tissue of an organism and of a population, so new properties appear as the result of interactions and interconnections emerging on every new level (S. J. Gould, 1985).

The extraordinary explanatory impact that the principle of emergence may have in the field of social sciences has not yet been recognised, since the latter are still dominated by the paradigm of methodological individualism, according to which the behaviour of aggregates can basically be traced back to the behaviour of single individuals (Godbout Caillé, 1998). This is particularly true of economics. The whole theory of microeconomics is based on the assumption of the atomistic behaviour of agents. On the contrary, as we shall see, some of the phenomena crucial to the interpretation of the multidimensional crisis we are at present experiencing derive from the specific properties of the aggregates which, once certain thresholds are crossed, emerge as the consequence of the specific ways of interacting among agents. It is, therefore, an aspect that will be kept well in mind in the course of this analysis.

Let us now consider some basic characteristics that concern biological and ecological systems more closely.

4) Biological systems tend not to maximise any variables

In living organisms growth is always subject to limitations. In complex organisms it is generally self-regulated: they reach a certain size, after which some chemical signals *within* the organism impede its growth. In general, too high, or too low, a value of any variable is dangerous for the organism: too much oxygen involves the combustion of the tissues, just as too little leads to a state of asphyxia. Life within the biosphere, immersed in cosmic radiation, develops within a range of electromagnetic frequencies of barely four and a half octaves of the forty that we know, as V. I. Vernadskij (1945) underlined in his masterly work. In the biological world there are thresholds everywhere which, however flexible and difficult to determine they may be, cannot be crossed.

This principle gravely conflicts with the assumptions of standard microeconomic theory, according to which the behaviours of economic agents are of a maximising type. A larger quantity of goods is always preferable to a smaller one (non-satiety hypothesis). On a macroeconomic level, nothing opposes a continual growth in income and in consumption; on the contrary, it is held to be the first and essential objective of every economic policy.

5) Biological systems have multiple aims

If we exclude the general variable of the survival of the species, we cannot assert that biological systems pursue the maximisation of a single aim to which all other variables are subordinated. In the biological world, mammals, in particular, present a system of multidimensional values (Bateson, 1972).

This characteristic also stands in contrast to the assumptions of standard economic theory. Some specific hypotheses have been introduced with the aim of ensuring that the well-being produced by the consumption of any sort of goods may be ordered according to the same unidimensional index: *utility*. As has been demonstrated,⁷ the possibility of ordering a variety of baskets of goods according to a single unidimensional index fails when we consider preferences of a “lexicographical” nature, that is to say, when the various goods cannot be substituted for one another. Everyday life shows that this is a common situation: access to the Internet cannot be a good substitute for someone who has no access to drinking water, just as the bread distributed by

⁷ See: NICHOLAS GEORGESCU-ROEGER, *Analytical Economics: Issues and Problems*, Cambridge, Mass., Harvard University Press, 1966, and K. MAYUMI, *The Origins of Ecological Economics*, Routledge, London, 2001, pp. 8-20.

humanitarian groups cannot satisfy someone who desperately seeks justice and dignity. Contributions from highly different fields of research, from biology to anthropology, from social sciences to psychology, teach us that true welfare consists in multiple dimensions, each of which is irreducible to the others.⁸ As we shall see, the introduction of a multidimensional concept of well-being offers a possible explanation of one of the fundamental paradoxes into which the neoclassical theory of the consumer falls: the so-called *paradox of happiness*.

6) *Biological systems present a combination of competitive and cooperative behaviours*

For neoclassical economists, social and economic systems are characterised by the presence of exclusively competitive forms of behaviour. A reductionist interpretation of the theory of evolution has led to a representation of the living universe dominated exclusively by the “struggle for survival”, and this concept has been extended to social and economic systems (social Darwinism). It is interesting to note, on the other hand, how in Soviet interpretations of biology the cooperative, symbiotic relationships among species prevailed; there was almost no competitiveness, and nature became a metaphor for universal cooperation. It is time to go beyond these ideological and instrumental interpretations: today it is clear to biologists that in ecosystems both competitive and cooperative types of behaviour coexist and that both are essential to the preservation of the species. In the same way, relationships of a competitive and cooperative nature coexist among economic subjects, and, indeed, as we shall see, the latter become essential in order to compensate for some self-destructive spirals that characterise competitive (capitalist) systems.

7) *In an expanding context it is generally the competitive forms of behaviour that promote the success and development of the species, while in non-expanding contexts (equilibrium mode) it is the cooperative forms of behaviour that usually favour success*

According to Kenneth Boulding (1981), the interactions within ecosystems may basically assume two modes: one which is fundamentally *expanding*, (*colonizing mode*) and one, on the other hand, that is not expanding (*equilibrium mode*). The former is characterised by an abundance of resources. In this mode, organisms expand towards new ecosystems, that is towards non-colonised niches. In the latter mode, on the contrary, given the lack of new free territories or of underexploited ones, organisms settle in a state of equilibrium. Biology provides us with this fundamental lesson, that is to say that there is no one form of behaviour fit for all seasons but that if the environmental context changes, then so do the strategies that favour the development of the species.

Contrary to what standard theory asserts, “perfect” competition among economic agents, does not necessarily produce optimum results. It is likely that particularly competitive behaviours will prevail in expanding contexts. It is not merely by chance that *homo sapiens* has evolved by means of colonisation and the continual conquest of new territories, competing with other species. Aggressiveness and competitive attitudes are therefore deeply inscribed in his evolutionary path. In more recent times, the adventure of modernity (with its individualist and competitive culture) originated and developed in an expanding context characterised by the conquest of new continents (America, the Indies, etc.) and of new intellectual spheres (science, technology, etc.). Finally, it is again not merely accidental that the American economic spirit, in itself particularly individualist and competitive, was forged during the expansion towards the West. However, in non-expanding conditions, such as those that the human species is now inevitably approaching as a result of the almost total colonisation of ecosystems on Earth, it is the cooperative forms of behaviour that will prevail. Classical Chinese culture is an interesting counter-proof of this: it was forged in a non-expanding environment (as exemplified by the Great Wall), and in fact it presents strong, non-individualist and non-competitive traits.

⁸ See NICHOLAS GEORGESCU-ROEGEN, *Analytical Economics*, 1966, A. H. MASLOW, *Motivation and Personality*, Harper, N.York, 1970, IVAN ILLICH, *Tools for Conviviality*, Harper and Row, N.Y., 1973.

