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Sustainable Regional Development
A comprehensive approach

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Preface

This discussion paper has been written within the framework of the European research project “Instruments and Strategies for Sustainable Regional Development” funded by the Research Programme Environment and Climate 1994-1998 of the Commission of the European Union (DG XII Science, Research and Development). The members of the core research team are: Ruggero Schleicher-Tappeser, Rainer Röder, Roland Scherer (EURES Institute, Freiburg/ DE); Robert Lukesch (ÖAR, Vienna/ AU); Alain Thierstein, Manfred Walser (SIASR, St. Gall/ CH), Gerry Sweeney, Margret Sweeney (SICA, Dublin/ IRL), Filippo Strati (SRS, Firenze/ IT). All of them have contributed to this paper in a series of intensive discussions. A special contribution has been made by Enzo Tiezzi from the Department of Chemistry of the University of Siena who has written section 2.4 of this paper.

According to the work programme the general objectives of the project are:

- To develop a common evaluation framework for regional development policies and strategies in terms of sustainability,
- To draw on the experience gained in a variety of european countries concerning successful approaches to sustainable regional development,
- To identify some “key factors of sustainability” including legal, institutional, cultural, financial and management aspects,
- To work out a set of suitable policy tools for the promotion of sustainable regional development policies,
- To elaborate recommendations for the different policy levels.

This discussion paper refers to the first of these objectives. Further results will equally be published in this series. This paper has to be understood as an intermediate result of “work in progress”. Comments are welcome.

May 1997

1 Introduction

The purpose of the present paper is to provide a first part of the theoretical background for the European research project “INstruments and strategies for SUstainable REgional Development”. In this project approaches and achievements concerning the sustainability of regional development will be analysed in five regions located in different European countries.

The term Sustainable Regional Development (SRD) tries to combine two lines of scientific and political/practical discussion: Regional Development (RD) and Sustainable Development (SD). So, as a first step, it is necessary to look at the similarities, differences and relationships between these debates. That is what this paper is all about.

1.1 Sustainability: a concept between politics and science

This discussion is old and new at the same time. In the last three decades we have assisted extensive debates concerning environmental issues, regional development approaches and international development policy questions. Besides the public political debate, all three have mainly been discussed in different professional communities. However, always there have been fruitful mutual influences and attempts to connect the discussions.[1] The coming up of the concept of sustainability has brought a new situation in the scientific and in the political debate. The broad claim and the widespread acceptance of this concept, which tries to summarise different aspects that have been discussed since decades, urges all kinds of scientific and development debates to refer to it.

In this context it becomes clear that Sustainability is not only a scientific but also and prominently a political term. It has gained importance in a specific historical situation as an answer to specific problems. Its political usefulness consists largely in its novelty and flexibility, in its capacity to gather consensus and to shift perceptions and values at the same time. These characteristics do not correspond to the scientific need for precise meanings. However, it will strongly depend on science whether this term will disappear because of its diffusiveness

[1] See von Gleich/ Lucas/ Schleicher/ Ullrich 1992

or whether it will slowly get a more meaningful and reliable shape as the central term of an integrated approach to problems which have been dealt with separately until now. Research has to distinguish different interpretations, show implications and contradictions, put into evidence linkages to other threads of discussion, remind the shifts in perception and values associated with the use of this new concept. Research in this sense is actively taking part in a societal transition process. In the fifties Thomas S. Kuhn introduced the concept of paradigm changes in science and showed that such a process is slow, contradictory and not necessarily understandable by all actors involved.[2] We will sustain that the concept of sustainability was not really new when it was formulated with this term, but that it summarises and reinforces a paradigm shift that is taking place since several decades. Later, Giddens has pointed out that self-reflexivity is a central element of modern societies, i.e. that the concepts developed in social sciences are themselves shaping perceptions and value systems and thereby contributing to the transformation processes they are analysing. In this sense we are understanding the present work. We will try to get a better understanding of the relationship between Sustainability and Regional Development.

In order to look at this relationship we will first describe separately the development of both lines of thinking in the following chapters. Only after this presentation we will look more systematically at their interlinkages.

1.2 The regional dimension: growing interest for easily comprehensible units

In the last decades we have witnessed an increasing tendency towards growing international interlinkages. In the public debate “globalization” has become a common catchword which is being used for justifying political helplessness, attempts to dismantle social security systems and to foster tendencies towards polarisation. In such a perspective the leeways for sustainable development policies seem to shrink considerably. However, it can be demonstrated that the empirical tendencies until now mainly consist in a “continentalisation”, and that at least at a European level there are considerable opportunities for an enhanced orientation towards sustainability.[3]

While we are without doubt witnessing an internationalisation at the European level, a “Europeanisation” of economy, politics and more slowly also culture, there

[2] Kuhn 1967, see also Feyerabend 1975, Jantsch 1979, Watzlawick 1976

[3] Hey/ Schleicher-Tappeser 1996

is a simultaneous trend that stresses the importance of the regional dimension at a subnational level. It seems that the creation of an economic, political and cultural space of European dimension has created a new situation and brings about a need for new possibilities of orientation in a more comprehensible framework.

Regions see themselves increasingly as actors in a European arena of economic competition. With “Regional marketing” they try to put forward their economic and cultural peculiarities. “Regional Identity” strategies in analogy to “Corporate Identity” are increasingly being considered as important for economic development. Improved communication and transport technologies not only have changed the patterns of international relations, they also have changed the structure of the regional space: Issues that before have only been local ones now have acquired a regional character.

In the realm of politics we can observe increasing tendencies towards stronger regional autonomy throughout Europe. Especially in Spain, Italy, France and Great Britain regionalist movements - also with sometimes crude anti-solidarity tendencies - have pushed forward a process of devolution which today seems to be necessary anyway. Centralised national states feel forced to concede devolution in order to give space to regional dynamics and variety not only in terms of culture but also in terms of economy. Regions not only gain growing autonomy in relation to national states, increasingly they are establishing horizontal cooperation and networks even across national borders. Also this can widen their scope of action.

With the achievement of the internal market, regional policies have considerably gained importance in the overall policy of the European Union. Structural funds have been established as an instrument for transfer payments between European regions. Not always, but in many cases the management of these funds has lead to an increasing scope of action of the regions.

The considerable economic success in the last decades of some European regions with networks of small and medium enterprises - such as large parts of northern and central Italy (“Terza Italia”) - has drawn the attention to specific regional conditions for economic development that have been neglected by mainstream economy. Investigating into the embeddedness of economic activities at the regional level, taking into account the micro-aspects of the conditions of development instead of focusing the view on global macro-economics has lead to the discovery of new scopes of action for the regions.

On the background of all these considerations and phenomena the discussion concerning regional development has strongly evolved over last decades. It has many aspects that can only partly be reviewed in this paper. Obviously there are considerable linkages between the discussion on Regional Development and the one on Sustainable Development. Strong hopes have been put forward that

Regional Development strategies can essentially contribute to Sustainable Development. How far are they justified?

2 Con-versing in Sustainable Development *(Filippo Strati, SRS)*

2.1 Sustainability: an old concept which refers to different cultures and civilisations

The concept is both old and new. Old because it is present in the history of humanity since its beginning. New because it is strongly affecting cultures and societies of a relatively recent time.

Paul Samson (1995) quotes Pointing (1990) to underline that sustainable development has been a challenge to humanity since the earliest societies (Sumerian, Mayan, Mediterranean civilisations). Welford (1995) quotes the Kenyan old proverb: *"We didn´t inherit the Earth from our parents; we borrowed it from our children"*. This example gives the clear image of the meaning of posterity and futurity: a value of paramount importance in sustainability.

Also Robertson (1985) recalls old North American Indian cultures: *"This we know. The Earth does not belong to man; man belongs to the Earth. This we know. All things are connected. Whatever befalls the Earth, befalls the sons of the Earth. Man did not weave the web of life. He is merely a strand in it. Whatever he does to the web, he does to himself"* (from Chief Seattle's oration of 1852). This traditional attitude to the natural world gives another clear image of the importance of biological systems in all the economic and social activities of human beings: another extremely important value in sustainability.

Many writers agree on the world-wide influence of the Eurocentred or Western based cultures during the modernity era. This is clearly an historical matter, representing an example of the human process by which (previous) civilisations and cultures are substituted, integrated, mixed, annihilated or destroyed by the (new) powerful ones (Morin, 1994). Indeed Western societies became dominant powers in the world, while other societies (and their cultures) became weakened (P. Kennedy, 1988).

According to Khan (1995), in the past millions followed philosophies and cultures (as such as Buddhism, Sufism and Gandhism) which are different from the current dominant culture promoted and pushed by Western society. Whereas the former cultures are part of the area of *moderation*, professing frugality as

philosophy and way of life,[4] the main threat to the prospects of sustainable development arises from the latter one, which can be labelled as the culture of *maxima*.[5]

These two different ways of life are still confronting each other. For example, nowadays various communities (basically rural) express cultures which are more respectful of the natural environment, non-human forces, other living species both animal and not, etc. and are more sensitive to the so-called natural cycle of life than the typical industrialised ones. In other words, the industrial revolution, which has allowed human beings to put an end to the period of scarcity, did not completely cancel the influence of old or traditional (e.g. rural) cultures in the collective memory of the various Western cultures. In fact the industrial age represents only two centuries (Robertson, 1985; Grint, 1991) even though it was embedded in an era (modernity) which, from about the seventeenth century onwards, has dominated in Europe and has had a nearly world-wide influence as leading way of life (Giddens, 1990).

In fact, in the countries which experimented and promoted industrialisation, world-wide criticisms of their patterns of development have strongly emerged during the sixties, the seventies and the rest of this century.

These criticisms were aimed to both the two principal systems of the industrial era (the capitalistic and communist ideal-types of society) and they contributed to the birth of the notion of sustainability.

Therefore the notion of sustainability is half old half new, but the cluster of values from which it derives a transversal role which is broader than its limited meaning as used in individual disciplines, sciences and thoughts.

2.2 From old concepts of sustainability to ecology to new concepts of sustainability

Many writers and scientists of different disciplines have pointed out the importance of the growth limits and of nature in respect to the human life and economy.

4 Khan cites a quotation reported in a Goodland's manuscript; it comes from the Plains Sioux culture: "Only when the last tree has been cut down, Only when the last river has been poisoned, Only when the last fish has been caught, Only then will you learn that money cannot be eaten".

5 Khan utilises the definition of the European spirit given by Paul Valery in 1922: "Wherever the European spirit dominates one sees the appearance of maximum of *needs*, the maximum of *work*, the maximum of *capital*, the maximum of *return*, the maximum of *ambition*, the maximum of *power*, the maximum of alteration *external capital*, the maximum of *relationships and exchanges*. This set of maxima is Europe or the image of Europe".

Some elements will be now highlighted from this path of thought, remembering that it has been very long and has been interrupted in some periods.

An old example comes from the Greeks. They considered it necessary for life to balance population and resources in their cities. Plato was in favour of a zero population growth and Aristotle stated that a populous city was very hard to govern, etc. (Harrison, 1993).

In relatively more recent times, these arguments were taken into consideration by Wallace (1761) and Malthus (1798). Harrison quoted them to demonstrate how they had been aware of the risk of an overstocked Earth, which would become unable to support its population. Wallace recommended equality, raising criticisms and objections since a paradox was evident: if equality were to be the remedy to distress and selfishness, it would foster population increase; therefore inhuman rules and costumes would be introduced to limits the growth. Malthus, in confront to those who believed that humankind was capable of continuous improvement and happiness (i.e. Godwin and Condorcet), elaborated the principle of population[6] as a sort of natural balance between population and resources (food) which makes it impossible to improve income and to redistribute it. Malthus was convinced that it was very difficult (if not impossible) to arrive at a perfect society, in which all citizens live in ease and without anxiety about their means of subsistence. It is well known how many criticisms of these points of view[7] arose.

It was the period when classical economics appeared, along with the first Industrial Revolution, and the French Revolution exploded, giving new principles, perspectives and visions to the world for its future life.

Nowadays there is reasonable agreement about the typical features introduced in this period. Of course it is disputable whether some items are the result of one specific component of this significant change in society; the same might be said about modernity. Indeed a continuous historical combination of components characterised this age, as well as the others.

In any case, many scientists and writers recognise a very broad range of features, the most relevant being that:

- agriculture was no longer considered as the source of economic wealth;
- attention was drawn to the development of manufacturing and to the productivity of labour;

6 Briefly, the concept is based on the following conjecture. The natural tendency of population to expand faster and increasingly more than resources would have been limited by the scarcity and insufficiency of the latter. Therefore, every attempt to remedy poverty by increasing resources inevitably would have been unsuccessful, since a further growth of population makes the resources insufficient for the life of the newcomers.

7 For instance, Karl Marx wrote that not population growth, but the ways in which the economy and society are organised were the causes of poverty, thus formulating a basic criticism of capitalism.

- the indefinite expansion of markets, as well as trade, competition, profits and wages were considered as focal aspects of a self-regulative system, both national and international;
- the notion of risk became a constituent of entrepreneurial and trade activity;[8]
- factory systems and mechanisation[9] prevailed as a leading type of work organisation;
- social and geographical mobility of the labour-force was fostered,[10]
- the division of labour in productive and unproductive[11] work became a basic parameter;
- technical division[12] was emphasised as the leading way to organise work;[13]

8 Part of profit is a compensation for risk, according to A. Smith. Risk is localised and individualised, and depends on the probability to have losses or damages. Risk must be measured. Measurement is important because capital is risked in making investments, company in its activities, as well insurance and financial markets: 'nothing ventured, nothing gained; youth is a *good* risk, age is a *bad* risk'. "Risk largely replaces what was previously thought of as *fortuna* (fortune or fate) and becomes separated from cosmologies" (Giddens, 1990). Risk is the basis of probability (Bernoully 1700-82) and determines decisions. This definition distinguishes risk from uncertainty in which probabilities are unknown.

9 Both of them are strictly connected. The first image from the beginning of the industrial revolution is strongly related to the "spinning jenny" and the "water frame". Other machines followed synchronisation in technically sophisticated systems. Therefore humankind began to utilise not only devices, tools and instruments, but machines and mechanisms; men worked with them. Two aspects can be underlined which together refer to the cultural change introduced into the way of life. Firstly, the problem of alienation, as powerlessness, meaninglessness, isolation and estrangement (Grint, 1991) of individuals in the process of production, in the organisation of work and in the societal context (from one another). This concept was fully introduced and stressed by Karl Marx, but a rich course of studies and analyses followed involving many disciplines (sociology, psychology, philosophy, for example). Nowadays it is well known that "in the early period, dominated by craft industry, alienation is at its lowest level and the worker's freedom at a maximum. Freedom declines and the curve of alienation ... rises sharply in the period of machine industry" (Blauner, 1964). The second aspect is the incorporation of the machine-culture into other ones: nature, society and the human body became to be thought and regarded as machines (Robertson, 1985).

10 Even though, rural sociology often produced a stereotypical view of rural society (villages and farming systems as stable and harmonious communities, networks, etc.), it is clear that the industrial revolution helped to separate a societal fabric in which home and work were strictly connected, as well as fostering social mobility (i.e. K. Marx, J.S. Mill initiated a long series of studies on this topic). What is arguable regards the social change from an agriculturally-based and home-located lifestyle to the industrialist one. These phenomenon, initiated two centuries ago, probably has been not so rapid and universal as it was supposed by many scientists. Hobsbawm (1994) places the death of peasantry in the second half of the current century: "For since the neolithic era most human beings had lived off the land and its livestock or harvested the sea as fishers. With the exception of Britain, peasants and farmers remained a massive part of the occupied population even in industrialised countries until well into the twentieth century". The same can be said in regard to urbanisation. Urban settlements and agriculture are as old as human history, but only the industrial revolution produced a tremendous impact on urbanisation in the country which represented its vanguard; it is in the second half of the present century that the phenomenon acquired a world-wide dramatic dimension (Harrison, 1993).

11 The classical distinction between productive and unproductive labour was based on the concept of value; of course the value in exchange and not the value in use, since money became the universal means of economic interaction (the exchangeable value of commodities). For Smith, Ricardo, Locke and Marx (as for many other economists and sociologists) the source of value was labour which produces material goods to satisfy human needs. An uncultivated land, for example, was considered as not being of value because no human work was incorporated in it (Robertson, 1985). Therefore, productive labour was considered only a clearly money exchangeable activity which contribute to individual income and national wealth. According to J. S. Mill (1848) it is very difficult to affirm that a country is richer than another one by means of the genius, virtue, and talent of its citizens; this might be possible if these qualitative abilities would be considered as exchangeable commodities, activating the material wealth of other countries.

12 Adam Smith affirmed that division of productive labour increases the capacity of a society to increase its wealth. During the industrial age, organisations were thought as systems which require co-ordination of individuals, of groups and sectors to carry out different even though integrated activities. Moreover: markets encourage

- industrial production became also a fact of gender difference (sexual division);[14]
- as a result, the social division of labour[15] became a radical aspect;
- employment became the way to organise work.[16]

All the above mentioned changes were nurtured and fostered by a new perception of time and space by means of their separation and "their recombination in forms which permit the precise time-space 'zoning' of social life" (Giddens, 1990), as the basis of day-to-day life. In the pre-modern world, time and space were linked and usually imprecise and variable. "No one could tell the time of day without reference to other socio-spatial markers: 'when' was almost universally either connected with 'where' or identified by regular natural occurrences" (Giddens, 1990).

The measurement of time by means of a more and more diffused instrument (clock), the discovering of new parts of the world and the progressive charting of the globe helped to standardise both of them and to separate them.

specialisation in products and processes; technology and mechanical production facilitate the division of labour by means of greater degrees of co-ordination and control and they require hierarchy. "Any other method of organising production would simply have been economically inefficient and technically irrational" (Grint, 1991).