This all leads to a different evaluation of competitive pressure in today's social and economic systems: the presence of too high a level of competition, similarly of one that is too low, must generally be considered dangerous for the system. Biological organizations teach us that pursuing *efficiency* through competitiveness as the sole objective of economic activity, is not only the consequence of a reductive conception of the human being, but also easily leads, as we shall see, to self-destructive behaviour. New forms of slavery, the destruction of the environment and increasingly widespread financial corruption represent just some examples of these devastating effects.

8) *Social systems are characterized by the capacity to form shared representations of the universe in which they live*

What characterises biological and social systems, and distinguishes them from physical systems, is their capacity to form “representations” of the universe in which they live. Animals are certainly capable of forming an idea of the environment in which they live and of making decisions when faced with certain stimuli (*signaling*). Even single-celled organisms, for example, are able to monitor their own environment, estimating the presence of a certain chemical compound, and may move towards the area where the compound is greater. However, what characterises human socio-cultural organisations is their ability to *negotiate* such representations, giving rise to *shared representations*. Unlike what happens in the homologous activity in the field of biological systems (*signaling*), in negotiation *semantics* is important. The message may be totally new in form, yet the person sending it expects the receiver to be capable of interpreting it. In order for this to happen, it is extremely important that socio-cultural organizations should share the “attributions” and “narrative forms” on which messages are based (D. Lane, D. Pumain, S. van der Leeuw, G. West, 2009).

In other words, and more generally speaking, *the formation of shared representations is the premise necessary for common action*. As we shall see, this type of consideration is of great importance if we are to enquire into the problem of the (circular) relationship between social *imaginary* and institutional change. (Castoriadis, 1998, 2005).

PART TWO: EVOLUTIONARY DYNAMICS

Growth, accumulation and innovation as a self-increasing emergent process

Figure 1 shows Angus Maddison's data (2005, 2009) on economic growth in the very long term. Although calculation of GDP prior to 1870 must be taken very cautiously, Maddison's calculations show how European economy was basically in a steady state (or in slight degrowth) from the fall of the Roman Empire until the tenth century; this was followed by a slow, gradual growth until 1820, which amounts to about 30% in eight centuries. However, from the Industrial Revolution the curve clearly presents a discontinuity, revealing a decidedly exponential trend, with an 50-fold increase in production in less than two centuries. More precisely, the European economy has grown 47 times from the start of the industrial process (1820) until today (2001), Northern American even 678 times in real terms and global economy 53 times. The population's history follows the same trend.⁹

⁹ Population has increased 2.9 times in Europe in the same period (from 133 to 392 million inhabitants), 30.9 times in North America (from 11 to 340 million) and 6.1 times on a worldwide level (from 1 to 6.1 billion). Despite the great increase in the population, income per capita has grown on average 1.2 times per year since 1820 and 24 times more quickly compared to the estimates concerning the period from 1,000 to 1820 (Maddison, 2005).

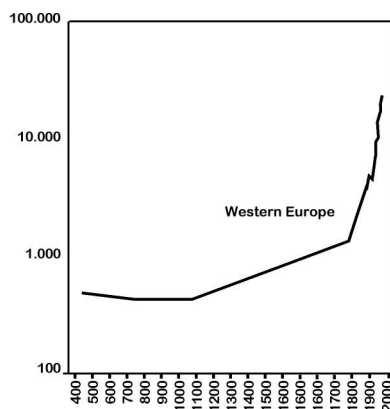


FIGURE 1 Economic Growth (GDP)

Source: Maddison (1995, 2001 and 2003)

The fact that part of the profit made by enterprises should be reinvested, thus increasing their endowment of capital, which then becomes the basis on which to make new products and hence new profit, is the fundamental trait of the modern, capitalistic economy. However, very little attention has been paid to the nature of this relationship in cybernetic terms: we are undoubtedly faced here with a process of positive feedback. It is this dynamic, with its persistence throughout the extraordinary transformations that have taken place in these centuries, that explains, we believe, the exponential economic growth that has characterised these economies since the Industrial Revolution, which was unknown to all the previous forms of economic and social organisation.

Classical economists, in particular Adam Smith and Marx, understood very well that this circular, recursive process of increase in profit, new investments and new profits (in Marxian terms the Money-Commodities-Money cycle) is the fundamental trait of the modern/capitalist economic system. The neo-classical interpretation, on the contrary, while devoting hundreds of pages to praising the (presumed) self-regulatory nature of markets, has said very little to underline the evolutionary nature of the process of accumulation, supporting a view of general equilibrium that is basically unhistorical. Obviously growth cannot be denied but, in neoclassical models (à la Solow), it is essentially attributed to increases in productivity, that is to say to technological progress, which is considered to be exogenous¹⁰.

Nowadays the sciences of complexity permit us to interpret the relationship among growth, accumulation and innovation in a radically different, far more promising light. First of all, innovation, as Schumpeter had already intuited, consists in a process of “discontinuous change”, transforming both the goods produced and the productive processes. In other words, growth implies the emergence of qualitative transformations that, as G-R claimed, can hardly be implanted in the arithmomorphic shape of neoclassical theory. Furthermore, in this perspective, particularly in competitive situations, growth, accumulation and innovation are part of the very same self-increasing process, where not only does technological progress sustain growth, but growth becomes the source of further innovations, precisely in a recursive, self-expanding spiral.

To put it very briefly, in following the sciences of complexity, we can state that the exponential trend of the growth curve reveals the presence of two fundamental processes:

¹⁰ More recent models (on endogenous growth) have tried to remedy this major drawback, taking into consideration the role human capital and knowledge play in explaining growth. However, in these models too, the neoclassical school carefully avoids considering the circular relationship among growth, accumulation, innovation and the emergent properties that characterise it.

1. A long-term positive feedback among growth, accumulation and innovation, and
2. The emergence of new structures/institutions connected to the multi-scale process of growth.

The presence of a long-term positive feedback is confirmed, as we have seen, by the exponential trend of the growth curve. As far as the second point is concerned, there have been various processes of structural change connected to economic growth in modern times. The following three brief examples give some idea of what types of processes of change are connected to increases in scale.

The first has been memorably described by Karl Polanyi in *The Great Transformation*. It concerns in particular the phase that characterises the passage from an economic system based on agriculture to an industrial one. Polanyi describes how some processes of structural change – from enclosures to the creation of a labour market – are necessary for the process of accumulation to begin. The simple fact that labour could be bought and sold like any other goods, something practically unknown to any previous form of social organisation, was not a chance occurrence. Making labour (and nature) a commodity, subject to the rules of the self regulating market, involves such a deep social change that, quite comprehensibly, the outcome of this process was the emergence of not only another economy but also of another society. Since the consequences of this “great transformation” affect above all social matters, we shall return to this point later when speaking of the social limits to growth.

A second great process of structural change is what we may call, along with Baran and Sweezy (1968), the emergence of *monopolistic capitalism*. The dynamic of growth has involved a profound change in productive structures, that is to say in enterprises. This process reached its first full maturity at the beginning of the 20th. century, when the American economy reached a powerful concentration of production. Profiting from the scale economies connected to mass production of the Fordist type, enterprises capable of making the most profit incorporated the weaker ones, moving towards the *concentration of production* within a few large companies. This growth in size strengthened their scale economies, permitting, by means of cost reduction, further increases in profit. In this way, too, a process of positive feedback was set in motion.

At a later stage, the profound transformation in the organisation of labour within the Fordist context, thanks to the increased strength of the trade union movement, particularly in Europe, raised the cost of labour, reducing profit (and savings) with a consequent reduction in growth rates in the more advanced countries, inducing the enterprises to transfer significant parts of their production to those countries where labour costs were lower (outsourcing). This process has caused the large transnational groups to renounce their direct management of the productive process, yet at the same time increase their control over financial activities, which have thus become strategic. This process has led financial organisations to play a leading role and increase their dominance over the real economy (Dore, 2008). The emergence of this new kind of economic structure permitted financial organizations to bypass the regulatory mechanisms instituted by national states.

This transformation of the economic and institutional structures has led to highly significant consequences on both the theoretical level and on that of the socio-economic reality. On the theoretical level, they show how the methodological approach of neoclassical economics, based on assumptions of reversibility and methodological individualism, where the behaviour of the whole can be traced back to the sum of individual behaviours, is quite inadequate when dealing with the phenomena described above, which are characterised by the presence of long-term positive feedback and by emergent processes.

On the socio-economic plane, despite the extraordinary variety of historical, geographic and political situations, the capacity frequently shown by these “megamachines” (multinationals, bureaucracies, systems of communication, of transport, of medical treatment, and so on) to maintain or further increase their position of strength acquired by means of the monopolistic control over some resources (Amin, 2002), or simply thanks to their very size, has become a permanent feature

of the socio-economic systems of “mature” capitalism. Structural transformations, therefore, have accompanied these changes in scale so that these social organisations (e.g. multinational companies) represent today something “other” to that which characterised the initial stages of the industrial revolution.

We can conclude from this that the process of growth/accumulation/innovation has assumed, in the situation following the “great transformation”, a central role in the dynamics of the world system, both in its unquestionable strength and pervasiveness, and because, as we shall see, the other most significant self-destructive processes, from the spiral of the ecological crisis to the various forms of social crisis, are closely connected the former.

1. Growth, innovation and the ecological crisis

The entry of new enterprises in competing markets, together with the natural exhaustion of the life cycle of products in mature sectors, leads to declining profit rates in the long run. This phenomenon, of which Ricardo was already aware and which neoclassical economists also acknowledge, in a certain sense constitutes the basic homeostatic process to which any competitive market economy is subject. The effect of this negative feedback would end up by dampening economic growth since it would cancel out the essential process of accumulation of capital. If, therefore, a society wishes to encourage a process of continual growth, which is to last over several generations, it is necessary to find ways in which this process of compensation may be rendered ineffective. There are two basic ways in which enterprises can ensure themselves lasting extraprofits. The first consists in creating some sort of barrier to other firms entering the market, usually thanks to exercising some type of monopolistic power. As we have seen, this is exactly what happened in America at the beginning of 20th century (concentration processes) and later on in other capitalistic economies. The second consists in addressing their production towards continually renewed goods and new markets. The continual differentiation of products and, finally, the creation of truly new goods/services/markets (what, in other words, is generally meant by the term *innovation*) represent the second basic process by which the productive system has avoided the principle of decreasing marginal returns, with a consequent drop in the profit rate, for more than a century.

However, this continual *racing ahead* does not escape the laws of thermodynamics: a new product is nothing but a “new” combination of matter/energy/information and thus its production involves not only the irreversible degradation of a certain amount of energy but also the “loss” of a certain amount of *available* matter, which, in actual fact, cannot be recycled at the end of the process. We can sum up the underlying causes of the ecological crisis in this dynamic (Georgescu-Roegen, 1971a). This “bioeconomic criticism” is the first pillar of degrowth.

The empirical evidence accumulated over the last thirty years has, in this regard, confirmed G-R's statements. As is known, G-R particularly stressed the role that the exhaustion of fossil fuels would play. More than thirty years later, according to Colin Campbell, one of the world's leading depletion analysts, (co-author of the 1998 Scientific American article, "*The End of Cheap Oil*"), data seem to confirm G-R predictions. Campbell maintains that the peak of production was reached in 2008, something, by the way, that could also explain the surge in the price of crude oil in that year to over 140 dollars a barrel (Hamilton, 2009). A debate rages as to the precise date of the overall peak, but it rather misses the point when what matters is the vision of long-term decline of cheap energy.¹¹

Of course is not possible to offer here an exhaustive survey of data about the ecological crisis. However, we should not be surprised that a process of accelerated growth such as that described

¹¹ According to ASPO researchers, following 15 different models (Bakhtiari, Smith, Staniford, Loglets, Shock model, GBM, ASPO, Robelius Low/High, HSM, Duncan & Youngquist), 95% of the predictions sees a production peak between 2008 and 2010 at 77.5 - 85.0 million barrels per day. See www.theoildrum.com.

must sooner or later come up against the biophysical limitations of the planet. All the simulations carried out since the 1970s by scholars at MIT, present, for the basic economic and ecological variables (availability of resources, population, life expectancy, industrial production, etc.), first declining marginal returns followed by a true degrowth in absolute values, according to the characteristic “bell-shaped” trend. (Meadows D. et al., 2004).

Another indicator that is fairly efficient in offering an overall evaluation of the effect of economic activity on the biosphere is, as is known, the ecological footprint. Here it is enough to mention that the ecological footprint of the global economy, that is to say the area of the land and water ecosystems needed to produce the resources and to assimilate the waste products, exceeds the regenerative capacity by about 30% . European values are three times greater than the average regenerative capacity, and American about five times . This means that if the American life-style were to be extended worldwide we would need roughly five planets to sustain it. (Chambers N., Simmons C., Wackernagel M., 2000).