13 A distinctive feature of the industrialist culture of organisational systems is that it is assumed that they tend towards: big dimensions (factory), certainty, stability, rigidity, specialisation, standardisation, bureaucracy and hierarchy, disempowerement, individualised performance, reward and consensus (Clegg, 1990; Grint, 1991; Hassad & Parker, 1993; Mullins, 1993). C. Handy (1993), taking into account surveys carried out by Hofestede, writes: "High uncertainty avoidance indicates that the culture likes to try to control the future. It is associated with dogmatism and authoritarianism, with traditionalism and superstition".

14 C. Handy (1993) quotes Hofstede and Mant to analyse importance and role of gender in national and corporate cultures. He gives an interesting picture, writing: "Masculinity is connected with ambition, the desire to achieve and to earn more, whereas its opposite, femininity, is more concerned with inter-personal relationships, the environment and a sense of service. Masculinity prefers quantity of things to quality of life, with men almost always preferring the quantitative alternatives". We can discover in these profiles the deeply rooted effects of the industrialist culture. In fact (Robertson, 1985; Grint, 1991; Simon, 1993), industrial production became synonymous with productive labour, of civilised progress, of growth without limits. Men were the productive part of society and allocated to the public arena (work), involved in the linear process of production. Women were the unproductive part of society, involved in cycle process of social reproduction, and allocated to the sphere of the private (home), where the female virtues expressed themselves in the family care. Progressively "The model of a full-time, single occupation, male breadwinner who worked outside the home and kept his family achieved pre-eminence in the dominant ideology" (Grint, 1991). Of course, during the industrial revolution, masculine/feminine polarity proceeded along the historical process of gender differentiation and discrimination which characterise many cultures and civilisations.

15 Sociology introduced the notion of social division of labour as an extensive characteristic of modern societies, which involves the components and the interdependencies of whole institutions and organisational systems and concerns many aspects, as such as role, status, power, ideology moral regulation, behaviour, gender, classes, etc. It represents one of the reach sectors of analysis, thought and sub-disciplines. The analysis of the power relations and ideology characterised the writings of Marx; Durkheim considered especially the moral consequences; gender analysis was initiated by Engels and found in Veblen an attentive scholar. Many are the writers of books on the above topics. A useful and relatively complete manual was written by J. Mullins (1985 and revised edition in 1989, 1993).

16 Employment as paid work is a typical characteristic of industrial societies. "In no other society and in no other period of history has work been organised that way" (Robertson, 1985). Also Grint (1991) highlights that "some cultures do not distinguish between work and non-work; others distinguish between work and leisure; still others by reference to employment as a particular category of work". What it is clear is the powerful influence of the Western based industrialised culture: work became employment; other kind of work are not fully recognised; therefore only employment exists as work; employment is the universal paradigm for work. Currently, when experts, politicians etc. refer to labour policies, they do not fully evaluate the role of the human activities and cannot understand the reasons why communities with high rates of unemployment can still survive.

‘Where’ was separated too between place and space; place as the meaning of physically local setting of social activities (face-to-face interaction); space as relations between distant places (interaction between absent people).

The separation of time and space and their formation into standardised dimensions “cut through the connections between social activity and its ‘embedding’ in the particularities of contexts of presence” (Giddens, 1990). Therefore the scope of time-place distantiation has been greatly extended by means of new methods of co-ordination. Organisations, institutions, ways of life were rationalised, enlarged, connected. Markets were expanded as well as trade, while productivity increased as mechanisation and factory systems became more and more sophisticated. Technical division of labour was fostered by means of co-ordination, control and rational hierarchies. Wages were based on time and place of work, as well as employment. Local and global were both visible even though not present at the same place, space and time. Everything seems to be like the combination of a clock with a map. Moreover a “standardised dating system, now universally acknowledged, provides for an appropriation of a unitary past” and, even though ‘history’ may be subject to contrasting interpretations, “the unitary past is one which is world-wide; time and space are recombined to form a genuinely world-historical framework of action and experience” (Giddens, 1990).

Therefore, it is clear that a total philosophy of society emerged based on a confidence in liberty and security of individuals as well as in order and good government, introduced gradually by commerce and manufacturing. (Smith 1776). Linear and progressive growth (arriving at the concept of optimal economic growth), cultural rationalisation, primacy of rationalised production (both of material goods and services), universal application of scientific methods to problem-solving, time discipline, bureaucracy and administration by rules, rational and functional hierarchy etc.; all these elements are the components of a common sense of society which can be labelled as the utopia of certainty, based on confidence in the ability and capacity of humankind to dominate nature (Giarini & R. Stahel, 1993).

This of course is the base of the anthropocentric view of development. According to this point of view, the environment is valuable only to the extent that it provides benefits to human beings[17]. As Robertson (1985) wrote: “The Renaissance, the Protestant Reformation and, ultimately, the industrial revolution brought a complete change of outlook. We distanced ourselves from the natural universe around us and came to regard ourselves as separate from it. Since then, from a position outside nature, we have measured it and studied it, exploited it and harnessed it. We have treated nature as an object in relation to ourselves, by

[17] As it is well known this rationale is strongly rejected, nowadays, by green movements. As Jacobs (1991) points out “They have argued that the environment has ‘intrinsic’ value, independent of any benefit that human society derives from it. According to this ‘ecocentric’ position, animals and plants and the ecosystems to which they belong possess moral rights which may override human interests in determining the appropriate level of environmental protection”.

bringing to bear upon it the objective processes of science and the manipulative processes of technology ... We have treated other species as things, to be captured, observed, vivisected, used and destroyed to suit human purposes. This perception of nature as something apart from ourselves has had a tremendous impact on what we have thought of as work, and on the kinds of work people have done and have valued during the industrial age".

In other words, what was useful for the economy of human beings should have been useful for nature. This was at the basis of concerns about limits to economic growth due to population growth. For instance, J. S. Mill (1857) elaborated the concept of 'stationary state' believing that economic growth would end in a static population level because of the 'niggardly nature' of nature which constitutes a factor of production and a source of life and wealth. Mill thought that the danger of overpopulation was a serious one and his real hope and desire was the restriction of numbers.

Only with Ernst Haeckel (1866) did the notion and the concept of ecology[18] appear, as the scientific study of the interaction between organisms, species and their environment. He had in mind economics since it defined ecology as the economy of nature[19] (1868-1889).

For many years ecology developed as a specialist discipline relating to nature and having a marginal role. It was for biologists, zoologists, botanics, etc. while economy, sociology and other disciplines were for human beings and development.

Some economists elaborated theories and studies on the importance of the environment on the economy and vice versa. Pollution was defined as a negative external diseconomy passed from the producer to the whole community (Pantaleoni, 1913). Therefore, a distinction has to be made between private costs of production and consumption activities and their full social costs (concerning society as a whole) in order to levy appropriate taxes as a compensation from the polluters according to the estimated damage (Pigou, 1920).

In any case, as a result of a long process, ecology was incorporated into various disciplines: as human and urban ecology in sociology (Chicago School of Sociology, e.g. by Park 1936, Hawley, 1944, Burgess and many others); as ecology of mind in anthropology (Bateson, 1972); as environmental economics (Turner et al. 1994); etc.

Ecology has become a scientific point of reference, especially from 1960, when it rapidly widened its contents and topics to cover the entire environmental

[18] The real beginning of Ecology (from *oikos*, habitat, home) as a scientific discipline can be placed at the end of the century (1895).

[19] The concept of 'economy of nature' was already proposed by Linneo and reconsidered by Darwin and Thomas Huxely.

problems as the patterns of development (Commoner, 1971), while the concept the of the limit to growth (Meadows, 1972) enlarged even more.

Therefore, for a long period of time, what prevailed was that human beings were no longer concerned by nature to the extent that they were able to dominate it, to modify the natural environment and, so it was hoped, to modify the natural laws of combination between dualism (e.g. chaos and order; subject and object; thinking and acting; individual and societal; etc.).

Of course many scientists disputed this concept. For instance, the two sisters paradox (De Jouvenel, 1957)[20] and the Nauru paradox (Washington Post, 1970)[21]. There were those who tried to minimise the environmental impact of human activities and those who pressed for radical change in economy and development policies. To conclude, it can be affirmed that the path of ecological thinking (traditional and innovative) has been consistent and long. It is important to be aware of its role, because it combined the conservative aspect of the survival of living beings and the revolutionary aspect of solidarity, equity, brotherhood in economy, policy and societies.

There is indeed an important element in the meaning of ecology: a coming together of different species, things and elements as a natural combination determined by different rules and forces. What seems to be chaotic in nature has a natural order; each component has its own characteristics and takes part in the complex natural framework; each component represents the global framework to the extent that the globality represents the part; they are both different and united in a synergetic way. Moreover there is the concept of limits which is of paramount importance for sustainability. This was the broad background that gave birth to the notion of sustainability. According to many writers, it emerged in 1972, in *The Ecologist's A Blueprint for survival* (cited by D. Basiago, 1995) and important steps to affirm this concept were:

- the UN's Stockholm Conference (1972) on the Human Environment and the subsequent international environmental treaties;
- the World Conservation Strategy (1980) by the UN's Environment Programme, World Wide Fund for Nature and IUCN-The World Conservation Union;
- *Our Common Future*, elaborated by the UN's World Commission on Environment and Development, chaired by Brundtland (1987);

20 One of the sisters is a dancer, the other one is a housewife. While the direct contribution to the increase in GDP is positive in the first case, it is not considered in the second case. Of course there is a clear link between this example and the concept of productive / unproductive labour already mentioned. Criticism is famous in the Marxist conception of value in exchange from anarchists (and others): a prostitute is productive if he / she works for a brothel; if he / she works only to gain some money to survive is unproductive.

21 Nauru is an island in Oceania, rich of natural resources and its inhabitants reached an high standard of living selling raw materials and, piece by piece, their territory. Having cars but not roads, refrigerators but the water comes from other countries by vessels, their material wealth is really inexistent at least until they do not emigrate maybe when the entire island is sold!

- the Bergen Declaration on Sustainable Development worked out by the European Union in 1990;
- the UN's Earth Summit (1992) with the Rio Declaration on Environment and Development and Agenda XXI;
- the Fifth Environmental Action Programme (1993) of the European Union (*Towards Sustainability*).

Therefore, during the past 24 years, there has been intense activity, at least from the theoretical point of view; as a result, many uses, definitions, domains and dimensions of sustainability are nowadays available.

2.3 Methods, issues and implications of defining sustainable development (SD)

The most well-known definition of SD was formulated by the Brundtland Commission as:

- *a development that meets the needs of the present without compromising the ability of future generations to meet their own needs*;
- *a process in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony, and enhance both current and future potential to meet human needs and aspirations.*

These concepts imply awareness of the actors, right decisions and courses of actions by means of a combination of:

- utilising,
- maintaining
- and passing on to future generations

the available resources in order to allow them to wisely govern this heritage (environmental patrimony), reducing progressively the environmental deficits in such a way that these will not be a burden and threat to posterity. This powerful definition means that development and sustainability should proceed together and be linked. Development as the way to overcome poverty; sustainability as the precondition of lasting development preserving, replacing and substituting resources in favour of future generations as well as the present one.

Briefly, sustainable development means not merely creation of wealth but conservation of resources and the fair distribution of costs and benefits between

generations. This means that everyone should be committed to improving the quality of life and of the environment, since SD has overall implications for all human activities. For instance:

- according to Khan (1995), “the paradigm of sustainability which seeks to pursue growth and equity within the context of intergenerational resource stability[22] sees development as achieving the interlinking objectives of social, economic and environmental sustainability both in the short and in the long term”;
- according to Basiago (1995), “it is as if sustainability is ... an organising principle governing activity at all levels”, “seems less a doctrine ... and more a research methodology belonging to the workaday world of applied science”, “is like the empirical method in the physical and natural sciences”; he arrives at this conclusion after having underlined the biological, economic, sociological and ethical methods of defining sustainability, as well as in urban planning.

It is interesting and possibly useful to compare the components of the above distinct areas of influence in the meaning of sustainability, bearing in mind that they are integrative and interlink the above paradigms. In fact it not easy to attribute meanings, definitions and concepts to each discipline or method, since they influence each other. Even though each discipline tries to distinguishes itself from the others by means of an autonomous scientific statute, the interconnections are so strong that it is possible only to highlight some significant distinctive features. In any case, what it has to be noted is the broad influence gained by the ecological side of human thought.

2.4 Ecological constraints and sustainable development[23]

Sustainability is a "long term" concept. Economic development is sustainable only if the range and diversity of economic options will not diminish in the future. This basic condition of sustainability is respected only if the natural and physical constraints of development are fully taken into account. The implementation of a sustainability policy must use tools as taxes, subsidies, etc., that are suggested by physical indicators, Green Accounts and social considerations. Comparative analyses by means of sustainability indexes (emergy, exergy, etc.) will be accomplished in order to develop integrated ecological economic, thermodynamic

22 A definition of stability is given by Edgar E. Gutiérrez-Espeleta (in Macgillivray, 1995) “as the capacity of society to keep, without wide variations, the use of transformation trend of the natural system”.

23 This paragraph was written by Enzo Tiezzi as one of the precious contributions from professors of the University of Siena.

and societal indicators for systems and processes. Our goal is the use of these indicators not only for the analysis of systems, but also to indicate a path towards sustainability policies at regional level.

System dynamics and energy analyses have been jointly applied successfully at both the macro-economic and regional scales, and to natural systems. Such systems are all qualitatively different, and are suited to different approaches, in terms of numeraire, treatment of outside influences and policy aims.

In order to understand the relationship between ecology and sustainable development, the following points have to be taken into account:

(i) integrating economics with thermodynamics and ecology for a better understanding of the sustainability concept;

(ii) to develop a thorough understanding of the interactions between the macro-economic human scale, the regional human scale, and natural systems, using a systems dynamics approach, and with an emphasis on physical numeraires;

(iii) to apply this understanding in identifying tensions between the sub-systems, establishing the link between such tensions and unsustainable practices, and to develop indicators relating to these tensions.

The epistemological background refers to Herman Daly's analysis on "natural capital" *(nc)* and man made capital *(mmc)* and on the consideration that *nc* and *mmc* are complementary and not substitutable.

Until now, economics has rightly used the first law of thermodynamics and the respective conserved quantities, energy and mass, to deal with man-made capital. Orthodox economics has assumed all the theoretical equipment of the doctrine of mechanical determinism including time reversibility. Natural capital which could be ignored yesterday, but which has now become a limiting factor, belongs to another logical type, that of systems far from equilibrium, complex evolving systems. Like entropy, dissipating structures, irreversible processes and dynamic chaos, natural capital must therefore be treated in evolutionary terms rather than in terms of energy-mass conservation. The constructive role of time and probability must be assumed in full. In simple terms, this means substituting evolutionary physics for classical physics in economics and ecology.

As underlined by Matthias Ruth, economies are open systems contained in an ecosystem (the biosphere) with which there is exchange of matter and energy. Economic systems and ecosystems are both in a steady state, far from equilibrium, and dynamic evolutionary models based on irreversible, non-conserved quantities and functions can enable us to understand the complexity of the interactions between natural and man-made capital, between biosphere and system of production, between nature (of which we are part) and economic activity. This fundamental challenge can be won by integrating the economy

theories, with thermodynamics of irreversible processes and the basic principles of ecology.

The range and diversity of economic options, i.e. the sustainability of economic development, crucially depends on how the economic activity interferes with the process of storage and degradation of solar energy. In order to study this feedback, it is necessary to refer to indexes of thermodynamic efficiency considered from the point of view of sustainability. It is not yet clear which are the best indexes for analysing the interference between economic activity and the thermodynamic process of storage and degradation of solar energy in order to design the best policy interventions for assuring sustainability. Each of the indexes of thermodynamic efficiency suggested so far show different advantages and disadvantages for sustainability analysis. Their potential for this purpose will be therefore carefully compared and assessed in the first stage of this research.

The above described epistemological background and the requirement for a new evolutive paradigm in the economic thermodynamic approach to ecological economics is based on the consideration that some environmental emergencies are responsible for the depletion of natural capital and for global changes in the bio-geochemical life cycles, namely:

(i) greenhouse effect and the carbon cycle;

(ii) acid rain and effects on humus and water cycle;

(iii) inhibition of photosynthesis due to UV radiation (ozone layer) and effects on agriculture.

2.5 From ecology to sustainable development

The biological methods of defining SD (Basiago, 1995) imply that biological systems should form the foundation of all economic activity. “If these systems fail, so does the economy”. Bio-diversity, as “the genetic-based variation of living organisms at all levels” (Wilson, 1994) should be protected and maintained on a regional basis. He cites the example of California with the “Agreement on Biological Diversity” (1991) to show how a rich natural heritage may be recognised as fundamental by the State to its economy. Therefore, to protect biodiversity and maintain economic vitality, the regional dimension becomes of capital importance; that means the development of a bioregional approach.

Obviously, reconciliation has to be pursued between nature and humanity, since they have been in conflict for long time, as it is stressed by Miller (1988, quoted in Basiago 1995). He distinguishes between a sustainable natural ecosystem and a simplified human system. The former is based on: energy from the sun;

production of oxygen and consumption of carbon dioxide; creation of fertile soil; storage, releasing water gradually and its purification, as well as of pollutants and waste; self-maintenance and self-renewal; etc. The latter is characterised by: energy from fossil or nuclear fuels; consumption of oxygen and production of carbon dioxide; depletion of fertile soil; release of water rapidly and its contamination, as well as production of pollutants and waste; needs for continual maintenance and renewal at high costs; etc.

In this context, environmental sustainability assumes its full meaning as the way to reconcile humanity with nature. On this topic, concepts and principles have been elaborated by a large crew of scientists: Daly, 1973, 1974; World Bank, 1986; Pearce et al., 1988, 1989, 1990; Serageldin, 1993; WWF, 1993; Jacobs, 1991; Turner et al., 1994; Adriaanse, 1995; Dirgha Nidhi Tiwari, 1995. From the above contributions, a set of criteria for sustainability emerges which can be summed up as follows.

Firstly, the environment must be maintained as a natural capital which has three main function as a provider of: inputs (sources) in supplying natural resources; a sink for waste and environmental pollutants; conditions to maintain life.