Needless to say, other more specific indices, such as matter/energy flows and the human appropriation of net primary production (HANPP), must accompany the aggregate indicators as far as more specific or local items are concerned. On the borders between ecological economics and political ecology, the continual growth of production and consumption involves an increase in the flows of matter and energy usually from the poorest countries, generating social conflicts in the lands where such resources are exploited. This “environmentalism of the poor”, analysed in particular by Joan Martinez-Alier’s school, represents an important process, both because it has a significant impact on the culture of the local populations and because the prices of many resources essential to the world productive system are tied to the outcome of these conflicts (Martinez-Alier, 2002). The increase in the costs of the resources can play an important role in conditioning long-term scenarios.

2. Social limits to growth

The analysis of the consequences of economic growth on social systems (what we might call social sustainability) is certainly more complex and controversial than that which concerns ecosystems. It must be admitted that our understanding of the dynamics of social systems is still extremely limited. Yet, if we do not intend to renounce any chance of imagining eventual, however uncertain, scenarios of future un/sustainability, the questions that arise concerning this level of complexity are, in many aspects, unavoidable. Considered as a whole, the analysis of the social limits to growth represents a second pillar to degrowth.

2.1 The criticism of development

Very generally speaking, we could say that until today the problem of social sustainability has basically been faced in terms of *equity* (Sachs, 2007). The widely shared belief is that, since social systems are sensitive to differences, a greater inequality is considered to be a cause of conflict and social instability (Wilkinson R., Pickett K. 2009) . Basically the question underlying this approach to sustainability is whether growth and development may be considered, as the neoclassical theory of convergence maintains, the bearers of a more equitable distribution of wealth among different countries or rather its contrary.

Until the mid-1970s consensus on policies of development, seen also as a means of promoting a fairer redistribution, was almost unanimous. These were the years of the economic boom, mass production and the Keynesian pact between capital and labour. On the international level, from President Truman's famous “State of the Union Address” in 1949, development became the key word in defining the west's relations with the rest of the world (it is not accidental that these countries have since been referred to as “developing countries”). In this framework the hegemonic

policy of the west became disguised as a monumental plan for universal emancipation: the whole planet was invited to follow the west in its magnificent and progressive destiny of growth and development (G. Rist, 1996).

Needless to say, the improvements in the material conditions of life that took place in this period, particularly in the years from 1955 to 1975, cannot be denied, at least in the western world. However, since the 1980s it has become increasingly evident that the recipe for development could not be extended to everyone, despite the universalist claims of the west (S. Latouche, 1991, 2009).

The data we have at our disposal in this regard speak for themselves: the Gross Domestic Product (GDP) of the entire African continent is today still around 3% of global GDP. It is now obvious that Africa, and many countries and areas in Asia, have lagged far behind and do not show any tendency to catch up. Moreover, on a worldwide level the gap in income between the very rich and the extremely poor is becoming dramatically wider and wider. One datum will suffice to exemplify this: the annual income of the richest 1% of the people on earth is more than the annual income of 57% of the world's poorest populations. The difference in incomes between the 20% richest and the 20% poorest increased from a ratio of 30:1 in 1960 to 74:1 in 1997. (UNDP, 1999, 2002)¹².

The scene worldwide is increasingly that in which wealth and well-being exist alongside a vast panorama of those excluded from the feast of consumer society. Whatever the figures used to dramatise this reality (2 billion, 7 hundred million people who live on less than 2 dollars a day, or a child dying every five seconds), they testify to the fact that not only has the grand programme of development not been able to eliminate the plague of poverty, but it has also meant that the fate of the very wealthy and that of the poor are becoming dramatically more and more distant. Even within the rich countries, there are various ways in which people are being marginalised and are having to face hardship, thereby joining the ranks of those who are already radically excluded. There are over 100 million "newly impoverished" people in Europe and the United States (S. Latouche, 1991).

Is it possible to individuate a basic dynamic that takes into account how and why it seems that the great dream of the western world of offering continually improving conditions of material well-being for all humankind has not come true?

According to "critics of development", such as Ivan Illich (1973), F. Partant, (1982); G. Rist, (1996), V. Shiva, (1988) and S. Latouche (2004), although the picture is undoubtedly complex and conditioned by the various historical and political conditions, the main factor to be held responsible for poverty and exclusion must be sought precisely where it was claimed that the solution was to be found, that is to say in the policies of growth and development.

This apparent paradox can, however, be clarified within a systemic approach: as we have seen, the process of growth and accumulation has a self-increasing nature. The ever-increasing number of investments of western countries since the dawn of industrialization has generated faster and faster technological progress, which has brought about both increases in productivity and continual innovations. Given the competitive framework of international markets, it follows that those areas which have not succeeded in keeping pace with innovations and technological progress find themselves facing a technological gap that is increasingly difficult to be bridged. It is now clear that productivity has reached such levels that a minority is capable of producing all that the world economies require. The others, those "shipwrecked by development" (Latouche, 1991) (both as individuals and as entire nations), are unable to take part in this match because they are not efficient and competitive enough.

In the course of time, this competitive advantage has been accumulating in structures such as the military, financial, transport and media institutions, which tend to maintain and increase the positional advantage they have gained. If this underlying dynamic has characterized the parabola of development up to now, it comes as no surprise that we are confronted with a polarized world

¹² Cf.: United Nations Development Program: Human Development Report 2002, *Deepening Democracy in a Fragmented World*, available at <http://hdr.undp.org/en/reports/global/hdr2002/>

where the contrast between the centre and the peripheries is becoming more and more marked. (Latouche 1991, S. Amin 2002). UNDP data show how 20% of the richest population consumes 82.7 of world production; on the other hand, the intermediate 60% consumes only 15.9. The remaining 20% live on 1.4% of global production.

It cannot be denied that alongside this self-reinforcing dynamic there are also processes of a self-correcting nature, which are often labelled in texts as the so-called *trickle down effect*. This effect of the distribution of wealth is linked to various processes: on a national level, it is principally connected to the redistribution policies of the welfare state, on the international level, to the re-equilibrating effects of foreign investments, and finally to processes of imitation and learning in peripheral areas. They can explain how wealth and material well-being have spread within rich countries and later been extended to some countries (in particular China and India) giving rise to a new, global “middle class”. These processes of negative feedback, however, do not seem able to compensate the self-increasing polarizing nature of the growth process as such, which until today has constituted the primary process. Furthermore, the more the growth self-reinforcing dynamic is freed from any regulating intervention, the greater the polarization will be. As we know, this is precisely the policy that has been endorsed by international organizations (WTO, IMF, etc.) over the past 25 years of uncontrolled globalization.

2.2 The systemic dynamic of positional competition

In the mid-1970s, in an innovative text that was far ahead of its time, Fred Hirsch explicitly posed the following question: Aside from ecological limits (which he indeed considered “uncertain and in the distant future”), are there *social limits to growth*? (Hirsch, 1976). Let us look at what he meant. To start with, Hirsch intuitively feels that the structure of individuals’ preferences undergoes transformations of a qualitative nature when their average yields grow. This is highly interesting from our point of view since it foresees the emergence of new types of behaviour connected to the scale of the process. Observing consumers’ behaviour reveals how, along with the growth in the scale of consumption, an increasing amount of a family’s expenses shifts from the consumption of the “basic goods” (that are needed to live, eat, clothe themselves, and so on), to the consumption of *positional goods*. “Pure” positional goods are characterised by the fact that the well-being they procure is not tied to their “use value”, as in the case of food, but to their relative scarcity. In other words, what is important for positional goods is the difference between what each individual possesses and what others possess. All those goods or services that are rightly called “status symbols” (which can be objects of prestige, exclusive services, but also professional roles of leadership, etc.) are good examples of positional goods. Education is also a possible example of positional goods if it is considered solely as a means of obtaining a coveted job: as the number of graduates increases, so the benefit of having a university degree decreases. Naturally, there is an enormous variety of minor differences, and each type of goods may offer, along with the value connected to the relationship with the object itself (for example, the convenience of travelling by car), a varied positional connotation (the well-being tied to the fact of owning a more prestigious, faster car than others).

The systemic nature of positional interaction must be borne in mind: while we can ignore the interaction with other individuals as far as basic goods are concerned (for example, the pleasure we get from drinking a glass of water can quite reasonably be considered to be independent of what others do), the well-being associated with the consumption of positional goods depends on the behaviour of others. In this case, too, as the scale increases, so do discontinuous effects appear. Once a certain threshold has been crossed, individuals become “sensitive” to interactions with their “neighbours”. This can be seen, for instance, in the case of physical congestion (a traffic jam), but also when the number of people sharing a certain social area (a street, a beach, a club) increases along with growing consumption: when the number of people who own that object, or frequent that

place, crosses a certain threshold, individual well-being quickly diminishes, with the result that individuals and groups move towards other objects, places or symbols. In other words, however impossible it may be to measure exactly the effects on aggregate well-being, it is in any case clear that positional competitiveness is usually found to be a zero sum game.

What we are interested in here, is not analysing individual behaviours, but rather recognising, behind the dynamics of positional competition, whether an aggregate effect - with long-term self-increasing consequences - emerges. As we have seen, according to Hirsch's reasoning, economic growth increases positional congestion/competition. However, we might argue that it is also true that positional competition fuels growth. It is possible here to discern a dynamic that is in many aspects complementary to that enacted by enterprises through continual *innovation*: the desire to own "unique" objects (even when millions of the same type are produced), chasing after the "latest model" or following the latest trend in fashion, of which marketing experts are both interpreters and modellers (through the loudspeakers of the media), continually stimulates the production of new objects and symbols reinforcing economic growth. In this way the self-increasing loop is closed, with the important aggravation that, unlike the consumption of basic goods, the demand for positional goods is, in its very nature, essentially unlimited.

At this point, some questions of an historical and anthropological nature concerning the extension, the establishment and the evolution of positional consumption in each society arise, questions that would require a further clarification of the tie that exists between consumption patterns and social and economic hierarchies (Dumont, 1970, 1986). They are questions that make the picture more complex than we can investigate here, and which, for the most part, still await further research. We can, however, outline a few steps that are enough to reach a few initial conclusions.

The need for *distinction* seems to be deeply rooted in human beings and is found in highly different cultures (Bourdieu, 1984), even the most archaic and simplest: it cannot, therefore, as such be judged to be negative. We must, then, see the specificity that characterises positional consumption in today's industrial societies. Since ancient times positional consumption has always been connected to a social *status* that usually had its roots outside the economic sphere. Needless to say, things changed with the advent of the market society and mass consumption. Once again we find at the root a problem sensitive to scale. It is obvious that it is only after the advent of the market economy, in particular with the structural transformation known as "consumerism", that a significant part of consumption becomes *mass* positional consumption.

It is on this scale that the circular relationship between growth and positional consumption becomes, ecologically speaking, unsustainable. As is known, about 20% of the world population consumes the 82.7 of world production. A very significant percentage has so far been excluded from positional competition but is knocking at the door and wants to take part in the game. Nowadays the "intermediate 60% of the world population consume only the 15.9 of global production." No sophisticated calculations are needed to conclude that it is impossible to extend the life-style of the richest 20% to the "intermediate 60%", even considering a complete exclusion of the remaining 20% when, at the present rate of consumption, the ecological footprint already exceeds the regenerative capacity of the planet by 30%. From this we may conclude, contrary to what Hirsch maintained, that not only does the existence of social limits not diminish the relevance of ecological limits to growth, but that, on a global scale, *there is a close relationship between the social and the ecological crises*.

Furthermore, the continual entry of new players in the cycle of positional competitiveness gives rise to a process of the systematic frustration of individuals' expectations, reflected in a loss of well-being. Getting stuck in the traffic on the way to work, spending a significant part of one's money and time on buying objects that soon turn out to be identical to all the others, or studying for years only to find oneself unemployed, are simple, everyday instances of this loss of the quality of life.