Secondly, economies can respect the environmental system:

- utilisation of renewable resources must proceed at rates less than or equal to their natural or managed rates of regeneration;
- efficiency must be introduced in the utilisation of non-renewable (exhaustible) resources by means of the optimisation of the rates at which renewable substitutes can be created through technological progress;
- generation of wastes and their discharges to the environment must be at rates less than or equal to those of a clearly monitored and demonstrated assimilative capacity of the environment without impairing it;
- life-support services of the environment (e.g. genetic diversity and climate regulation) must be maintained.

Thirdly, society must be aware of all the biological implications existing in the economic activity.[24]

[24] As many writers declare: “to achieve economic sustainability one must consider environmental sustainability - one cannot be achieved at the cost of the other” (Khan, 1995).
“Fundamental to sustainable development is a recognition of the interdependence of the economy and the environment. This is two way interaction in which the way we manage the economy impacts the environment and environmental quality impacts the performance of economy. This perspective stresses that damaging the environment is ultimately tantamount to damaging the economy. This perspective therefore concludes that environmental protection is a necessity rather than a luxury” (J. Karas et al., 1995).

2.6 The contribution of political economy to the concept of sustainable development

As is well known, conventional economic concepts refer to three principal factors of production: land, labour, capital. They were at the basis of the economic thought which accompanied the industrial revolution. During the last two centuries, changes have occurred in these concepts, from many disciplines and points of view. As a result, all three are nowadays assumed to be capitals: nature, human beings and human-made assets.

The “Earth-friendly approach” (as Basiago quoted through an essay written by Gilman) embraces five forms of capital:

- environmental, which includes all natural systems, the atmosphere, biological systems and even the sun;
- human, which regards health, knowledge, skills and motivations of individuals;
- socio-organisational, which is the ‘metaphysical dimension of culture’ as all habits, norms, roles, traditions, regulations, policies, laws, social and institutional dynamics, etc.;
- manufactured, which includes all buildings, tools and equipment, household durable goods and “anything made but not yet returned to the environment”;
- credit capital, which refers to money and debt.

This broad distinction is of course debatable. For instance socio-organisational capital seems to correspond to society (or social formation) in which a primary role is given to individuals and communities (human capital), while manufactured and credit capital are still two faces of the same coin. Other distinctions can be detected according to the scientists taken into consideration, revealing similar or different meanings. For instance:

- natural capital (broadly equivalent to what are often termed natural resources), physical capital (plant, equipment, buildings and infrastructure, accumulated by devoting part of current production to investment purposes), human capital (the productive potential or the stocks of learned skills embodied in particular individuals) and intellectual capital (the disembodied skills which comprise the stock of useful knowledge as it is part of the culture of a society); moreover “if human-made capital is defined to be the sum of physical, human and intellectual capital, then capital stock consists of two parts: natural and human-made capital” (Perman et al., 1996);

- natural capital (environmental resources), physical capital (i.e. man-made, machines, etc.) and human capital (i.e. human skills, knowledge and ingenuity) (Turner et al. (1994);
- natural capital (natural resources), human-made capital (buildings, machines, etc.), technological expertise, other kinds of knowledge and so on (Jacobs, 1991).

Moreover many scientists have treated the concept of sustainability in different manners. Putting together some of these conceptualisations, a sustainable state can be identified, from an economic point of view, as one in which (Perman et al., 1996):

- utility, consumption and natural capital stock are non-declining through time;
- minimun conditions of ecosystem stability and resilience are satisfied through time;
- resources are managed so as to maintain a sustainable yield of resource services and to maintain production opportunities for the future.

Since in economics it is assumed that the maintenance of the productive potential depends on the maintenance of the composite capital stock, either the individual elements of this stock are able to substitute for one another or they should be non-declining over time.

Economists are divided over this issue and even though many accept the Daly's concept (natural capital and man-made capital are complementary and not substitutable, see paragraph 2.4), we can distinguish two broad environmentalist positions or perspectives. The former (technocentric) assumes "that there will continue to be a *very high degree of substitutability between all forms of capital* (physical, human and natural capital)", while the latter (ecocentric) rejects "even a policy of 'modified' development based on the sustainable use of nature's assets" (Turner et al., 1994).

Taking into consideration the numerous writings of the already mentioned environmentally orientated scientists, a tentative short list of the most important concepts can be made, with the help of some publications edited by The New Economics Foundation (i.e. Macgillivray et al., 1995; J. Karas, 1995):

- ***development versus growth***; while development is a broad concept that encompasses economic, social, environmental and cultural welfare, growth represents the economic and quantitative measurement of wealth (e.g. GDP and GNP); in fact there can be growth without equity, without social and environmental well-being or prosperity; growth can exists along with poverty, etc.;

- ***sustainable development versus conventional development***; SD differs from conventional development in many aspects; the most relevant can be noted following a list made by Mikessel (1992, quoted by Khan, 1995); natural capital is emphasised as the main limiting factor; great importance is given to the intergenerational utilisation of resources availability; in order to measure performance, all social benefits and costs, as well as the depletion of natural resources, are included; waste absorption is regarded as a major function of the environment and an important limitation on economic growth;
- ***environmental limits***; social or economic goals have to reflect sustainability constraints; the starting point is the definition of SD as "improving the quality of life while living within the carrying capacity of supporting ecosystems";[25]
- ***precautionary principle***; if the environment has to be considered as a basis of economic development and no longer treated as an unlimited, free commodity, where there is a threat of serious damage, action to prevent environmental degradation should be taken and lack of scientific certainty should not be a reason to delay this decision;
- ***resilience***; the above context fosters a consideration of capacity of society to react and adapt to natural or induced stress or shock situations; the social system has to be fully aware of and improve its capacity to come back to or maintain equity and productivity levels during or after this kind of situations (short or long as they may be);
- ***environmental efficiency***; as already underlined, it is pursued by the means in which the economy respects the environmental system and, thus, it is tightly linked to the principle of sustainability constraints; in other words, environmental efficiency will exist if pollution, resource exploitation, and environmental damage remain within the sustainability boundaries; changes are requested in the ways of utilising renewable and non-renewable resources, of reducing pollution, of managing production processes, as well as in products (size, durability, utilisation, full life cycle, quality) and in demand; many of these changes can be progressively obtained improving and raising economic and technological efficiency; some others need typical measures of demand-side management (e.g. orientation of consumption, individual and collective behaviour) and socio-demographic interventions (i.e. a reduction in population), as well as spatial planning initiatives (i.e. from big and chaotic to small, flexible dimensions);
- ***environmental productivity***; again sustainability constraints help to understand what it means; in fact anything that can reduce the flow of

[25] From IUCN, UNEP, WWF's *Caring for the Earth* reported in Macgillivray, 1995.

materials and energy will reduce environmental burdens; therefore, environmental productivity can be measured in terms of the ratio of total output to direct input of energy and other resources, their transformation in products and services; in terms of environmental productivity also the utilisation of products and services is important as a ratio between output and input in recycling and waste discharge, according to the principle from cradle-to-grave (full life cycle of the products).[26]

To sum up, for a long period of time, development has been heavily orientated towards the so-called philosophy of growth, based, as already mentioned, on the primary assumption that natural resources were unlimited and that (manufactured, credit, etc.) capital was the principal scarce resource. Later it was recognised that these postulates (and beliefs) were not true.

Moreover, an undue reliance was placed on the capacity of the market to guarantee an efficient allocation and utilisation of resources, as well as on the capacity to substitute them and to restore those destroyed during the process of production and consumption.

In respect to this orientation a more cautious orientation gradually emerged. Restraints must be introduced to uncontrolled growth and increase in consumption, in order "to live within the limitations of the biophysical environment" (Goodland, quoted by Khan, 1995). This is one of the reasons why, as a path to a sustainable economy, some writers ask for a rational framework to be adapted to the interactions of all the above mentioned forms of capital, which are connected in complex ways (Gilman, quoted by Khan, 1995).

Of course, the decline in centrally planned economies has prevented many scientists from calling for similar approaches, but it is also recognised that the free-market is not perfect[27] and that markets and planning can coexist. A starting point for a general approach to which many agree, is constituted by the Pigou's and the 'polluter pays' principles along with the Hick's definition of income.[28] The internalisation of the external costs is assumed to be a measure that prevents both distortions and failures of market, moving from a market optimal to a socially optimal level of output and considering that many environmental goods are public-type rather than private things or commodities (Turner, 1994). To this end, Jacobs (1991) suggests a two-stage process: to set key environmental targets to protect

[26] As Basiago (1995) writes, quoting Gilman, "... everything that can be done, such as 'long-life designs, easy repair and good recycling', to prolong product life span (from the initial extraction of raw materials to their ultimate disposal, when most damage to other forms of capital occurs) maximises the net value of manufactured capital".

[27] Despite the rhetoric of some politicians, there aren't any 'free market' system in industrialised countries - and very few people who wish there to be. Markets are already subject to all sorts of regulations and taxes ... All such measures restrict what suppliers and purchasers can do, and thereby influence their behaviour" (Jacobs, 1991).

[28] Khan cites Goodland (in manuscript), who wrote that to arrive at a definition of economic sustainability, it is necessary to extrapolate the Hick's definition of income from the focus on human-made capital to the other forms of capital. Hick (1946) defined income as "the amount one can consume during a period and still be as well off at the end of the period".

environmental capacity; to influence economic activity to comply with these targets. Instruments to help the above process are classical: voluntary mechanisms (persuasion, information, changing the legal context, as well as non governmental initiatives by individuals, groups, etc.); government expenditure; taxation; financial incentives and government subsidies.

Nevertheless, the use of market mechanism (which is what the 'polluter pays' principle asks for), as well as the important role of the political dimension, does not seem to solve some basic issues (as was underlined, amongst others, by Welford, 1995).

Firstly it is argued whether it is possible to accurately assess the additional costs. Large margins of error, implicit difficulties and different personal judgements exist regarding the value of the various components of natural capital as well as of manufactured (human-made) capital. In this case, the full cost methodology requires to decide the scope (e.g. the amount and the extent) of what should be included and excluded in the accounting. Direct pollution effects might be clearly determined but many are less direct such as the inter-regional and inter-temporal impacts on populations, etc.[29] Moreover, compensation for external costs must be paid, but the property rights of many environmental goods are not very clearly defined or do not exist (e.g. the air and the deep sea).

Secondly, as far as the political dimension is taken into account, problems arise as to what is the right, sustainable level of production and consumption, as well as on who should determine it.

Both of the above areas of problems are at the basis of economics. For instance, one of the aims of A. Smith (1776) was to demonstrate that the maximisation of the individual advantages (his own interest to meet his needs) will contribute to maximise the common good, by means of the existence of an inherent natural order, superior to any order created by humankind (an invisible hand which is based also in the natural inclination of man). Also K. Marx developed his theory on the concept of need.[30]

Solutions to these problems can be sought by economic methods, but they need to be integrated with other disciplines and methods. In fact the relationships between need and consumption require a wise combination of demand-side and supply-side management, and, according to the conventional economic approach

[29] Harrison (1993) has clear ideas on this but they may seem a little bit emphatic: "... government interference in market price is justified to ensure that the full environmental costs are reflected in the price of a product. This includes the costs of reducing pollution to acceptable standards, costs borne by sufferers of pollution or depletion, benefits forgone by future users, and so on" (Harrison, 1993).

[30] "Production brings forth the things needed for the satisfaction of wants; distribution shares them out according to social laws; exchanges distribute that which has already been shared, according to individual want; in consumption, finally, the product leaves the social sphere, it becomes directly the object and servant of individual want, and satisfies it" (K. Marx in the *Critique of Political Economy*).

"after all, the prime motivation for the existence of the corporate sector is to make profit" (Turner et al., 1994).[31]

Therefore, all measures already cited are necessary: costs must be internalised to give a new qualitative and quantitative re-addressing to the performance of making profit and to foster innovation; governments must set and planning must regulate some general aims, goals and targets to prevent environmental degradation; taxation and subsidies must be finalised to this end. These instruments help corporate culture and business to have an environmental commitment and to foster an ethic of sustainability.

2.7 The contribution of sociology to the concept of sustainable development

According to Adriaanse (1995), within social policy (in which education, health, women's status acquire a specific emphasis) resource use, productivity, poverty/ equity and investments might be considered as the determinants in order to realise a sustainable development.

Equity is the highest priority of SD as the way to meet the needs of the poor. All the writers already mentioned agree upon this principle which must be applied both within and between countries and generations (present and future). At least the same opportunities of the current generation should be given to the next ones. Equal opportunities in the access to resources mean a change in the current patterns of development, between the richest and the poorest communities of the world. Many of the latter might be considered as creditors if the large historical amount of supply of natural resources to the former were taken into account. It is widely known that the consumption patterns of the richest part of the planet result in deprivation of resources for the poorest part. Therefore the imperatives of equity necessitates a reduction of these high levels of consumption in order to guarantee a fair sustainable distribution of resources; that means also that the patterns and styles of life originating in the Western industrialised countries should be re-addressed and shouldn't be exported to other counties,

[31] A. Smith's affirmation is well known, that "It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regards to their own interest". Many writers, obviously, have argued against this thought, underlining that there is a need to change the above mentioned stereotype. For instance, J. Schumpeter (1883 - 1950) defined an entrepreneur as a catalyst of innovation and change. This function has a role qualitatively different from the existent order and perturbs it. Therefore, the capacity to conceive and introduce new products and techniques (processes of production) acquires primacy in managing the organisation. Profit is the consequence of this capacity and risk-taking a way to improve it.
"Perhaps the most pernicious guiding idea to penetrate to the hearth of Western business management over the past thirty to fifty years is that the *purpose* of the enterprise is to maximise return of shareholders' investment ... Can there be little wonder that people in such organisations are uncommitted, that they view their jobs as mundane and uninspiring, and that they lack any deep sense of loyalty to the organisation?" (Senge et al. 1994).

while a multicultural approach should be adopted to meet the above mentioned culture of moderation.

As a principle, obviously, equity applies not only to the relationships between the North (or the First World) and the South (the Third or Fourth Worlds), but also within the developed countries in order to combat the poverty that is present among their communities.

In conclusion, equity means the capacity of society to be fair: wealth, benefits and risks coming from the use or transformation of the natural system have to be distributed in relation to the contribution to the development process by the various components of society.

Sociology has developed a very large numbers of thoughts and theories on topics that are central to discussions on poverty, deprivation, welfare, equity, equality, ethics, distribution of income, wealth and opportunities. Obviously, psychological,[32] social, economic and cultural needs were included. The concept of need was also utilised to study the functioning of society (e.g. T. Parsons and the structural-functionalism school). In any case, what emerges from this rich experience is that there is disagreement on many aspects, especially over whether it might be possible to define needs in absolute or relative terms and to assess them objectively or subjectively. The value of the concept is also an object of disagreement as well as whether it is right and useful to decide whom should decide and how: market, government, State, politicians, groups, communities, individuals, technocrats and planners.

The difficulty of identifying the right combination of demand and supply (market) is linked to the difficulty of identifying the right social constitution (needs, activities, organisations, institutions, laws, behaviour, values, styles of life, etc.). In fact on both sides there is humanity with different types of populations and individuals and with different needs: psychological, economic, social, cultural, etc.

Therefore the difficulty is determined by the meaning of society and it ends often in a vicious circle showing the tautological nature of the attempt, given that needs and the ways to meet them are socially determined.

They (needs and ways) and their relationships are parts of a process mediated by the meaning which they acquire in the specific context in which the social interaction happens; and the actors of the social interaction are fully legitimised to decide their future by means of confrontations, conflicts, negotiations, agreements. Nothing exists having an objective value by itself. The role of environment has became and is nowadays important because of this natural way of being of humanity.

[32] Psychology has contributed to define origins and dynamics of needs, behaviour and habits. It has suggested tentative methods of defining hierarchies of needs (e.g. A. Maslow).

This assumption is demonstrated by what happens in the supply side of the market (goods and services provided for by businesses) as the way of meeting the demand side (needs, customers, collective and individual behaviour, style of life).

Studies, theories and schools concerning entrepreneurial and managerial spirit, behaviour and ethics have populated sociology (and psychology). An important reflection comes from them: different cultures characterise the past and the present of these organisations. If the objective of profit maximisation has an important role, there are also a lot of objectives, aims and functions to declare that the concepts and roles of business and entrepreneur do not have a unique and universal meaning. Moreover the different meanings are related to national and regional cultures[33] (Japan is different from USA, Germany from Italy, etc.).

A general direction can be identified which has characterised the orientation of corporate culture:[34] from the product to the market, to the customer satisfaction, to the innovation of the socio-economic context, to the local development, and recently in some cases to environmental management and sustainable development[35] (Ansoff, 1979, 1987; Mullins, 1993; Drucker, 1993; Pasmore, 1994; Gouillart and Kelly, 1995; Hammer and Champy, 1994; Senge et al., 1994; George and Weimerskirch, 1994; Peters, 1994; Garrat, 1994; Welford, 1995).

"Traditionally, the process for planning which is thought to be the most rational and scientific, is a linear process - survey / analysis / plan. I maintain that this is counterproductive - that, in fact, going backwards can be a creative process" (Hickling, 1974). In fact, the necessity for a cyclic process emerged as a strategic approach to decision-making, to problem-solving and planning. "Continuous success, and even survival, is possible only if management gives a high priority to the firm's strategic activity", as "a set of decision-making rules for guidance of organisational behaviour" (Ansoff, 1987). This means that corporate culture should be guided by means of the simultaneous operation of four levels: "events, patterns of behaviour, systems, and mental models". Ways to combine the above levels are of course different from one firm to another one, but what it is important

33 See as an example the concept of company formulated by Ikujiro Nonaka (1991) and further quoted in this paper.

34 Peters and Waterman (1982) draw particular attention to corporate culture: "Without exception, the dominance and coherence of culture proved to be an essential quality of the excellent companies. Moreover, the stronger the culture and the more it was directed to the marketplace, the less need was there for policy manuals, organisation charts, or detailed procedures and rules. In these companies, people way down the line know what they are supposed to do in most situations because the handful of guiding values is crystal clear".

35 "Sustainability has to be seen as within the intrinsic business concepts like profit and loss, debt and equity, capital and cost .... shifting perspective from the profit motive ... it may be necessary to sacrifice considerable short-term gains in order to secure long-term benefits ... organisations that serve the needs of the greater society in which they exist are more likely to prosper" (Welford, 1995). In order to demonstrate the viability of this set of assumptions, Welford cites many other writers and some interesting case such as the Business Council For Sustainable Development and the Responsible Care Programme, launched in 1989 in the UK by the Chemical Industries Association.
"The emphasis on the environment will shift from mere protection of the environment to recovery of what has deteriorated. Sustainable development will become the rule for business expansion, and global attention will be given to the future ... Organisations that shifts from polluting to recovery technologies will gain significant competitive advantage" (Pasmore, 1994).

are the methods adopted, e.g. stressing the concept of *synergy* (fully explained by Ansoff, 1987) as one of the major components of the corporate planning and programming.

To sum up, a meaningful change has been developed in the shift from linear thinking to systems thinking: things are no longer seen as structures but as processes. Planning requires strategic thinking, as the way of "knowing what needs to happen" (Senge et al., 1994), "accepting the intellectual challenge of creating the future" (N. I. Smith, 1994).

According to this innovative approach (accepted by many writers, see, for instance, Sense et al., 1995; N. I. Smith, 1994; Hammer and Champy, 1994; Gouillart and Kelly, 1995):

- a clear image (vision) of what the future should look like ('where we want to go', 'what we will be like when we get there') drives strategic planning;
- provides clarity of purpose to the organisation's missions ('why it exists?, 'what it is meant to be involved in and with', 'how we operate, on a day-by-day basis, to pursue our vision')
- gives a sense of commitment to all its members ('what are we here to do together');
- empowers and helps people to be flexible in setting goals and objectives in order to take the organisation closer and to revise instantaneously plans in such a way as to tightly meet the missions;
- is the way to communicate a sense of the kind of organisation the company needs to become, how it is going to operate, what results it must achieve.

A clear demonstration of the meaning of this approach comes from the Japanese school of entrepreneurial and management culture: "A company is not a machine but a living organism, and, much like an individual, it can have a collective sense of identity and fundamental purpose. This is the organisational equivalent of self knowledge - a shared understanding of what the company stands for, where it's going, what kind of world it wants to live in, and, most importantly, how it intends to make that world a reality" (Ikujiro Nonaka, 1991).

Collective sense of identity, self knowledge, shared understanding and so on, all these properties come together when a company is more and more seen as a *learning organisation*; a concept nowadays fully recognised in organisation theories and world-famous (B. Garrat, 1994). Further development in this open-mind approach is represented by studies concerning strategic organisational change.

According to many writers (including those already mentioned), a profile of the changing patterns in organisational systems can be detected as follows: formal organisation is giving place to flexible, informal, lean organisation, to non-

hierarchical shamrock and federal organisations, to the art of *networking*; as *day-by-day learning* organisations; they are orientated towards improving the capacity to nourish innovation; they act in local areas, local communities stimulating local initiatives and economies to become more and more sensitive to the creation of networks as a tool to make a synergistic use of endogenous and exogenous resources; they promote the capitalisation and the interaction between different experiences and knowledge.

The local dimension is the focal point of networking, of federal or shamrock organisation of power, both from an administrative and political point of view.

At the same time also global dimension (of market, business, technology, innovation, economy, etc.) is important.

Therefore local and global are relevant and simultaneous. A new notion was introduced to clearly represents this phenomenon - *glocacity* - which can be defined "as the capability to act locally with a global perspective, and to be effective globally with both global and local perspectives" (OECD, 1996).[36]

As already written, networking assumes a strategic role in corporate culture and strategies. In other words, every organisation is a network of other organisations. Networking means alliance as a way to cope with diversity, risks and uncertainty. In this ambit, stakeholder alliances are the dynamic sources to foster the total chain of value-adding. In fact the customer, the supplier and the producer are interacting in vital ways; they can become a single image, that of the prosumer[37] (McHugh et al., 1995; Giarini and Stahel, 1993).

Very recently another Japanese concept has appeared: *Kyosei*. It pursues a very global entrepreneurial approach emphasising social and environmental - or ecological - responsibilities for the present and future generations, as well as equity within world-wide and between local economies (Ryuzaburo Kaku, 1996). This concept gives a clear vision to organisational behaviour and corporate culture as a combined process of continuous slow (*Kaizen*) and fast unpredictable (*Kairyo*) modifications and improvement (see, for instance, the principles of Total Quality Management).

Therefore, environmental management needs a strategic vision which encompasses the principle of sustainable development as a set of core values guiding the firm's decision-making processes at all levels (Welford, 1995) and fields of activity (e.g. marketing, total quality, training, auditing, life cycle of products and processes, etc.).

36 "Each costumer and each local situation will be different. If a company is serving a major multinational customer, then it will have to provide, or co-ordinate the provision of service, in a number of different countries and regions. In each situation, there are unique local characteristics, customs, business practices, and ways of getting things done effectively. The same global procedures cannot be applied uniformly in every local situation. There has to be a balance between the desired uniformity of global practices, and the local variations" (OECD, 1996).

37 The term of prosumer was coined for the first time by A. Toffler (1981); the term is the fusion of producer and consumer

As the above set of new principles gives orientation to foster innovative patterns in the corporate culture, it should be placed in a context of overall social change based on the following criterion.

“The achievement of economic and social sustainability must go hand in hand and ... one aspect cannot be achieved at the cost of the other”, as was affirmed by Kahn (1995), who includes variables such as equity, empowerement, accessibility, participation, cultural identity and institutional stability as distinctive variables of social sustainability in the paradigm of sustainable development.

Therefore sociological methods to define sustainability seem to revolve around the notion of “the socially equitable sharing of environmental harm” (Basiago 1995) who quotes Farmer (1995). She gives a vigorous image of sustainable economies. Their ethos is oriented to the main purpose of a thriving co-operation between humans and nature. They are:

- *holistic*, because they are based on both demand- and supply-side interdependence, on the diversification of markets and capitals, encourage subsistence farming for domestic production, reindustrialise for diversity and are based on inclusionary models;
- *diverse*, because they strive for a diversified economic base, works, tasks, etc., foster biodiversity, democratise ownership, etc.;
- *fractal*, because their organisational systems are non-hierarchical at all scales of economics, are labour-intensive, have appropriate technologies, based production for full employment;
- *evolutionary*, because they grow towards diversity, equity and democracy, conservation of resources and higher quality of life, etc.

The above concise list of characteristics contains leading concepts which constitute, to a large extent, the profound change taking place in society as a whole and, maybe, the most relevant contribution from sociology to SD comes from the definition of some basic concepts by means of the analysis of the current social change.

Taking for granted the knowledge of the intense evolution of a very wide range of theories, a tentative and not exhaustive list of these concepts can be made as follows:

- ***culture and civilisation***; there is still much discussion regarding the meaning and the relationship between these concepts; for instance, civilisation was assumed to mean the progress of humanity (see the ‘Civilising Process’ - Elias Norbert, 1939) while nowadays the latter has changed (see below) and more emphasis is placed on culture as a concept which passes over the human world questioning its boundaries (P. Rossi, 1991); in any case, as a general meaning, culture manifests itself as a cohesion of ideas, values, beliefs, norms and ways of acting shared by the

members of organisational systems and communities; culture can be defined as a complex pattern of values and beliefs which characterises (stems from and influences) actors, their decisions and actions as an ongoing process of coping with, anticipating, creating and managing change; therefore (E. Morin, 1994), culture relates to all that is singular, original, local and expresses the sense and the rational (ethos) of a community, an ethnic group, a nation, etc. (cultural identity), while to civilisation is attributed a meaning which is more universal (globalisation - Giddens, 1990); for instance values coming from a community or country can become universal; e.g. the values of 'Liberté, Egalité, Fraternité' were originated as cultural expression of a specific society during a specific historical period, but they have acquired universal meaning as civilisation; moreover, a two-century civilisation started from the Western cultures based on rationality and on "an instrumental orientation towards the domination of physical nature" (J. O'Neill, 1995) and nowadays a new process of civilisation seems to have appeared based on a multidimensional integration between cultures (both current, from the past and for the future) and also upon the universal meaning of the reconciliation between humanity and nature (E. Morin, 1994);

- ***progress***; it is linked to the vision of history as a perception of the emergence and development of human actions; since its beginning, sociology defined progress not as a evaluative concept, but as the gradual and unavoidable deployment of human capacities (Comte, 1830 - 1842); it was clearly influenced by the growing Western civilisation that assumed progress as an increasingly sophistication of scientific knowledge and the improving quality of life; for a long period (up to the last two decades), the concept of progress was based on evolutionary theories and perspectives (social dynamics - Comte; social evolution - Spencer; social development - Marx and Engels), following the culture of the nineteenth century (optimistic, rationalistic and materialistic); it seems nowadays more evident than in previous ages that the historical process should be seen as fragmented and discontinuous series of events, linked not by necessity but by accidents and coincidences rather than a monotonous and continuous deployment of successive events (P. Daudi, 1990); this new vision is clearly influenced by at least three key-elements, the failure of science to create a sort of moral utopia valuable for all humanity, the emergence of doubt, the abrupt explosion of the environmental dimension;
- ***social equilibrium***; it refers to a state of balance in the social patterns; according to many past sociologists (e.g. Pareto and T. Parsons), when changes are introduced in society, it is unavoidably brought back to equilibrium by means of new levels and types of social exchange; in other words, the opposing forces or tendencies, sooner or later, neutralise each other; this means that changes ('moving equilibrium' and 'disequilibrium')

are unavoidably functionalised to a new social order, since the tendency of social systems towards equilibrium are taken for granted; apart from a sort of tautology, the influence of a deterministic (and fatalistic) certainty is evident, based also on postponing solutions to later time; nowadays this concept is no longer able to explain change and it is strongly challenged by the theory of uncertainty (Giarini and Stahel, 1993), as well as by new principles such as the precautionary one emerged from the environmental position;

- ***complexity***; nowadays sociology (as well as other disciplines) are fully involved in this concept; of course, the notion of social complexity is not new and it has characterised many theories (e.g. systems, structural functionalism, social action) and scientists (e.g. Spencer, Pareto, Parsons, Luhman); what is new is a broad change in the theory's horizon that happened as a catalyst combination between scientists as A. Einstein, I. Prigogine, E. Morin, G. Bateson, F. J. Varela, H. von Foerster; they underlined how the rational, linear, mechanistic conceptions were limited and unilateral; terms such as reason, order, symmetry, certainty, measurability, harmony, equilibrium, homogeneity, law, truth, objectivity, rationality, regularity, predictability were strongly questioned; on the contrary the complexity theories affirm that life, humanity, evolution, change, knowledge, etc. originate from and go hand in hand with disorder, chaos, perturbation, dissymetries, instability, non-equilibrium, flows, turbulence, non-linearity, marginality, uncertainty, relativity, dis-harmony, fractalism, imponderability, etc.; this is more true nowadays when the overall interdependence (globalisation) acts in such a way that local actions have very broad consequences, both in distance (space), time and dimensions; globalisation is the coming together of different, also unique, individual and fragmented initiatives; therefore only a connecting strategic thinking (holism) can comply with complexity, respecting what is diverse (and divergent), the multidimensional facets of situation and problem (fractal and hologram) and operating on their interdependencies[38]; in fact the whole is in the part as well as each part is in the whole (as Pascal said: since all things are causes and effects, mediate and immediate, connected and separated at the same time, it is impossible to know a part without knowing the whole, as well as vice versa); in words very well known by environmentalist, this means to think globally and to act locally with its reverse, to act globally and to think locally; ecology, as a broad meaning in culture, mind and society (besides environment, economy, etc.) clearly played a role in this reform of thinking and nowadays maybe the opposite is happening;

[38] As P. Drucker (1993) writes, quoting E. M. Forster (1879-1970), it is very important to confine ourselves to connect what we know or we are going to know; this is a principle to foster knowledge's productivity.

- ***chaos***; an evident break with the past is incorporated in this concept; in fact chaos is order; especially Baker (1993) has analysed the sociological implications of chaos theory, with its roots in physics, in fact the new concept of chaos (J. Briggs 1993) was introduced by Lorenz and other scientists during the last 60s - 70s; the distinctive character of a dynamic chaotic systems is based on its extreme sensitivity; they are always mutable and never return to their previous status; obviously this concept is again partly an old concept (remember, for instance, the Eraclito aphorism of the river of time; and this is true also for the water-river, as ecology teaches); the theory of chaos relies upon the holistic nature of non-linear dynamic; in other words, the dynamic systems are holistic, a character of wholeness in which the parts influence each other and global (whole) and local (part) influence themselves at the same time; the feed back effect can amplify some unpredictable influences (external or internal), showing the strong holistic connection of all components; originated from another disciplines (i.e. meteorology), the new concept of chaos has strongly influenced many aspects of sociology (see for instance the concept of complexity); the notion of fractal geography, introduced by Mandelbrot, is now applied (along with holonic, hologram etc.) in the analysis of organisational systems, institutions, power, political and social organisms (e.g. subsidiarity, federalism, shamrock and virtual organisation, etc.) and has evident reflections in corporate culture (Pasmore, 1994; McHugh et al., 1995 and many others); of course there is a tight and interactive connection with ecological, biological and environmental thought;
- ***change***; it constitutes the basis of social dynamics; even though in its beginnings, sociology was influenced by a sort of mechanist concept of progress (e.g. the predictable stages based on the development of human knowledge - Comte), society has always been considered as never static; changes occur continuously; they can be slow, gradual, almost imperceptible or fast, shocking, upending, unpredictable, unrelenting, ubiquitous; they can be very broad in range and intensity; they include short-term and long-term, large-scale and small-scale effects, operating at local and global levels (see, for instance, Pasmore, 1994); what it is worth noting is that the nineteenth century correspondence of change with progress has been strongly argued, since change may be positive and/or negative, regressive and/or progressive, constructive and/or destructive; there is, thus, a clear correlation between this concept and those which have emerged from the environmental side in regard to development and growth;.

- ***uncertainty***; it replaces certainty;[39] uncertainty (Giarini and Stahel, 1993) has the meaning of interaction between different options and alternatives;[40] it is the natural home of dialogic principles which bring together complementary or antagonistic assumptions (e.g. conservation, revolution, resistance);[41] is the expression of circularity, feed back, complementary, wholeness, solidarity, subsidiarity, holism, etc.; reality itself is uncertain; as B. Groethuysen was used to say 'To be realist, what a utopia!' (quoted in Morin, 1994); nowadays it is clear that human beings perceive reality as they think of reality; the piece of Pirandello is well known "Così è se vi pare" (reality is what you think it is); in fact, reality is another dialogic concept; the factual reality can be unreal (future change can overturn what was thought to be true); unreality can be real (when what was thought as unreal or false, or maybe the expression of madness, is revealed to be true in later time); moreover, if before attention was focused on certainty of the present and the future, nowadays the name of the future is uncertainty (E. Morin, 1994); of course, the human perception of problems and solutions may improve if humanity becomes more aware of the existence of three times, the present of the past, the present of the present and the present of the future (from the old saying of S. Agostino, quoted in Morin, 1994); again there is a strong relationships between sociological uncertainty and the environmental side of limits, caution, awareness, futurity, recovery of old thought and cultures, perception of what was really unreal (and above all, the certainty of the linear connection between progress, development and growth as a real one); uncertainty derives also from the perception of risk;
- ***risk***; risks and vulnerability are no more limited to individual activity but they potentially spread outside the individual sphere of control, i.e. threatening the survival of humanity or jeopardising large numbers of the population, natural environment, etc.;[42] the above character calls for involving people

39 Giddens (1990) quotes Popper (1962) "all science rests upon shifting sand" and affirms that "In science, *nothing* is certain, and nothing can be proved, even if scientific endeavour provides us with the most dependable information about the world to which we can aspire".

40 To paraphrase Albert Einstein, a problem cannot be solved at the level of thinking at which, and with the same culture by which, it was created or perceived.

41 "*Does it seem paradoxical to be uncertain and positive, to learn how to make up your mind and change it, and to become both rational and intuitive? Yes, but have you noticed that the future is full of paradox?.....Being optimistic about what might happen can change what does happen. Being positive and confident in what you are trying to accomplish lets you relax and, paradoxically, concentrate*" (Gelatt, 1991). "*Hier, nous avions le droit d'etre fatalistes par optimisme; nous devons désormais etre audacieux par pessimisme*" (Minc, 1993).