However, the expenses of the single agents we have described are added together in the indices of national accounts, which therefore show a continual rise in consumption and GDP. This is not

all: the frustration suffered, together with other causes of ecological and social malaise, which will be seen below, gives rise to a whole series of expenses of a defensive nature (for example, costs of safety measures, insurance, health precautions, etc.) which, while not leading to any improvement in well-being, contribute to a further increase in GDP. This helps to explain how the processes of positional competition are an important factor in that paradox of happiness on which a growing number of economists have, quite rightly, concentrated their attention in recent years. We shall return to this point.¹³

To conclude, here are just a few remarks concerning Hirsch's analysis. As we have seen, positional competition in itself does not constitute a "social limit to growth", in the sense that this is not only no impediment to growth itself but is rather an stimulus for continual expansion (unlike "ecological limits"). Yet the process leads, as we have seen, to a sort of general frustration and thus indeed constitutes more precisely a sort of "limit to social well-being". There can be no doubt, however, that positional competitiveness, through the increase in consumption, indirectly drives the system towards ecological limits. The process is undoubtedly of systemic significance, for the additional reason that positional competitiveness does not flare up merely on an individual level, as in the examples above, but among groups, regions and, above all, States.

The "arms race" is the most obvious example of the latter; yet one must not forget how much money certain states still invest in order that their economies may become "competitive" and reach the standards of the western world (China is just one example of this, but one could include others). In general, if we think of all the economic and social lengths that to varying degrees organisations go to in order to attain, or defend, positions of strength, prestige or leadership, we can see the impact of positional dynamics and their decisive role in the dialectics of modern times.

2.3 Growth and the dissolution of social ties

If the problem of social unsustainability finds its first basic anchorage in the question of poverty and exclusion, it has by now become clear in contemporary socio-anthropological analysis that it is not possible to restrict oneself solely to the question of *equity*. Marx himself, in his illuminating description of the *fetishism of commodities*, had already understood very well that a particular structure of social relationships was hidden behind the exchange of goods.

Continuing this interpretation, but enriched by the seminal acquisitions of early 20th-century anthropology on "primitive", and more generally pre-industrial, societies (Malinowsky), the trend of thought that goes "from Mauss to MAUSS", passing through the fundamental contribution of Karl Polanyi, permits us to place the Marxian lesson within a far more extensive socio-anthropological background and, above all, to set out, alongside inequality, what we might consider a long term fundamental social dynamic. This dynamic is related to the processes by which human beings organise themselves into societies and hence, to use a simplified formula, to the making and unmaking of social ties.

For Karl Polanyi the capitalist process, the "great transformation", which accompanied the industrial revolution, implies a dual process of mercantilization: factors of production, human beings and nature must be reduced to commodities. It is the "mega-machine" that demands this: a continuous supply of work and natural resources is in fact essential if the productive process is to be carried out regularly and, above all, for huge invested capital to find adequate, relatively safe returns. Thus, in the eighteenth and nineteenth centuries, the conditions were created for the exploitation of natural resources and labour markets.

This process resembles a social metamorphosis, that is to say, in systemic terms, the *emergence* of a new form of social organisation, rather than a gradual process of natural development, something that

¹³ Cfr. B. S. FREY, A. STUTZER, *Happiness and Economics. How the Economy and Institutions Affect Well-Being*. Princeton University Press, Princeton, New Jersey, 2002. E. DIENER, R. BISWAS-DIENER, *Will Money Increase Subjective Well-Being?* Social Indicator Research, vol. 57, n. 2, pp. 119-169, 2002.

Polanyi himself stressed: never before, in earlier economic-social organisations, had labour been bought and sold as it was in England at the beginning of the nineteenth century. A series of institutional mechanisms, of rules strongly enforced by laws and customs, acted as *negative feedback* systems, preventing labour, with all the importance of social and symbolic relationships it involved, from being bought and sold in the market. This process of reorganisation meant that the reciprocal relationships on which traditional socio-economic systems were based, were disbanded and replaced by the exchange of goods. To use the words of the great economist, the economy advances on the desertification of society.

According to Polanyi, this “great transformation” involved the emergence not only of a new type of economy but also of a new type of society. In the first phase it required the disbandment of the rules and relationships that characterised the previous type of social organisation and of the homoeostatic processes that ensured its stability. This was accompanied by the rise of an almost autonomous sphere of economic relationships, together with a successive increase in the complexity of this sphere (specialisation of labour, etc.) which ended up by dominating and shaping them.

It is important to understand, as the process of transformation gradually reached full maturity and the market economy spread throughout new countries and towards new societies, how this process involved a progressive dissolution of social ties.

As has been shown by the pioneering work of Marcel Mauss (1990, 1st ed. 1922), and by the studies of the *Mouvement anti-utilitariste dans les sciences sociales* (MAUSS) which he inspired, (in particular of A. Caillé, J.T. Godbout and S. Latouche), what characterizes traditional societies is the threefold obligation of giving, receiving and reciprocating (Godbout Caillé, 1998). In other words, it is through the multiplication of giving and taking that social ties are maintained and strengthened.

In contrast, what characterizes market relations is their *impersonal* nature. Market relationships are based on what economists call “exchange of equivalents”. The equivalence of what is exchanged makes it possible for market relationships to cease at the same time as the exchange takes place, therefore without any personal ties being formed as a result. As Milton Friedman, the Chicago school ideologist of neoliberalism, cleverly said: “In the great global market it is not necessary to know, let alone to sympathise with, one another.” This fundamental characteristic of the market offers significant advantages. First of all, it has permitted an extraordinary multiplication of the number and types of goods exchanged: it has been calculated that in the city of New York the consumer can choose among a hundred thousand million different types of goods. Together with the break-up of traditional social ties, this has meant for many people an increase in personal freedom. However, what is not normally mentioned is that there is another side to the coin: the spread of market relations is accompanied by a progressive dissolution of social ties.

This process further increased in speed from the early 1980s along with neoliberalism and the globalisation of the markets, as many sociological studies have recognised. In Bauman’s interpretation (2005, 2007), the disintegration of social ties today can be seen in the form of social *liquidity*. It is not merely by chance that modern, liquid society is “a consumer society”, that is to say, a society in which all things, goods and people are treated as consumer objects, hence as objects that lose their usefulness, appeal and, finally, their value very quickly. Liquid society is thus a mobile, transient, precarious society where anything of worth soon changes into its contrary, human beings and their relationship included. All in all, according to Bauman’s description, modern society reaches levels of the disintegration of social ties that were hitherto unknown.

This is not to deny that even modern, liquid societies, alongside this fundamental, long-term process, present compensatory dynamics (negative feedbacks). Even liquid societies present new forms of socialisation but in this case, too, we believe that the “primary” process, linked to the all-pervasive nature of the market, is moving towards a greater social liquidity.

In conclusion, the process we have described permits us to formulate a few hypotheses about the relationship that it has with other social processes of some significance to us.

First of all the process of the progressive dissolution of social ties may be seen as a common framework for different kinds of social malaise: a loss of satisfying human relationships, a loss of security (Beck, 1988, 2009), precarious conditions of life and work, problems connected to migration and drug abuse are just a few example of problems that social scientists split into different categories but which can be tied to the same long-run historical process.

The dynamic of the progressive dissolution of social relationships may in its turn:

1. be significantly responsible for the loss of well-being that contemporary societies show,
2. lead to a loss of resilience of social organization when faced with external stress (such as economic or ecological crises).
3. offer us a first clue to comprehending why contemporary societies seem to show very little reaction when confronted with the multidimensional crisis we are facing¹⁴.

The first point deserves a few specific considerations.

The paradox of happiness

Basically, researchers have encountered a situation in which, in the face of an increase, even a substantial one, in income *per capita*, subjective well-being has not grown, or has even diminished. More precisely, the index calculated in this way has diminished in the USA from 2.4 to 2.2 in the years from 1946 to 1991 compared to an increase in income *per capita* of 250% over the same period. Even more striking results concern Japan, where with increases in *per capita* income of 600%, from 1958 to 1991, the number of people who state that they are “very happy” has remained essentially unchanged. If we consider the ten most advanced countries, we can conclude that none of them present a positive correlation between income *per capita* and the index of subjective well-being, while two of them, the USA and Belgium, show a significantly negative correlation (Kenny, 1999; Diener and Suh, 1997, Diener, 2006).

Standard economic theory seems unable to encompass this paradox, which, on the other hand, may be easily explained within a complex approach. As long as the economic process was in its initial stages of development, when the pressure on ecosystems was low, consumption consisted mostly in basic (private) goods and positional interaction was on the whole weak, it could generally be assumed that growth in income meant higher subjective well-being.

Yet when a certain scale threshold is crossed and the system enters what we might call a “full world”, where as a result of the growth both of the economy and of the population the pressure on ecosystems reduce their capability to support life and the economic activities, the dissolution of social ties advances and positional competition becomes more intense, it is not surprising that further growth is associated with lesser subjective well-being. In other words, it is not surprising that significant modifications in ecological, economic and social structures (the funds, in G-R’s sense) may produce even irreversible changes in the ecological, economic and social flows/services and hence in the *enjoyment of life* (or *bem vivir*) of a certain social organisation. This, at least, is the hypothesis we propose here.

From a systemic point of view, despite the fact that research in this perspective is only just beginning, it seems fairly clear by now that the standard theory is inadequate to deal with this issue in at least two aspects:

¹⁴ This type of explanation, which undoubtedly requires further research, must be considered complementary to the traditional explanation based on the material conditions of the population. Certainly, in a rough comparison with the crisis in the 1930s, the conditions of the lower class in Western countries -while having significantly worsened in relative terms during the last 30 years- are still much better if compared to those in the first decades of the twentieth century. This does not mean that the dissolution of social ties, together with the transformations in the social imaginary, does not play an important role in explaining the diminished social reactions to the present crisis.

- a) On the one hand it assumes that well-being is associated with the quantities of goods and services, when it is now clear that enjoyment of life depends on a complex adaptation dynamic (*hedonic treadmill*), and not on the absolute quantities of goods consumed (Kahneman & Tversky, 2000; Diener 2006);
- b) Things are probably far more complex than this, as the enjoyment of life is the outcome of a complex interaction among the transformations in the structure of the representations (or preferences/values) and the changes in the flows of goods and services, of an economic, ecological and social nature.

Unlike what is assumed by standard theory, the system of preferences, or more precisely of representations/imaginary, can in no way be considered to remain unchanged in the course of time. This is unquestionably a field that has been studied far less (at least by economists) and which, on the contrary, plays a crucial role in the sustainability game.

The imaginary between post-modern fragmentation and mediatic colonization

As we have seen before, what characterises biological and social systems, and distinguishes them from physical systems, is their capacity to form “representations” of the universe in which they live. In particular what characterises human socio-cultural organisations is their ability to *negotiate* such representations, giving rise to *shared representations* (D. Lane, D. Pumain, S. van der Leeuw, G. West, 2009). In other words, *the formation of a shared imaginary is the premise necessary for any common action*.

However, according to Lyotard (1979), with the end of great narratives and the advent of *post-modern* society, any possibility of shared meaning has been lost. As long as religious tradition (Christianity in the western world) and, above all, Marxism, offered a common horizon of meaning, with their heroes and myths with which people could identify, it was not difficult to take up a standpoint and see a sense in what they did. All this, at least from the 1970s, has disappeared, or somehow lost its influence on the social imaginary.

The post-modern imaginary is polymorphic and fragmented, where quotations replace the great narratives, and the multiplicity of codes and forms substitutes the universalism that characterised the great emancipatory project of modernity. However much the post-modern condition is characterised by an undeniable freedom and variety of expression, it camouflages at the same time the deeper reasons for fragmentation and dependence (Mattelart, 1999, 2001). Let us try to sketch an outline of some of the dynamics that may be held responsible for this process of transformation.

With respect to the long-term processes mentioned above, we might suggest the hypothesis that the fragmentation of the imaginary is first of all connected to the dissolution of the social ties that characterises the passage from traditional society to that of the market. In other words, it is feasible that the dissolution of the social ties of a traditional nature, and of the symbolic mechanism they possess, constitutes the indispensable ground for the progress of modernity and its symbols.

Furthermore, as David Harvey (1990) acutely noted, it is necessary to clarify *that the post-modern condition* does not appear to be a break with modernity but rather an “internal revolution” within modernity itself, and ends up by accentuating its deepest and most characteristic traits. What marks common experience in all modernity if not uncertainty and fragmentation, transience and a sense of chaotic change? In the words of one of its greatest exponents, “being modern means finding ourselves in an environment that promises adventure, power, joy, growth and the transformation of ourselves and the world, and yet at the same time threatens to destroy everything we have” (Berman, 1985, p. 25). Basically, the passage to post-modernity has done nothing but accentuate this tendency.