42 Giddens (1990) defines risk of current society as global in the sense of intensity, of expanding number of contingent events. Risk stems from the created environment, or socialised nature, from humanity itself and it is institutionalised in the life-chances of millions. There is a knowledge gap of risk along with a well-distributed awareness of it, while the vulnerability increases also in *expert systems* that, as a consequence, may not be reliable for prevention of the whole risk.
Giarini and Stahel (1993) ask for a global strategy to cope with a risk which they define as pure, superior to the individual capacity of control and intervention; this kind of risk has also became the economically most significant type and it has overwhelmed and incorporated the conventional entrepreneurial risk.

concerned; in other words, control has to be applied at a local level within a global awareness and action to prevent and react to the risk;

- ***time, space, physical dimension***; the disembedding and re-embedding through differentiation and specialisation of time and space which heavily characterised the modern era (Giddens, 1990) is nowadays gaining new degrees of intensity and meaning; according to E. Morin (1994) we are confronting at least three dimensions micro (e.g. relations person-to-person), meso (e.g. ethnic groups, communities) and macro (e.g. great areas of civilisation and the Planet itself); there is an interactive combination between these dimensions which leads to a new concept of unity based on a complex planetarian constitution of space-time-physical size where all societies can live; this means that different places of the world, different time (archaic, rural, industrial, post-industrial) and different size (small, medium, large) are united;[43] of course this is allowed because of the role of the information technology in opening the intellectual capacity of humanity, and giving to human work and activity a new dimension in respect to the synchronised mechanism between machine and human beings experimented during the industrial era; if this synchronisation was based on both specialisation and velocity, nowadays it possible to become more generalist (utilising machine for specialised work, and by means of expert systems connecting the whole process - Hammer and Champy, 1993) and to decelerate the day-by-day time-flow of humanity by means of the accelerated globalisation of time-space-size; it is evident how the influence of the environmental side of human influences and, in its turn, is influenced by this set of concepts;

- ***knowledge***; all the above mentioned issues show significant cases of conceptual changes, but the destiny of many traditional scientific paradigms is the same, since they are not adequate to understand the current social changes; in other words, they are changing within the changes of our society; while we know what we are going to leave, we do not know what and where we are entering and creating; what seems to be clear is the need for new modes of knowing to analyse, approach, understand the multiplicity of the present and next human condition; in the present transition we should try to understand what is happening, what are the symptoms of change; we need new knowledge that is a continuous process of *learning and taking action* through de-construction and construction, disembedding and embedding, differentiation and similarity, de-connection and connection (Daudi, 1990; Giddens, 1990; and many others already quoted); briefly this means analysing and comparing different situations, cultures and practises, mixing approaches such as those coming from the

[43] The role of virtual reality must be underlined which, by means of sophisticated expert systems, allows the connection between at least three dimensions, space (and place), time and physical dimension.

environmentalist part of humanity, because the post-industrial era requires a cultured person (Drucker, 1993) and a humanity able to express multidimensional cultures and a new civilisation (E. Morin, 1994);

- ***human capital***; sociology introduced a progressive extensive meaning to the role of labour: from workforce and manpower to human resources (e.g. Human Relations Movement, 1920s -1940s), to human capital[44]; development and sustainability are principally a human and social process, which is dynamic and continuous as a result of changes and interventions; it requires the best use of *human capital*, that is the improvement of ability and capacity to: analyse; diagnose; conceive proposals; plan; experiment; implement; evaluate; diffuse solutions; they are not only technical or administrative skills but basically entrepreneurial capacities since they imply risk-taking, problem-solving, negotiation, co-operation, decision-taking, innovation-management, etc.; the meaning of skill is moved from specialisation into acquisition of the habit of learning; the need for new styles of working puts the emphasis on personal and social behaviour; that means acquisition and development of core-knowledge in the ambit of the perception of the global life of the organisation with the appreciation of the need to be flexible, adaptable and capable of using positive uncertainty; these ingredients are requested of individuals as human capital at any level of economic and social organisations; moreover, employment is becoming a mixture of skills depending on the several different activities in which we are progressively or simultaneously involved: a combination of being subordinate and having autonomy; a mixture of employment and self-employment; a combination of dependency culture and entrepreneurial culture; a mixture of phases of employment and unemployment; the industrial age meaning of employment is likely to come to an end (Robertson, 1985); relevant changes in organising work will include many useful activities according to individual and social needs and purposes; in any case work will remain the central human activity requiring vital decision-making skills such as: changing one's mind; keeping the mind open; being responsible and improving oneself autonomy; learning to learn; being a creative entrepreneur of oneself.

All the above concepts are at the base of a very intensive debate which regards the shift from modern to postmodern social theory.[45] From a sociological point of view, it is important to underline that structuralism (e.g. Claude Lévi-Strauss, Althusser, Poulantzas, Godelier, etc.) gave birth to poststructuralism (e.g.

[44] This concept is very comprehensive and refers to society and its organisational systems as vital organisms in which human dimension has a primacy role. Therefore it should not be confused with the human-capital theory, as an extension of A. Smith's wage - profit (and productivity) dissertations.

[45] During the past two decades many scientists argued about the main characters of the transition from the industrial age to a new, yet not very well qualified, age: post-industrial; post-modern; high-modern and so on (e.g. Lyotard, 1985; Daudi, 1990; Giddens, 1990; Giarini e Stahel, 1993; Clegg, 1990; Lash, 1990; Paolucci, 1993; Freitag, 1994; Minc, 1993; Kahn, 1994; Touraine, 1984,1992, 1994).

Derrida, Foucault) as well as the latter influenced the birth of postmodernism. However, if it is true that there is a connection of same kind between them, two groups of theories can be decisively distinguished.

On one side, according to some scientists (e.g. Giddens and Habermas), society can still best be analysed as modern. “Many of the phenomena often labelled as post-modern actually concern the experience of living in a world in which presence and absence mingle in historically novel ways” (Giddens, 1990).

On the other side, other thinkers affirm that society has changed in a very dramatic way and we live in a qualitative different postmodern era. As Ritzer (1996) writes: “... the postmodern encompasses *a new historical epoch, new cultural products*, and *a new type of theorising about the social world*”. Postmodern thinking rejects a universal, ahistorical, rational foundation for the analysis of society, while it prefers to be relativistic and irrational. In other words, it disputes grand - meta - narrative and rationality in general or in sociology - concepts which have fully constituted the basis of modern thinking.

In any case, if Lyotard is one of the most important father of postmodern theories, differentiation can be noticed between moderate postmodernists (e.g. Jameson) and extreme postmodernists (e.g. Baudrillard).

Postmodernism is orientated towards different theoretical perspectives. As Lyotard (1984) affirms “Postmodern knowledge is not simply a tool of authorities; it refines our sensitivity to differences and reinforce our ability to tolerate the incommensurable”. Jameson (1984) underlines that there is “A prodigious expansion of culture throughout the social realm, to the point at which everything in our social life - from economic value and state power to practices and to the very structure of the psyche itself - can be said to have become ‘cultural’ in some original and yet untheorised sense”. The ‘real’ is transformed in pseudo-events, in image or simulacrum in which one cannot distinguish between the original and the copy. One of the Baudrillard’s famous assumptions is that we live in the age of simulation where hyperreality become reality, or even more real than reality. Other writers follow this opinion. For instance, as P. Daudi (1990) writes, real events themselves are uncertain and interest maybe should be focused upon to the representation of these events; reality becomes hyperreality and a chain is created where “the subjective simulates the objective; the representation operates as if it were a concept, and, simultaneously, the concept is reduced to a state of pure representation” (Pecheux, 1982 as quoted by P. Daudi). Positive uncertainty makes it possible to reject the whole idea of disciplinary boundaries (as it is strongly rejected by Baudrillard); this helps creativity to be nourished whatever and wherever the differences can be. In fact, what it is worth noting is that postmodernists are conceiving new ideas and ways of thinking which have important relationships with and are influenced by other disciplines, ways of thinking and cultures. Let us give an example.

Albert Einstein wrote that so far as the laws of mathematics refer to reality they are not certain; and vice versa, that they are certain, so far as they do not refer to reality. This is an unavoidable loop concerning scientific certainty.

More recently Bart Kosko (1993) has elaborated the concepts of *fuzzy* logic (used by Lofti Zadech during the '60s). Fuzzy means soft and like fur, blurred outline and shape, not clearly defined, indistinct and vague. The yin-yang symbol can be assumed as the emblema of fuzzy logic. It represents contradictions and unity of opposites. It is another way of thinking. It is more linked to the Eastern mysticism (from Buddhism up to Mao Tse Tung thinking) than to the Western culture. Nothing is absolute, there is not dichotomy but continuity within an on-going holistic process. There is not rigid logic but flexibility, various point of views at the same time. There is tolerance and dialectics. In the end, one can discover that many arguments concerning the unity of and the connection between concepts often taken into account as different and contrasting (for instance, uncertainty and certainty, chaos and order, simplicity and complexity, and so on) are very new in Western society while are very old in other societies.

Fuzzy logic can be considered as one of the many expressions of postmodern thinking, including in its theoretical shape a high level of openness towards other cultures. In fact, closely tied to postmodernism, another recent development is represented by the rise of multicultural social theory.

Therefore it can be noticed that there is cultural *compassion* in postmodernism more than in modernism. Of course a compassion as it is defined in the Buddhist literature: clear acceptance or recognition of the other, like oneself, the development of concern about the others, irrespective of one's attitude to oneself. In other words, paraphrasing Lyotard, the postmodern thinking looks for a plurality of heterogeneous cultures as a way to improve knowledge, in which science does not have a privileged place.

In conclusion, sociology is an attractive and internally divided discipline. Even though it has a clear theoretical core (study of social life), it has an opaque perimeter with economics, psychology, anthropology and so on. Recently the environmental dimension has appeared also in sociology as an effect of the wide influence of ecology in many other disciplines. It is true that during the 1920s (University of Chicago) *human ecology* made some attempts to see the significance of environment - society interactions, but later the scientist's habit has prevailed to disregard non-social variables. Nowadays an environmental sociology can be build but it risks to limit itself in discipline's boundaries. What it should be always reminded is that even though sociology is clearly a modern science (its beginning is related to industrial more than rural societies), its vital development has been based on a fundamental idea: sociology is a multiple-paradigm science.

Nowadays sociology is interested by many changes since its statutory core is the analysis of social change. Attempts are orientated towards principles of holism and interdependence trying to connect the continuum which exists between macroscopic and microscopic, objective and subjective social dimensions (e.g. sociological metatheorizing as recently developed by Ritzer, 1996). According to Ritzer, “we must remember that in the real world, all these gradually blend into the others as part of the larger social continuum”. This consideration implies also a change from sociological to social theories especially when postmodernism is taken into account.

Within this theoretical context, sociology is nowadays fully aware that while in classical industrial society nature and society were artificially separated, in our time they are deeply intertwined. Social changes affect the natural environment as well as it is true the vice versa: “nature *is* society and society is also *nature*” (Beck, 1992).

This is the most important contribute of ecology to sociology and “it suggests that sociological encounters with the environment will entail basic archaeological work on the assumptions of the discipline, bringing nature into sociological remit ....” and recognising casual powers in nature as well as nature as mediated through social process (Martell, 1994). Very briefly this has been the course of sociology to reconcile itself with nature. It features a typical case of a science, originated in the Western world and within the Western cultures. As already mentioned, difference exits between this area and other parts of our Planet in the ways of thinking but the focus is the same: the essence of life. Just to demonstrate this assumption, let us mention a very old concept. “This essence is not limited only to humans. It is the essential quality which unites all beings - human, animal and plant - with the universe that surrounds them ...” This is the concept of Hinduism which refuses to separate religion from daily life, as well as individual faith from other great faith tradition of the world and “all religions are part of the process of discovering the unity of God, humanity and nature” (Ranchor Prime, 1994).

2.8 Two transversal principles concerning sustainable development

Up to now, a tentative analysis has been made of some specific contributions to SD coming from different areas of disciplines. Two principles assume, however, a transversal meaning and role:

- ***inter-temporal principle***; this important concept especially relates to futurity (or posterity); equity as a principle to be realised among generations calls for society to operate on a different time scale than that which is currently used in the economy; to assure SD longer term planning needs to

be adopted to consider the impact on the welfare of future generations; the principle of posterity needs to become a value which encourages society (in all its components such as population, government, institution, business, etc.) to develop a vision of what it must do to be sustainable; policy (at every level) needs to be proactive rather than reactive, recognising that the environment is a dynamic entity and force for human progress; the inter-temporal principle is also related to the past, since resources represent the stock of natural reserves and deposits which were accumulated over a very long timescale; utilising them now, society also exploits the time which was incorporated from the beginning of their transformation in natural reserves (e.g. a minute burning of a litre of petrol destroys a dynamic process which lasted maybe millions of years and this ratio of time is huge); the meaning of inheritance can be fully recognised considering both the past and the future of a patrimony that a generation borrows from the next one; and in this relationship (past, present, future) human cultures express their wisdom in dealing with the scarcity, utilisation of resources, their depletion and needs as an individual and collective demand for a better standard of living;[46]

- ***inter-regional principle***; environmental dynamics do not have boundaries; no country can see itself as separated from the general performance of nature; nowadays this is also true in the economy and society (globalisation of markets, institutions, styles of life, cultures); everything is connected; diversities are mixed; both local and global are relevant and simultaneous in this ambit, local is a strong point of reference for SD since "a sustainable community lives in harmony with its local environment and does not cause damage to distant environments or other communities - now or in the future. Quality of life and the interests of future generations are valued above immediate material consumption and economic growth";[47] the local dimension represents the focal point for channelling energies in view of managing innovation, diversification and integration, as they are very important bases for sustainable development; innovation is not only the capacity to invent and research but also the capacity to implement new modes of social life (OECD, 1993); innovation concerns not only what to do (e.g. products, services, etc.) but how to do it well (e.g. processes, markets, organisations, etc.); diversification means an increase in the variety of products, behaviours, ways of life; diversification is one important source of innovation; local economies can contribute to multiplying sustainable

[46] Welford (1995) quotes that the "Iroquois Indians of North America had a seven-generation planning horizon; they tried to predict the effects of their decisions for the next seven generations to follow".

[47] From IUCN, UNEP, WWF's *Caring for the Earth* reported in Macgillivray, 1995.

development and employment initiatives[48] if they improve their basic quality (diversification) through a more open attitude to innovation, change, connecting what happens here and there, now, yesterday, tomorrow; moreover regional environmental management system (REMS), regionalism and bioregionalism constitute a combination that changes the horizon of planning and programming requiring a shift from centralised policies to federalism and subsidiarity, empowering democracy, co-operation, networking, partnership and people participation, asking for holistic and synergetic methods which assume the importance of diversity and unity, limits and well-being (Welford, 1995).

2.9 The contribution of planning and programming theories to the concept of regional sustainable development

As highlighted above, temporal and spatial dimensions have an important role to play in planning. For instance, Basiago (1995) quotes some writers (Millichap, Carlthorpe, Berkebile, McDonough), to clarify what can be the planning methods of defining sustainability. The methods analysed refer especially to spatial planning, but from them re-emerge the principles of futurity and global environment, in which "biodiversity would be improved by returning land to natural habitat". Designers have "to insist on the rights of humanity and nature to coexist in a healthy, supportive, diverse, and sustainable condition". Therefore "planners define 'sustainability' in terms of settlement patterns that will allow civilisation to survive and even thrive. In their work, 'sustainability' is reduced to a theory of urbanisation".[49]

To sum up, SD involves globalisation and localisation (glocacity) as a process of world-wide interdependence, improving local initiatives, local actors and commitments to cope with, anticipate, and manage change, being aware of the new dimension of risk. All these principles call for flexible management to cope with micro and macroeconomic factors. Therefore, SD requires profound changes in policy and its implementation. According J. Karas (1995), SD requires a number of new dimensions to be introduced into programming and planning:

[48] The very rich empirical and theoretical path started in the mid 80s at European (EU) and international level (OECD) should be remembered (F. Strati, 1987; A. and F. Strati, 1990); it regards the so called LEIs (local employment initiatives) or LDEIs (local development and employment initiatives); at these levels specific programmes were managed (e.g. LEED - OECD; LEDA - EU); these approaches started also with the help of the knowledge accumulated through experiences and initiatives concerning the underdeveloped countries by UN's organisms and NGOs organisations. An important role is given to the creation and the training of the so-called local development agents, change agents, sustainable development agents. Moreover, EU structural funds and programmes related in a great amount to the concept of regional and local context.

[49] In this an indirect influence can be found coming from both urban sociology and urban ecology.

- a shift in focus; away from demand-led planning towards addressing its ultimate ends in the reconciliation between environment and development;
- an integrated approach, as the interactions between policies in different sectors, calling for “a more holistic view in which environmental considerations are given weight in social and economic policies - and vice versa;
- trade-offs, determined by the already mentioned principles of sustainability, in targets, timescale, spatial scale, powers, roles, competencies and responsibility.

The concept of governance, as a catalyst and facilitator of change, is therefore of extreme importance. As Osborne and Gaebler (1992) writes “entrepreneurial governments have begun to shift to systems that separate policy decisions (steering) from service delivery (rowing) ... Steering requires people who see the entire universe of issues and possibilities and can balance competing demands for resources. Rowing requires people who focus intently on one mission and perform it well”. Therefore all organisational principles already examined before have to be re-embedded in the concept of governance: lean and learning; no-hierarchical and participatory; federated and virtual; networked and open; etc. To paraphrase Osborne and Gaebler, regional environmental programming is a strategic thinking process with basic steps:

- *analysis* of the situation, both local and global;
- *diagnosis*, that is identification of the key issues facing the interdependence between the environment and the economy (*Eco*nomics);
- definition of the *programming environmental basic mission*;
- articulation of the basic *goals* of the organisational systems involved;
- creation of a *holistic vision* of the entire process results-oriented;
- development of a *strategy* to realise the vision, the missions and the objectives;
- development of a *timetable* for that strategy;
- measurement and evaluation of *results*, *ex-ante*, *in-progress* and *ex-post*.

Regional programming is a process that concerns many policies according to the responsibilities (and power) shared between State, Regional and local authorities. Indeed regional programming is not only a formally ruled process but a very socially complex process composed of:

- the collective agencies, i.e. the institutions, interest groups, economic and social organisations, political groups and parties;

- the courses of action adopted by the collective agencies to deal with problems, chosen areas of their application, their objectives and their expectations;
- the relationships between the collective agencies, the courses of action decided upon and their recipient subjects;
- the supporting measures by which these courses of action will be implemented.

Nowadays regional programming requires a creative decision-making process, an unconventional wisdom as a combination of rationality and imagination based on:

- an experimental and flexible approach in which local areas (communities, sectors, etc.) operate as learning organisations;
- more exploration, learning by doing, learning from experience, learning to learn, proceeding step by step, making adjustments, taking into account the complex nature of problems and uncertainty (e.g. unpredictable behaviour of markets, actors, etc.).

In other words, regional development is a socially complex process through which ***local actors*** conceive and implement ***innovative courses of actions*** based on a synergetic utilisation of endogenous resources, to foster employment by means of the diffusion of entrepreneurial culture.

Regional development can become sustainable.

Components of regional development	**Regional development may become sustainable if the concept of sustainability becomes:**
local actors express themselves in collective agencies, i.e. the institutions and the interest groups (economic and social organisations, political groups and parties)	the core *aims* of local actors in their visions and missions (ethics)
courses of action are policies and initiatives adopted by the collective agencies to deal with problems; they are targeted to specific recipient subjects, areas of application, objectives	the ***guiding principle*** of the courses of action (policies and initiatives)

Components of regional development	Regional development may become sustainable if the concept of sustainability becomes:
courses of action are ***innovative*** when they are based on a synergetic utilisation of endogenous resources; in other terms, when resources are utilised in holistic ways and ***supporting missions*** exist both among the actors (i.e. networking, partnership) and within legal, organisational, procedural and financial measures	the ***symbolic representation*** of the content and values of organisational culture and of diffuse entrepreneurism (*supporting missions*)
endogenous resources are human, economic, environmental, technological	a ***guiding aim*** to a synergetic utilisation of all the endogenous resources; one of the ***leading topics*** of educational and training culture to improve the quality of human capital (local actors)
the courses of action result in social facts which can be depicted by the ***interactions between economic activities, employment, environment***; they represent the ways of acting from the members of a collectivity in order to improve their social and economic life; this depends upon the local knowledge, know-how, initiative, entrepreneurial culture and attitude	***explicit*** in social facts; in other terms clues exist in favour of a development that meets the needs of the present without compromising the ability of future generations to meet their own needs

2.10 The contribution of ethics to the concept of sustainable development

If social structure is composed of “systems of social relations and system meanings” (Hays, 1994), morality is a practice “negotiated between learning agents capable of growth on the one hand and a culture capable of change on the other” (Wolfe, 1989). Therefore it is this moral capacity (closely tied to culture) of human beings that make it possible to form society. Ethics is the moral code as a set of mutually coherent precepts that ought to be obeyed by any moral person (Bauman, 1993).

In the modern era, morality, by means of ethics, has been assumed as universalizable and rational.

Nowadays postmodernists assume other points of view. According to Bauman (1993): universalisation may take the form of substitution of the autonomous responsibility of the moral self (thus, it means nothing less than the incapacitation, even destruction, of the moral self); and morality is and remains irrational; thus “morality can be ‘rationalised’ only at the cost of self-denial and self-attrition”. The conclusion is that the social management of ethics is complex and includes more ambivalence than what it tries to eliminate. In other words, the postmodern perspective makes it evident the relativity of ethical codes and moral practices they recommend or support as social, universal and rational order. The many times cited examples of the Holocaust and other types of genocide are utilised to demonstrate as rationality and universalisation based on the concept of social order create only the destruction of societies and cultures. They show how ethics can substitute morality, to the extent that a code substitutes the moral self, and heteronomy substitutes autonomy. Therefore “the frustration of certainty” - or, in other words, the existence of uncertainty - is morality’s gain (again Bauman).

Other writers underline how cultural and ethical relativity merges one another. “Cultures are unique particulars which can be analysed and appreciated but not compared”; they moves in the field of complexity and instability. Again *nature*, as studied by biology and ecology, helps to understand how an organism (like society) can be based on autonomies which are connected and interrelated; in other words how it can be holistic and fractal, holonic etc. According to these concepts, there is a syllogism which can be briefly expressed as follows: “Ethics is a cultural phenomenon; culture is relative; therefore ethics is relative” (Edel, 1995). Cultural diversity becomes particularly important when nature is incorporated in society (see above - Beck, 1992). In fact “If no human culture holds the key to ecological wisdom, then it is essential to conserve the greatest possible number of ways of interacting with the environment if we are to maximise the chances of survival, both of our own species and those with which we share the planet” (Milton, 1996). Therefore, paraphrasing the above mentioned writes, an ethics of sustainability will clearly be constituted by means of a fusion of

universal principles and local moralities; and, given that ethics depends on culture, it can be evaluated for its contribution to the growth of knowledge of humankind in its adherence to the other living organisms and the nature as a whole. “This does not mean that ‘Science give us values’. Science does not create values, only men create values. Science does not give us virtues, only men grow values. Science does not give us goals, but men use their knowledge to broaden and refine and increasingly to achieve their human aims. And they use their growing knowledge of themselves to work out what their aims are and to distinguish increasingly the spurious from the genuine. A full scientific understanding thus moulds their way of looking at the world. They see themselves at every point as active creators out of the past and into the future” (Edel, 1995).

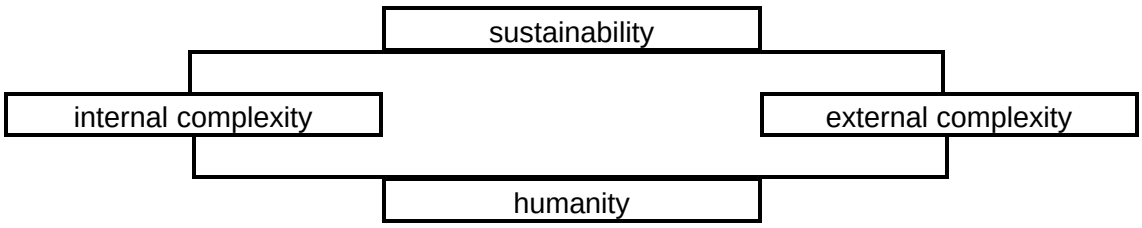
Generally, all the writers of the environmental and ecological side of current thought underline the strong role that ethics has to play in sustainability. Basiago (1995) writes of it pointing out that it implies a choice between a philosophical revolution (giving the environment unprecedented standing) and the status quo (mere substitutability of resources).

In this search for a new ethics, many of the above writers try to define a paradigm of sustainability in which essential components are those have been analysed up to now, especially: futurity, equity, global environmentalism, glocacity, biodiversity.

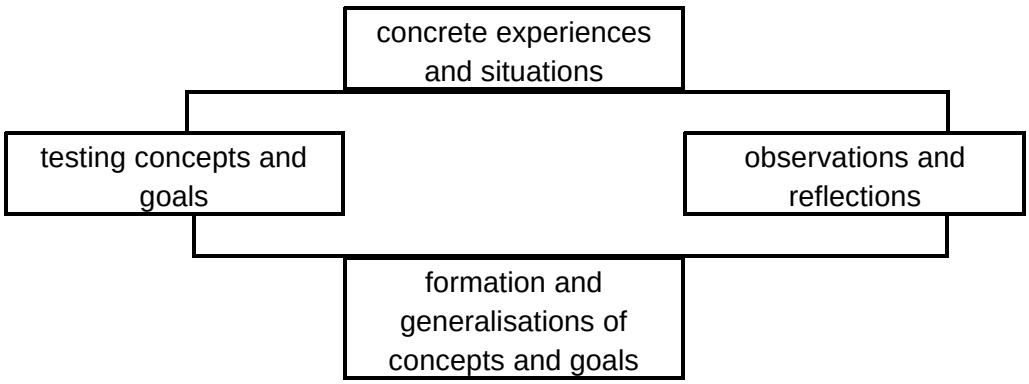
As a result, the concept of SD has multiple meanings and, as P. Samson (1995) writes, they are all equally legitimate: “multiple views of sustainable development are not only equally legitimate, but absolutely necessary to the health of the debate. Sustainable development can be successfully implemented only if each view makes its unique contribution to the solution. Since each represents only a part-truth, there is no single solution to a given environmental problem. In other words, sustainable development strategies cannot be attained through the dominance of a single view or by the exclusion of others; instead they require continual evolution and balance”.

To sum up, the concept of SD is nowadays a sort of container of multiple meanings, depending upon the discipline, the point of view, the context (where = space and place) and the time dimension (when = past, present and future) taken into account. All these meanings are useful and have the same right to take part in the debate, because the issues of SD have implications which will be understood if a way of thinking emerges which is orientated to the following principles:

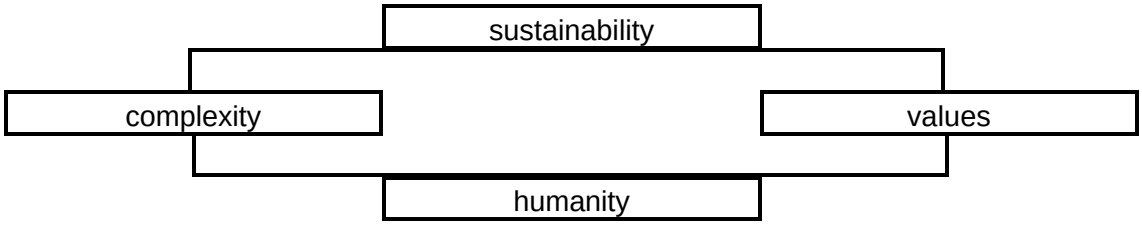
- **opening** of the concept, since, as an humankind intellectual product, SD has a correlation between intra-complexity and inter-complexity;



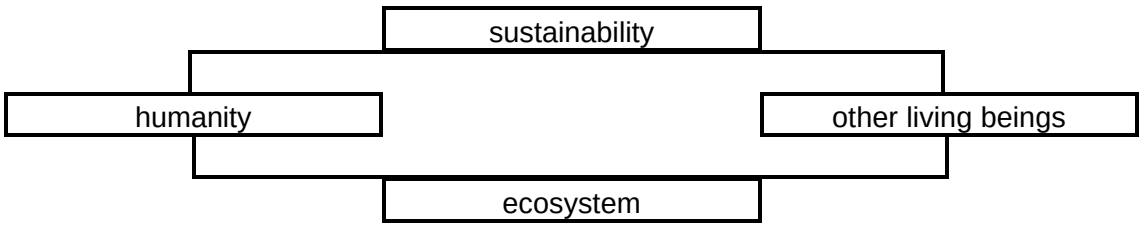
- **continuous learning**, because as a half old half new concept it is necessary to start from concrete experiences; making observations and reflections; forming and testing concepts, methodologies, guidelines; making inferences and drawing conclusions; implementing those conclusions; beginning another experiential learning cycle;



- **vision and missions**, because SD requires a set of values to be shared by people concerned;



- **users**, because humanity and all living beings are involved in the process of SD;



- **markets**, because SD regards all the world and the global and local interdependencies between economies, societies, cultures and knowledge;
- **results**, because SD requires a network of initiatives, policies, decisions and actions which should be continuously monitored and evaluated, improving appropriate methodological tools (Kahn, 1995).

The above principles help a holistic way of thinking to be promoted towards SD. They can contribute to the growth of human knowledge by means of the reconciliation between *ethos* (based on vision and mission), *logos* (constituted by the conceptual opening, the continuous cycle of learning and the monitoring of the result) and *pathos* (the aesthetic appeal of value-adding as they are perceived by users and markets).

But an overall meaning of sustainability has to be considered.

Sustainability is the concept which nowadays best represents the change in long term thinking, i.e. the strategic thinking of the current historical time.

Long term thinking characterises humanity in all fields: intellectual activity, manual activity, religion, science, economics, culture, ethics, philosophy, policy, etc.

In other ages, the way of thinking changed when consistent parts of these fields reached the critical mass in which the old ones decline and the new ones were so diffused to become, abruptly, catalysts of new perspectives and horizons.

This phenomenon is nowadays happening again and maybe aspects, elements and pieces coming from different areas and fields of the human activities and societies will reach a point in which they will be combined in a new dynamic puzzle, in a sort of patchwork, from which a new statute of thinking will start.

This means that concepts will be clearer than now and will give a theoretical certainty of what the future should be and how to construct it for the sake of humanity.

These new concepts will appear clearer and more accessible and will form a vision which will be progressively developed and shared by million and million of people.

For instance the modern era, followed by the industrial revolution, represented a progression in respect to previous periods. In both of them (the modern and the

previous period) there were positive and negative sides. They were expressions of the natural cycle of life and together they determined a very consistent change in civilisation. The fundamental vision was based on the unity of three different meanings: freedom, equality and brotherhood. They were different because, freedom can act against equality and brotherhood as each of them can act against the others. They were united to act as a dialectic combination.

Sustainability seems to represent one of the new points of reference for a new vision. In fact sustainability is creating a shift: from equality to equity; from freedom to subsidiarity; from brotherhood to solidarity. These principles can be seen as basic values of a new Constitutional pact within various social dimensions and levels, but only human beings can write their Constitutional pact. It depends on the actors, on their perception of the new values, on their culture, on the degree in which these values are shared among and within the international, national, regional and local social communities.

In other words sustainability is a concept that appears more and more as one of the symbols of the current transition from the age of industry and modernity to another era. The century that humanity is leaving was called the age of the extremes by Hobsbawm (1994). The last part of the century was named the age of paradox by Handy (1994).

All these ways call for a very interesting period of the world history having in common rich dynamics in many fields; dynamics open to seek new solutions to old problems. What is certain is that only a new shared strong vision can introduce an age of wisdom, a new planetarian civilisation (E. Morin, 1994).

In other words, sustainability can be understood as a methodological way to affirm the vision of a new civilisation.

This new civilisation is closely tied to moral responsibility as the most personal and inalienable human property, which is unconditional and infinite, and acts individually, collectively and globally. The postmodern mind is more aware than the modern mind of risks, doubts, uncertainty and so on. This is what Bauman (1993) underlines when he writes that the “postmodern perspective offers more wisdom”. A wisdom based on the awareness that “there are problems in human and social life with no good solutions, twisted trajectories that cannot be straightened up, ambivalence ...., doubts which cannot be legislated out of experience, moral agonies which no reason-dictated recipes can soothe. The postmodern mind does not expect any more to find the all-embracing, total and ultimate formula of life without ambiguity, risk, danger and error, and is deeply suspicious of any voice that promises otherwise”.

3 Regional Development - Theory and Policy[50] *(Alain Thierstein and Manfred Walser, SIASR)*

3.1 Introduction

All the major changes, issues and debates that are of interest in the area of regional development today are very much related to a long term process whose parameters, structure and implications we do not yet understand well (Suarez-Villa 1991). Long term structural change has an economic, social and political component. The transformation process is made up by various sub-processes which interact and thereby change our lifestyles (Castells 1995). Although ultimate causes are hard to isolate, there are two distinctive lines of development that are interlinked and interact permanently: technological and organizational change.

First it is technological change with all its derivatives like inventions, new products, new processes. Information and communications technologies today shape production, labour, distribution, social interactions, patterns of time and consumption as well as values toward the material side of life. The second stream of structural change encompass the organizational structure and modes of the society: the socio-political and economic fabric. Characteristic is a permanent widening of spatial references: from near to far, from local to global, from centralized to decentralized, from regional trade to global free trade agreements. Internationalization means a widened fabric of economic, political and individual interrelations, which are promoted by media and technologies.

Underlying both lines of structural development are two tendencies. Internationalization is parallel or followed by regionalisation of politico-economic processes and of socio-cultural needs. Regionalisation can be interpreted as a counter-movement that is fed by the need for clarity and the need to regain power to shape one's own future. Second, the continuum of internationalization and regionalisation opens up a growing variety of behavioural and organizational modes. The increase in potentials to make own decisions, at the same time goes hand in hand with growing demands in decision-making power. Growing chances

[50] This paper is meant to give a short introduction into the broad topic of regional development. Therefore it does not cover the full range of topics in the discussion of regional development. Questions about instruments, implementation and evaluation are not treated.

are opposed by growing responsibility and an increase in uncertainty of decisions. Therefore politics have to look for a framework which leaves open to individuals a maximum of freedom to choose.

3.2 Economic theories of regional development

For a long time the main focus of regional development was on economic factors of development and therefore on spatial and regional economic theories. Problems of living conditions were regarded as problems of the individual and treated by social policies. Up to this moment regional development policies still have a strong economic bias.

3.2.1 Significance of spatial and regional economic theory

In spatial and regional economic theory there are two distinctive lines of scientific argumentation, the one coming from geography, the other from economics.

In the early 20th century theories in geography were elaborated from the assumption, that human economic activities are determinated by nature (Lütgens 1921). Later, the interaction between man and nature was acknowledged (Kraus 1957). Today the spatial pattern of the economy is regarded as a result of the activities of economic subjects. The influence of nature is mostly reduced to economic costs for natural resources or environmental protection. The significance of landscape has changed from a sheer geographical point of view to the perception of a landscape re-designed through economic activities. At least the economic space has become a social system. At the same time a methodological change has occurred: Economic geography slowly becomes a discipline which deals with theoretical models and uses tools and models known by social sciences (see Schätzl 1992).

Economic theories on the other hand examine the interaction of economy and society under the condition of scarce resources. These theories work at best with an idealized model of space. Classical economics started with axiomatic theorems and developed the whole system of economic science with the help of a deductional methodology. At the same time ‘space’, social factors and the physical geography became eliminated as production factors (see Schätzl 1992; Harrison 1992). Today the different theories of spatial economies can be divided in three types:

- theories of location, including both the choice of a single firm or household and the optimal structure of locations,

- theories of spatial mobility, causes and effects of the mobility of production factors, of goods and services and
- theories on regional growth and development, including the socio-economic development of a single region, interregional differences of development and the dynamics of structural change in a region.

Between the two general lines of theoretical reasoning, there are many points of contacts and overlappings. There are still a lot of differences in how the two approaches explain regional development as an interaction between economy, territory and society. Generally, there are three areas in which a paradigmatic change of the main explanatory factors for regional development can be observed:

- theories which shift from exogenous to endogenous explanations,
- theories which shift from a locational focus to a focus of development,
- theories which shift from an approach oriented towards production factors to an interactive approach, involving institutions and regional actors.

3.2.2 A short chronology of regional development theories

Today, theories of regional and spatial development draw from many disciplinary backgrounds. The earliest contributions date back to the turn of the century. Although there is a chronological path in regional developing theories, more revealing insights follow the detection of paradigmatic changes, which happened along this chronological developing path. On the following pages the main strands of argumentation in regional development theories will be summarized. Second, three paradigmatic changes will be explained with the help of specific lines of discussion in regional economic theory. A synopsis (annex I) shows the classification of important theories and models in the three areas. Some main topics in the recent discussion on regional development will conclude the section.

Regional and spatial development theories, as far as they draw on economic and geographic science, go back to the turn of the century. Two fundamental strands of argumentation can be observed: theories of regional development and regional growth, which center around the factor ‘time’, whereas theories of location focus on the factor ‘space’.