We have here, at least in neo-Marxist interpretations, a close tie between the common experience of being modern and the transformations in the underlying economic and social

structures. Marx did not just happen to underline how a fundamental trait of capitalist economy was its condemnation to ceaseless innovation. Harvey goes even further than this, clearly showing how the transformation that marks the post-modern imaginary is linked to the transition from the Fordist socio-economic organisation to the post-Fordist one. It is a foregone conclusion that post-Fordism, like Fordism, does not simply mean for Harvey a system of labour organisation but a new system of economic and social organisation where public institutions and civilian society adapt to the changed conditions proper to “flexible accumulation”. The disappearance of the large factory, the financialisation of economic processes, flexibility on the labour market (part-time, temporary or subcontract work), the central role assumed by services (for marketing, insurance, landed property, informatics), the extraordinary differentiation among products and the acceleration in the rotation of consumer goods are inseparable from the specific way of thinking, feeling and living in what we call post-modern society.

If anything, the most surprising fact is the total acceptance of the liquidity and fragmentation that characterises post-modernism, its “floating and splashing about in the the chaotic currents of change as if there were nothing else”. We should not, therefore, be surprised that what characterises, for example, post-modern architecture is its “deliberate superficiality”, and it would not be difficult to extend this judgement to many other fields, in particular to fashion, entertainment and the industry of cultural events (Jameson, 1984, 1990, 1991).

Hence, the fragmentation of the imaginary is (recursively) linked to the multiplication of the artefacts characterising consumer society. We must realise that the objects we surround ourselves with, thanks to the time we spend *with* them, and *for* them, become for each of us a source of meaning and identity, however restricted and fragmentary. There can be no doubt, without going into this question in detail, that enterprises employ many resources in order to feed this process. The budget relative to marketing and publicity is inferior only to that of military expenses and, as experts in this field are well aware, the might of the media system is such that the efficacy of a “campaign” is never questioned. Contrary to what many post-modernist intellectuals claim, the capacity of the media system to colonise the imaginary is boundless (Brune, 2005). Must all this, therefore, lead us to the conclusion that there is no shared imaginary in a liquid society? As Serge Latouche warns us, this would be a thoughtless mistake (Latouche, 2006, 2009).

In the society of the end of the great narrative, the consumer imaginary is the *only* shared imaginary. This apparent paradox can, however, be understood if we think that the lack of sense and the dissolution of great narratives is precisely the ground on which the spread of the dominant imaginary is based.

Of course, some compensatory processes are possible, as some scholars of complex systems also remind us, attributing new functions to the artefacts that issue from the capitalist cornucopia¹⁵: It is possible, for instance, using information technology, originally planned for military purposes, to promote the formation of social or solidarity networks, or, just to give two extreme examples, to use advertising against advertising (i.e. *Adbuster*, *Casseur de Pub*). Yet, these reactions are not able to counteract the power of the processes of fragmentation and colonization.

There can be no doubt that *homo consumens* has an unbelievable freedom of choice at his disposal, yet the consumer-citizen can make his choices only within predefined *frames* (Goffmann, 1974; Lakoff, 2008) and cannot determine *ex ante* the set of things from which to choose (Bauman, 2007). Technology undoubtedly is to be found within this set. This means that decisions relating to “how” and “what” to produce in a certain area, under what social and ecological conditions, are out of the control of communities, territories and even states. In other words, the market system promises freedom (on a micro scale) but diffuses dependence (on a larger scale).

We now come to one fundamental aspect: the question of the imaginary is clearly closely linked to that of *autonomy* (Castoriadis, 1987, 2005), and autonomy to that of *scale*.¹⁶ Unfortunately, very

¹⁵ D. Lane et al. speak in this regard of *exaptive bootstrapping*, op cit. Ch. 1.

¹⁶Autonomy is essentially taken to mean making one’s own laws (both on institutional and economic levels), self-determination and explicit self-establishment. Ivan Illich (1973), who had a significant role in Latouche’s thought, as in

little attention has been paid, within both the mainstream and the Marxist traditions, on the fact that dependence and autonomy are closely linked to the scale of the processes: basically, no autonomy and no chance of any real participation and self-determination are possible in the long chains of global economy.

Towards a degrowth perspective

There can be no doubt that in the conflict between economic growth and autonomy, humankind has chosen growth. This has been the history of western modern civilisation, and it has not been the choice of merely a few people in power, whose self-interests drove them in this direction, but a choice, although frequently not explicit, that has been widely shared (by enterprises, states, bureaucracies, trade unions and common people themselves), going to shape the dominant imaginary of which, quite rightly, Latouche speaks.

This is not to say, however, that in the new context which we shall have to face in the coming decades this decision should remain unquestioned.

Although it is far beyond the aim of this essay to elaborate future scenarios, it is reasonable to imagine that in the face of increased resource costs (peak oil, climate change, social conflicts etc.), not to mention the approaching framework of *declining marginal returns* in many crucial organizations (Tainter, 1988; Wallerstein, 2009; Beinstein, 2009), it is likely that the capitalist system will not be able to relaunch another long-term phase of growth and global expansion¹⁷. In this critical context, it is important to understand that the institutions that have been perfectly well suited to the context of long-term growth will find themselves having to face an increasingly critical situation.

More precisely, if the economic structure based on competitiveness and on large scale economic processes, (multinational companies, global institutions based on free trade, etc.) has proved to work “very well” in an expanding economic context, whose dominant, shared aim was the growth of material production, when the framework changes, as the sciences of complexity teach us, there will be other forms of economic and social organisation more suited to the new situation. In particular, in a context of global crisis, or even stagnant growth, cooperation among decentralized, smaller scale economic organisations, will offer greater chances of success. These organizations can lead the system towards conditions of ecological sustainability, more social equity and, by involving citizens and territories, even increase the level of democracy.

It is quite clear that the aim of ecological sustainability can also be reached from a diametrically opposed process: centralization, increasing social polarization and loss of democracy. In both cases it will not be possible for the present institutional framework to remain unchanged.

In conclusion, although the bioeconomic relationships that we have recalled will constitute in a certain sense the material framework within which future choices will be made, it will be social dynamics, and above all imaginary representations, that will play a crucial role in determining which path, among the various possible scenarios, humankind will follow. What is by now certain is that if the analysis proposed here is correct, any bland reforms tied to policies of sustainable development will not be enough to overcome the crisis; rather, it will be necessary to imagine a profound revision of the ecological, social and cultural conditions of the production of wealth. In other words, it will be necessary to risk a transition towards a sustainable *degrowth society*.

many other degrowth thinkers, preferred the term *conviviality*, but the basic idea is the same: a convivial society is one that maintains control over its own tools, in other words, one that decides how and what to produce without delegating decisions to experts or representatives.

¹⁷ To consider these points, even briefly, would initiate a very lengthy debate that goes far beyond the scope of the present work.