Regional growth theories implicitly put the factor ‘time’ center stage. They are based mainly on neoclassical and (post)keynesian economics, indirectly on classical economics (Physiocrats, J.S.Mill, Ricardo). One sub-strand of reasoning applied neoclassical mechanics to the ‘case’ of regions and thus became regional growth models (e.g. Borts, Stein, Richardson, Siebert). They are in essence supply- and bottleneck-oriented, in so far that they focus on bottlenecks in the supply of production factors. On the contrary, post-keynesian models focus on

demand-side bottlenecks, like aggregate regional demand and export-based development (Duesenberry, North). Further theoretical development led to theories of regional endogenous development, stemming from the (political) discussion on the North-South relation and to New Growth theories (Romer, Rebelo, Krugman). These latter theories are still on firm neoclassical grounds but endogenize the most important technical change and stress the importance of human capital. A second sub-strand of regional growth theories center around the notion of polarization. Sectoral (Perroux), regional (Myrdal, Hirschman) polarization and center-periphery models (Prebisch, Friedman) led to regional growth pole models which eventually grew into the concept of technopoles.

The second crucial strand centred on the factor 'space'. Locational and migration theories can be structured into micro and macro models. The former developed at the end of the last century on questions of location choice of companies (Launhardt, Weber) and industrial districts (Marshall). The macro models of location focused on the optimum distribution in space of agricultural activities (von Thünen), industry (Loesch) and services (Christaller). Later on, theories on urbanization (Jacobs) and locational economies gained in importance. This led to the discussion of 'Third Italy' and the concept of flexible specialization and economies of agglomeration. Finally the enterpreneurial perspective of Schumpeter regained ground and linked micro behaviour with regional and institutional settings (Johannisson).

In parallel to regional development and locational theories, there was all along the last hundred years or so an attempt to merge the 'time'-centred and the 'space'-centred approach to an integrated and dynamic view of economic and societal development. Starting from Long Wave Theories (Kondratieff, Mensch, Kleinknecht), from Schumpeter's 'creative destruction' and innovation cycles up to the regionalised 'product life cycle' hypothesis, the network and innovative milieu approach (Hakansson, Camagni, Maillat) and the National Systems of Innovation (Porter, Freeman, Lundvall).

The current picture show a vast variety of approaches, hypotheses, schools and often contradicting perspectives. In general they all draw from different scientific disciplines, like economics, geography, political science, sociology and psychology. The most interesting conclusions do not come from this more or less chronological account of development theories, but from 'cutting across' and identifying three changes of theoretical and practical focus.

3.2.3 Three paradigmatic changes in theories of regional development (RD)

Three main changes of thoughts in regional development theories can be identified and therefore termed 'paradigmatic' (see annex I for an overview).

3.2.3.1 From exogenous to endogenous approaches

The paradigmatic change from exogenous to endogenous approaches demonstrates the change in the significance of ‘space’ as a resource in regional economics. Space in classical economics was only seen as a ‘container’ for economic relations. Quality and development of a regional economy was described in terms of interaction with the outside world. The characteristics of the container were seen as less important. The models allowed only a restricted interpretation of reality: they were not able to explain why comparable regions developed differently. Step by step the specific qualities of space were discovered and developed. This change can be demonstrated on the basis of different center-periphery-models (see Hahne/von Stackelberg 1994):

Prebisch (1959) developed his model as a sheer economic argumentation. He started with the mobility of goods on the basis of comparative cost-advantages. Regional differences in demand and in technological progress are responsible for structural disparities between center and periphery. Therefore the deterioration of the terms of trade leads to the transfer of income in real terms from the periphery to the center.

In contrast to this argumentation, Friedman (1973) took into consideration not only economical, but also sociological, psychological and political criteria. Human activities and social interactions are interlinked and dependent from their spatial context and therefore has an influence on space in return. Development is seen as a discontinuous, cumulative process of innovations leading to clusters especially in urban areas. Structural disparities are a result of hierarchy, authority, self-assurance and decision-making power.

From this argumentation a direct path leads to the ‘concept of embeddedness’ (Granovetter 1985), which refers to the regional and local level of economic development.

Recently, neoclassical economics have undertaken the project to develop a New Growth Theory (Romer 1990; Krugman 1991; Cheshire, Carbonaro 1996). External economies and increasing returns of production are introduced in the growth model. Research and development, innovation and human capital become endogenous determinants for regional growth. All this implies that regions have a certain potential to build up agglomerative effects which finally could lead to circular-cumulative growth.

3.2.3.2 From location to development approaches

The paradigmatic change from a location-oriented towards a development-oriented approach can be labelled as a change in the focus of interest. Theories of location since Weber (1909), Predöhl (1925) and Christaller (1933) have been

committed to either the conditions of location of a single firm or household or to the optimal spatial structure of all economic activities within a national economy.

Important elements of analysis are traditional factors of production and distribution: labour, raw materials, transport infrastructure, factors of agglomeration and so on. For identifying the impact of a single factor it was necessary to work with simplified models. If a model was to function accurately, the assumptions had to be even further restricted. Therefore a lot of aspects of reality were left out of account - for example the quality of a specific territory, behavioural preferences of the economic subjects, the political determination of spatial distribution, the level of economic development in historical comparison and others (see Schätzl 1992).

Searching for more empirical or practical relevance, various modifications have been introduced. Pred (1967) for example incorporated behavioural aspects of decision-making in the locational theories and thus left the deductive approach. The necessity of the entrepreneur's noticing and using new information became crucial for the quality of economic development. In this reflection not only a new explanatory factor has been added, but a step from static to dynamic theory was made as well: 'Time' as an independent variable has been introduced through the ability of the entrepreneur to learn from mistakes or to imitate other entrepreneurs. The theory moved from a timeless, territorialized model to a model which includes the dimension of development.

In a further step, Richardson (1973) constructed a model of regional growth that emphasized the role of agglomeration economies, locational preferences and locational constants (see Richardson 1978). From here, only a few steps lead to theories of urbanization and regional clusters (Lasuén 1973) and the theory of industrial districts (Piore/Sabel 1984).

Finally, Krugman (1991, 1994) developed a synthesis of ideas from location theory and uneven development theory by linking external, pecuniary economies and regional industrial agglomeration with interregional and international trade. Thereby he acknowledges that regional economic development is a historical, path-dependent process, that is to say: history matters.

3.2.3.3 From factor-oriented approaches to approaches focussing on regional actors

A very good example for the paradigmatic change from factor-oriented theories to approaches which focus on regional actors and institutions is the literature on industrial districts that came from classical theories centred on agglomeration (see Harrison 1992).

The neoclassical analytical categories to describe the advantages of clustering and concentration - first formulated by Alfred Marshall with his 'factory without

walls' - are factors of production. The analysis of the concentration of economic activities is devoted to economies of scale and the unit costs of production. The benefits of a pool of common factors of production - land, labour, capital, energy, sewage and transportation are seen as important. If many producers share access, the pool expands and therefore attracts a great variety of economic activities. In this way, the pool achieves a 'critical mass' in the end. The theory of agglomeration describes a cluster, which confers on firms a variety of external economies related to location (like Ricardo's idea of comparative advantages). However, there was no explanation why such agglomerations grow and expand.

A further approach combined Schumpeter's theory on innovation and the fact of rapid growing locations. However, Perroux' (1955) 'growth poles' referred to economic sectors rather than to regions which were later focussed by Myrdal (1957) and Hirschman (1958). The critique of the concentration on economic factors went as this: what matters to a locale is not the specific set of industries in a location but the ability of leading firms to react to changes in structural conditions. Such structural changes could be for example the turning away from product standardization and the heterogeneity and uncertainty of market demands. Nevertheless, these models brought an element of cooperation into the discussion. This continued development of Marshalls 'industrial atmosphere' is rather connected with the characteristics of a specific place than the sheer concentration on economic factors.

The theory of industrial districts is territorialized (first by Piore & Sabel 1984) because it stresses network relations, which in turn require a specific kind of local (economic) culture.

The qualitative and important element of this model is the territory-specific 'web of external economies and diseconomies, of joint and associated costs, of historical and cultural vestiges and the social embeddedness', in which the inter-firm and intercultural relationships are woven (Becattini 1989, see Harrison 1992). Out of this point, theories of innovative milieus and networks started ten to fifteen years ago.

3.3 Shifts in regional policy and regional planning

Theories of regional development focus not only the economic perspective. Confronted with the imperfection of markets, political intervention becomes a necessary, though debated principle.

3.3.1 Regional economic policy

Regional policy today is facing a variety of challenges and problems. This has not always be the same. In the late 70s, Richardson (1978) described three challenges for economic policies by summing up different authors and various empirical findings: migration and regional development, efficiency and equity,

The conflicts between *migration and regional development* is a main argument to justify regional economic policy. The discussion is related to the argument of prosperity of locations versus prosperity of people. Subsidizing outmigration is thought to be the most cost-effective way of helping the poor in backward regions. On the other hand it is most unpopular and could have negative long-term consequences for both, the rich and the poor area. The promotion of economic activities in less developed regions can be justified in terms of equity as well as in terms of efficiency: it is possible that regional policies stimulate agglomeration economies in peripheral regions. Likewise it might be efficient for a firm to take advantage of public investments in such regions, especially if sought-after qualities of infrastructure and labour is offered. Leveling out ecological divergences is another aspect of promoting regional policy: Financial compensation can help to revaluate the environmental quality in densely populated locations. But the costs to implement a policy of interregional diffusion or compensation may be very high if not seen in a long-term perspective.

In the European culture, equity of living conditions is at the core of regional policies. There are two problems connected to the principles of *efficiency and equity*. First, measuring equity by the average income per capita has several defects. Secondly, efficiency is an ambiguous concept when for example environmental quality and other externalities are neglected at the same time. Still, it may be possible to satisfy both when only concentrating on the use of existing resources. Different authors (Higgins, Stöhr & Tödtling, etc.) therefore argue out of an economic viewpoint for supporting regional policies. Their proposals range from a strategy to narrow regional gaps to strategies of ‘selective spatial closure’. To sum up, it is possible to generate efficiency in regional equity strategies if efficiency is seen as a long-term strategy including social and ecological externalities.

The concept of growth poles as an operational regional planning instrument is either said to be ineffective or is compromised by ideology. All too often policy makers expect results too soon and therefore they change the course of policy prematurely. Growth poles can be centres of attraction or centres of diffusion. In the first phase the spatial concentration of economic activities in an urban center of a less developed region will probably promote polarization. Such initial drain effects may have to be part of the short-time price to be paid for eventual success. Such success can be seen if diffusion to and linkages with the backward region can be expected. Above all the temporal horizon is a problem of political legitimacy. In some cases growth poles can be complemented by rural strategies

like delivering basic services and an attractive range of infrastructure. Such a dual combination may determine whether the population of the hinterland stays put or begins to migrate.

Bearing Richardson's account in mind, one can paint an idealized mode of development stages in regional policies since Second World War. These stages can be traced - one way or the other - in all highly industrialized western countries, although some older type policies still are in vigour or are regaining prominence in times of economic recession.

3.3.2 Stages of development in regional policies

During the unprecedented economic take off after the Second World War, to be more precise in the early 50s, regional policies did hardly not exist. Macroeconomic (global) economic policies tried to secure efficient allocation of still scarce resources according to their marginal rate of return. The main focus in this first stage, following a neoclassical approach, was to spur spatial mobility of resources. After this *mobility-oriented approach* towards regional policy, it became evident, that regional disparities did not decrease but increase, and that peripheral and structurally disadvantaged regions have to be helped by improving their infrastructure. So the next stage centred on a *location-oriented approach*, with emphasis on subsidizing physical infrastructures like roads, ports, energy, education or culture in less advantageous regions. The macroeconomic shock, following the First Oil Crisis 1974/1975, shifted public concern towards the labour market. *Employment-oriented regional policy* thus was at center stage. Still, subsidizing labour and infrastructure did not decrease regional disparities enough. It became evident that regional development was more than just a recombination of cheap production factors. Quality, interaction and interconnectedness were acknowledged as being key factors for a long-term regional future. *Innovation-oriented regional policy* then was the next stage in 'policy-fashion'. But all the economic potential and wealth in the world will not help, if the environment suffers. 'Limits to growth' finally had an impact on regional policy and gentle initiatives to formulate an *'internalization-oriented' regional policy* sprung up. Incorporating ecological aspects and various policy instruments ranging from regulation to economic incentives eventually led to an comprehensive view of regional development: *integrated regional policy* recognizes, that it takes an approach that cuts across traditional sectoral policies. Integrated regional policy thus encompasses not only regional policy in the strict sense, but also other spatially relevant policy fields like regional planning, environment, fiscal policy, innovation and technology policy. This 'holistic' approach marks also the latest stage in the conceptual debate on regional policy.

3.4 Key topics in the recent discussion on regional development

The first part of the paper gave a review on important theories, concepts and models of regional development. The second part will deal with key topics of the recent discussion on regional development. Key topics often appear as buzzwords in scientific journals, lectures or conferences. Such keywords include: innovation, management, spillover, ecology, subsidiarity and federalism, guidelines and leading goals, network and milieu, cooperation, and so on. Though very broad in semantics, they are all centred around the notion of regionalised development.

Regional development is debated along two scientific lines: an economic and a political focus.

3.4.1 The economic focus

Even though the increasing intensity of global trade and investment flows increased, national specifities in terms of products traded and technologies produced could evolve: in certain aspects, territorially integration did not lead to similarity, but to specialization as a form of regionalisation. The region might be a fundamental basis of economic and social life 'after mass production'.

The indicator of such a development is the emergence of new successful forms of production in some regions but not in others. The successful regions seem to involve both: institutional and technological localization and regional differences and specificities. Therefore a change of perspectives occurred that linked late twentieth century capitalism, regionalism and regionalisation in a new way. The role of the region, in short, is that of a locus of 'untraded interdependencies' as a kind of cooperation between actors. The untraded interdependencies generate region-specific material and non-material assets in production way beyond the hard 'productions systems' orientation. These assets are the central form of scarcity in contemporary capitalism, with its fantastic capacity for production of standardized output, essentially because they are not standardized. The region is an important factor of underpinning these interdependencies.

To be precise on the numerous new forms of industrialization and regional or local development, one must establish a vocabulary along standard lines (see Storper/ Harrison 1991). Approaches like 'flexible specialization', Marshallian industrial districts or Japanese production systems and culture have all difficulties to build a picture which represents the multitude of forces which interact in highly complex ways in regional development.

Before we turn to the significance of the region in economic development of today, we concentrate on some definitions. An *'industrial production system'*

contains an *input-output structure* (a set of units of production of different sizes linked together), a *structure of governance* (authority and power) and a *territoriality* (whether dispersed or concentrated). A *production unit* is defined as a physically integrated set of activities occurring at a single location. Most industrial production systems consist of more than one unit. A *firm* is understood as a legal entity. An *input-output system* is a collection of activities which lead up to the production of a specific marketable output; I-O sytems are the functional core of economy. The *branch of production* is the statistical aggregate of similar I-O-systems. A *territorial agglomeration* is a collection of production units in a limited territory such as a city or a region. Where functional inter-relations between units are dense and localized, there may be an 'industrial district'.

This leads us to the debate on the significance of the region today. This debate distinguishes three main 'schools', that have participated and contributed (see Storper 1995).

3.4.1.1 Institutionalists and the flexible specialization as a key concept

From the mid-1970s, the attention was drawn to a development model which was dubbed `The Third Italy´. The industrial system of the Italian Northeast-Center was made famous by Piore and Sabel in 1984, when they proposed the model of `flexibility plus specialization´. The `industrial divide´ separated the era of flexible specialization from that of post-war mass production. The basis was Becattini´s elaboration on Alfred Marshall´s `industrial district´ in late 19th century England. Economic characteristics - externalities lodged in a division of labor - and socio-cultural supports to inter-firm interaction within an industrial district are at the core of the theoretical approach, which was supported by rich empirical work from Italy and southern Germany. The fundamental contributions of the ´Italian school´ and Piore/ Sabel are the following thesis:

- technologies of production and divisions of labor in production are rather a result of institutional pressures and choices made at critical stages in the history of certain products and their markets.
- flexibility and specialization are fundamental alternatives to mass production.
- some of the dynamic forces in contemporary capitalist development are both localized and territorially specific and have to be seen in relation with localized and territorially specific institutions.
- appropriate networks are essential bases of adaption when facing technological and market uncertainty. This adaptive capacity is only available for appropriate institutional forms of coordination, which are therefore the key to survival of the economy as a whole.

3.4.1.2 Industrial organization, transactions and external economies of agglomeration

In the early 1980s Californian scholars put forward the argument that flexibility rooted in the division of labor in production and is linked to agglomeration via the transaction costs associated with inter-firm linkages. Agglomeration is an outcome of the minimization of transaction costs like the costs of noncodifiable or tacit knowledge or where trust is required and full contingent contracting is impossible. Without agglomeration, the advantages of interdependence like flexibility, risk minimization and specialisation are reduced.

The ´California school of agglomeration´ shares the notion of the economics of network forms of production. Advantages over the institutionally inspired flexible specialization school are:

- agglomeration do not depend on thick and historical institutional contexts. New industries have ´windows of locational opportunity´, they are not attached to old stocks of external economies.
- regulatory and technological changes, not a combination of long-standing civic cultures and the events of the post-war period set the process in motion.
- The model has a wider sectoral view because it allows for any mix of firm sizes, any sector, any mixture of linkages. Nevertheless it is centred on three groups of sectors: high technology, revitalized craft production, and producer and financial services.

The agglomeration model was expanded in the late 80s with the question of institutions and evolution. Going beyond the initial transactional framework by Oliver Williamson, who stated that the 'institutional arrangements' of agglomerations - especially the nexus of transactions and their economic performance - are themselves outcomes of broader institutional environments, and themselves generators of future choices for pathways of development. Critics reversed the argument and put the large firm as a nexus of shifting relations at center stage. But one can see, that parts of the same big firms which are involved in those productive activities are not free of agglomeration nor free of uncertainty in the relevant parts of their input-output chains. It seems unlikely that transportation, telecommunications and formal institutional arrangements (i.e. strategic alliances and contracts) are sufficient to obviate the need for proximity in these cases.

The deficits of the California School are the same as with the flexible specialization school. The localization of input-output relations, i.e. the localization of traded interdependencies, is inadequate to the task of explaining the link between flexible production and the resurgence of regional economies of today.

3.4.1.3 Technological change, learning and innovation

From the late 1970s certain research concentrated on regional development and the role of high technology. The question is: why are such high rates of growth in places like California or Massachusetts and how can we get a part of the action? And: what occurs to economic activities affected by waves of radical technological change?

A first branch of work is the American School of high technology regional development which sought the sources for growth in Silicon Valley and Route 128. They stress the importance of the university-production link for future technology-based industries. A second branch is the 'regional politics' approach. It holds that regional coalitions secure resources that push for the transfer of high technology resources. The military-industrial complex therefore plays an important role like in Southern California or New England. But other places with similar politically motivated investments do not show signs of dynamic high technology agglomerations, like Texas, Georgia, Toulouse, Nice. The link between high-technology and regional development nevertheless is missing.

The GREMI group in Europe - as an alternative approach - sees the innovative milieu and the network as the essential context for development. The milieu empowers and guides innovative agents to be able to innovate and to coordinate with other innovation agents. Therefore the milieu is like a territorial version of the 'embeddedness' of social end economic processes (see Granovetter 1985). The network links the milieu with the outer world and the necessary resources which are not available in the milieu itself. Networks are the principal organizational metaphor with GREMI.

The milieu links this approach with a key theme of the Marshallian school: that there is something intangible, "in the air", which permits innovativeness to proceed in some places and not in others. What misses is the identification of the economic logic behind, by which milieus foster innovation. There is circularity: innovation occurs because of a milieu, and a milieu is what exists in regions where there is innovation. Neither the potential mechanisms and processes by which such milieux function are specified, nor what the economic logic of a milieu would be.

Nevertheless, regional science should be exactly what GREMI talks about: the abandonment of regional analysis based on the two fundamental precepts of neoclassical economic science: the comparative statics with its equilibrium notion and the rational action paradigm for human behaviour. Instead the economic process is fundamentally about creation of knowledge and resources. This 'Schumpeterian' process cannot be derived from the calculations of the rational actor on the margin.

3.4.1.4 A synthesis approach: Technology, path dependency and untraded interdependencies

This line of thinking draws on evolutionary economics, pioneered by Nelson and Winter (1982), and on refinement for technology by Dosi, Arthur, Pavitt or Soete. In essence it is technologies which develop along pathways or trajectories. Therefore technological change is the product of interdependent choices. Technologies are subject to a variety of user-producer and user-user interactions. There are significant technological spillovers in the economy: knowing how to do one thing is frequently consequent upon knowing how to do another, or key to doing certain other things.

This knowledge or 'common practice' spillovers are often non-traded technological connections. From there it was a short step towards technological learning, which once characterized competition within mass production. But with the emergence of new forms of production, technological trajectories were 're-opened' and the industrial world was on the way again towards a 'learning economy'. The regional aspect comes into play when we realize that technological spillovers and their untraded interdependencies would be territorialized under certain conditions.

These territorial specializations can be viewed as absolute advantages which shelter at least temporarily, from Ricardo's comparative advantages. The argumentation in short (Storper 1995):

- technological change is path dependent, because
- it involves interdependencies between choices made over time, and often irreversible.
- These choices have a spatial dimension, which is closely tied to their temporal interdependence and uncertainty (labor markets, conventions, common languages, rules etc.)

The evolutionary approach bases not on transaction-costs and on cost-minimization by efficient allocation. It is about the forces that allow the parameters of cost- minimization to be altered and which get in the way of optimizing. The evolutionary approach in regional development poses a couple of further questions: what is a (technological) trajectory? and what defines the trajectory? and why limit the trajectory to technology? Trajectories not only concern 'technology' in the hard and soft sense but also, the means and mechanism to reduce uncertainty: trajectories of conventions, trajectories of worlds of production or organizational trajectories.

3.4.1.5 Innovation, learning process, and proximity

Most dynamic theories of regional development, especially those based on the evolutionary approach, stress the importance of individual, collective and cooperative '*learning processes'* as a driving force for innovations. This seems to hold not only for technological innovations but for most of social innovative endeavours. To go even further one can say that economic development and innovation arise out of the social context of a particular area or locality. By stating this, it becomes clear that as a consequence, interactions between actors within and outside a firm, included the entrepreneurs (Johannisson et al. 1994), seem to be of great importance. 'Interacting' as a process itself, in many cases, is linked with an other key feature of the regional innovation debate, that is spatial or geographic 'proximity'.

Regional development is an complex outcome of interaction between the micro (firm, potential entrepreneur, household), the meso (regional institutions, rules, conventions, localised production systems, networks, milieus) and the macro level (national systems of innovation, economic policy, legal framework) of an economy at large. Learning processes happen on all three levels, and depend on each other. Since the evolutionary approach was introduced into economic reasoning on technological and regional change (Nelson, Winter 1982; Malecki 1983, 1991; Thomas 1985) the firm is regarded as a learning system. This implies departing from the linear innovation model and adopting an interactive innovation model. Firms, as a form of organizations, can therefore be viewed in terms of open systems depending on external information access for growth and survival (Sweeney 1987). Gathering, processing, and reproducing information obviously is a learning process over time. 'Learning' has many shades and colours. Learning by Doing has been introduced early by Arrow (1962), Learning by Using by Rosenberg (1982) and refined by von Hippel (1988), whereas Learning by Interacting was stressed by the GREMI group (Camagni 1991) and others(Lundvall 1992).

Thus it becomes clear that the firm is embedded in and dependent from the general environment. Ratti speaks of three strategic spaces which are relevant for the outcome of their learning processes: market-space, production-space and support-space (Ratti 1991). The market-space (learning by doing) encompasses the environment where the firm acts as supplier of its products and services. The production-space is shaped through learning by using and takes into consideration all actors who sell products and services to a firm. All actors to which a firm or its staff maintain non-market relationships belong to the support-space (learning by interacting).

Given that regional innovation is considered as an open learning process, driven by interactions of structures and actors, the notion of 'proximity' becomes crucial within the debate on regional development theories and policies. The debate even has picked up importance within the context of the so-called globalisation of the

economy. The discussion on the role and the characteristics of proximity dates well back to Marshall's industrial districts where it seemed to be sufficient just 'to be there' (Marshall 1961). There is a longstanding and vast body of discussion on the relative importance of proximity in relation to other determinants for innovation. It goes from the one extreme, stating that simply 'being there on the spot', meaning mostly intensive social interaction in an urban, dense context, is sufficient to spur innovation. On the other hand, there is the belief that proximity does not matter in most cases and is substitutable through distance-neutral communication technologies (for overview of debate see for example Piolle 1991, RERU 1993, Gertler 1995, Crevoisier 1996). It is important to distinguish in general *three dimensions of proximity*: spatial, social, and organizational. Although all of the three dimensions are strongly intertwined, it helps to picture more explicitly the territorially bound characteristics of close interactions between firms and institutions.

To overcome a deficit of most space-related innovation theories, that is a unsophisticated notion of space, Hausmann (1996) developed a concept which brings together three crucial and interdependent dimensions of innovation as an open learning process: *information, institution and proximity*. 'Institution' englobes firms, public and private infrastructure and services as well as social communities and social infrastructures. 'Information', as the most important dimension for business innovation encompasses four categories: information, knowledge, know-how, and creativity. Within that framework, *tacit knowledge* seems to be the most important kind of knowledge, especially in the context of technological innovation (Hausmann 1996). Tacit knowledge in general is territorially specific and thus it is a crucial ingredient of 'untraded interdependencies' (Storper 1995) of regional development. Within Hausmann's context it is important to add that know-how not only means high-technology as a kind of flag-ship of public awareness, but comprises all levels of technological skills which can contribute to innovation (Piore, Sabel 1984), especially revitalized and tacit skills of craft industries.

The threesome of Hausmann's determinants tries to avoid many shortcomings of regional innovation theories, that is either an over- or an undersocialized position (Granovetter 1985). Therefore, innovations cannot be sufficiently explained by the neoclassical economic man or by simply belonging to a particular collective or group. The (regional) innovative process is interactive in its core and has to take into account the structure as well as the actor, the different and intertwined levels of technology and the various skills, for to be able to get a comprehensive picture of what is going on.

3.4.1.6 Industrial production systems and forms of governance

Regional development today is not about single factor allocation anymore, is not about bottlenecks in development options alone. So many conditions interact that

it becomes difficult to compare regions to each other, to understand the similarities and differences in their developmental tendencies, and to assess goals and implications for regional development policies. At least it is clear that we need to understand the ways industrial and services activities are arranged within the territory, for this is crucial to understanding where the power to influence industrial development lies, whether in the locality, or outside its borders. A central notion therefore is 'the production system' as it has been defined in paragraph 4.1.1.

The question of influencing regional development was focused for a long time on the behaviour of large firms and their governance. Originally the 'core-ring image' was used to depict the notion of power of large firms over their usually smaller suppliers. Today this metaphor can be used in a general sense for describing four types of governance structures:

- *all ring, no core:* no symmetric lead firm, or a rotating leader, by project. There is no hierarchy.
- *core-ring, with coordinating firm:* the coordinating firm is the leader, the systematic agent in the input-output system, but the coordinating firm cannot function on its own, nor determine the existence of other firms in the system. There is some hierarchy.
- *core-ring, with leading firm:* the leading firm is substantially independent of its ring of suppliers and subcontractors, that is, it has the ability to reconfigure at least part of its ring. It can thus determine the existence of some of its ring. Power is asymmetrical; there is considerable hierarchy.
- *all core, no ring:* the vertically integrated firm.

In reality there are more complex and less discrete power relations in the industrial economy. Many firms or units may be involved in more than one input-output system. Thus we have inter-network relationships or supersets of productions systems, which complicate appropriate public policies. Many regions are composed of more than one input-output system, for example Silicon Valley or southern Germany. Organizationally, these supersets of productions systems include long- and short-distance alliances between core firms with varying rings, or more durable combinations, such as the Japanese keiretsu and the Korean chaebol.

To sum up, we easily are able to see, that the input-output structure of a contemporary production system may be reshaped and the governance structure may undergo change. This leads to the problem of regional policy making for areas with different types of production systems. Ideally the policy formulating problem can be depicted with a matrix with the following two dimensions of production:

- *the degree of division of labor*: Is the long-distance interconnections limited or extensive? If extensive, are the interconnections hierarchical or non-hierarchical?
- *the degree of local interconnections:* Are they limited or extensive?

With such structural knowledge policy formulating at least is based on more firm ground, than just arguing about outside constraints of the free world market.

3.4.1.7 The economy of a region and sustainable development

Today there is an increasing and urging debate to implement sustainable development (SD) on a regional level. That makes it a necessity to stretch the notion from 'hardware' of production systems to 'software'. Soft dimensions of technology include know-how and organizational rationalities, 'learning' becomes the key word. 'Learning regions', with 'learning regional economies' thus can become a interesting starting point for implementation of SD. Learning contains all these dimensions of production: design of products, processes, know-how, evolution of organizational skills. Thus human capital, knowledge production, transfer and management, knowledge accumulation and adaptive capacity become crucial key factors for regional sustainable development (RSD). Learning is a compound for at least five different kinds of learning phenomena: learning by command or external pressure; instrumental learning through positive or negative incentives; 'trial and error' with negative experiences; Learning in a laboratory situation: means through pilot projects or experimental politics; learning by model: adapting or copying existing knowledge or measures.

Economic assets develop from general to specific; this process of becoming specific is in three ways: the labor-market, the input-output system, the knowledge system. Underlying these ways of getting from generality to specifity are conventions, which make possible communication, interpretation and coordination among the actors who are making them become specific.

But to bear in mind:

- there is still little systematic knowledge of the geography of untraded interdependencies, i.e. conventions, and its relationship to economic development and especially to organizational and technological learning and competition
- untraded interdependencies, whether territorially concentrated or not, are not static, and cannot be read off from input-output relations (alone).
- the geography of an industry is not determined by either its input-output relations or its untraded interdependencies. There is too little knowledge when territorialized untraded interdependencies constitute real constraints on geographical behavior - means dispersion - and when they are

necessary to innovative behavior but do not constrain locational behavior. That means: untraded interdependencies are necessary to capitalist development, and they are under certain conditions necessarily regionalized!

- untraded interdependencies, especially in the form of conventions, not only potentiate collective action, adjustment and learning, but may impede it. That leads to institutional 'sclerosis' or organizational and technological lock-in (see also Arthur or Grabher 1992).

3.4.2 The spatial focus

The fundamental structural change in society not only brings about a paradigmatic change regional economic theories but a paradigmatic change a in regional development policies as well. The latter can be termed as a change from a 'technocratic-absolutist' view on territorially-bound policies and regional planning to a new perception of moderation between different sectoral policies and different demands on the use of land. This follows the shift of basic concepts in natural sciences, which go from substance - i.e. quantity - to form - i.e. quality or information. In the new generation of scientific theories one is confronted with catchwords like non-linear connections; chaos and complexity; networks, feedbacks and redundancy; evolution, structural coupling and entropy or self-organization, cognition and communication. Regional development policies thus begin to reflect these fundamental changes in natural sciences (see Huber 1993).

One can observe three areas in which the political system and its ability to act are challenged:

3.4.2.1 New scopes of action

The scopes of action of territorially-bound policies shifted in respect to three aspects: extension of the organizational structure of society, public interventions and new institutional division of responsibility.

In the recent discussion about the basic structural changes the *extension of the organizational structure of society* is said to be one of the main processes. It is called to choice ‘internationalization’ or ‘globalization’. Parallel to this development runs by society a regionalising of links to social, political and economical circumstances. This regionalisation is judged as a reaction against the unpersonal constraints of worldwide economies. People want to live in a reasonably small and overlookeable area and governments have to react for protecting their decision-making power.

Regions as a level of political acting are characterized by the following aspects (see Nijkamp et. al. 1992):

- Regions are open systems with respect to many characteristics. They depend to a large extent upon other regions for their development.
- Different regions are differently structured. Because of their limited area they cannot compensate all functions of nature and society within their boundaries.
- Regions are areas which include enough coexistence to support an authority that represents and serves the common good. Sometimes though this overtaxes the regional actors' capacities.

Public interventions of a sovereign character like interventions by law, decree or other top down-interventions became less significant for governments' acting. Public action shifted to 'weak' strategies of cooperation and coordination during the last few decades. To fulfil its tasks, a government has to take into account the specific characteristics of a policy area and the interests of the actors involved. As the discussion about subsidiarity in the European Union shows, the principle of federalism is identified as a possibility to promote efficiency and effectiveness. This is called the 'economic theorem of decentralization'. In the same way federalism is said to be able to activate basic potentials of society for problem solving and it enables the use of 'locational arbitrage' (see WZB 1995).

But not only the orientation of public institutions towards citizens has to be strengthened. In all industrialized nations there are various endeavours to establish a *new institutional division of responsibility.* Citizens increase their demands on politics and administration; the variety of interests and actors in society widens. Concepts like 'New Public Management' are gaining ground as a possible answer to the quest for efficiency and transparency. The general tendency seems to be the retreat of the state from single decisions and the upcoming of many formal and informal institutions to work on specific problems. A necessary basic condition for such institutions could be that the local and regional level are equally equipped with resources and competencies (see ARL 1994).

3.4.2.2 New fields of action

Territorially-bound policies not only changed the scopes of action but the fields of action as well.

In recent times, planning and development underwent drastic changes. First of all, *new ecological necessities* pose new challenges, like problems of irreversibility of decisions. Likewise new attitudes towards the value of landscapes and the environment in general gained ground and are regarded as a kind of basic need. Third, changing land use patterns in the vicinities or far-away regions increase pollution which as a consequence dissolves our perception of the region as an delimited and confined area. Therefore the planning of

regional development increasingly is oriented towards ecological requests and the evaluation of impacts (see Abart-Heriszt 1995).

Within the growing significance of overlapping territories of different size the necessity of *transborder cooperation* also increases. For a very long time in human history space had primarily a territorial connotation. Borders - and boundaries - are central elements of structuring and defining space. At the turn of this century, regions differed according to the theory of Central Places by the number of central places, the axes of development, networks of infrastructure or natural resources. At that point, the internal structures and their connection with the transborder spheres of action were of less importance (see Huber 1993). Today, conditions and influences external to regions interfere much more directly. The interrelations between regions and the complexity of threats, opportunities and public obligations lead to multiple demarcations or to a 'géométrie variable', as the French call it. It means that the territory of public action is not congruent with the territory of problems anymore, or in short: spaces of action do no longer equal spaces of problems.

Providing *public goods* is confronted with new demands: public policy has to produce public goods not only where markets are likely to fail or react more slowly than desired. Public policy has also to produce public goods which may be specific to technological-economic spaces. It is the development of these spaces that ultimately generalize their benefits. In these spaces one can find evolution through learning and in the same way these spaces offer the possibility of spillovers and complementaries. Public goods with specific assets include (traditional) industry-specific labor skills and training, technologies, industry- or region-specific assistance to firms and most important, they include conventions which make possible certain capacities for collective action and coordination (see Storper 1995).

The requirement for cohesion ultimately leads to a new approach of federal policy on all levels: the *prevention from risks* even they are not tangible in a concrete manner. In society, especially two kinds of risks are important today: first, the welfare state and its institutions are demanded too much, and second, the range and intensity of technological and ecological risks are spread beyond control. Against both phenomena, there is no safe protection. The best thing to do therefore is spreading of information and enabling people to use this information becomes as necessary as other kinds of 'helping people to help themselves' (see Willke 1992).

3.4.2.3 New ways of intervention

New scopes and new fields of action, as a consequence, lead to new ways of intervention, if territorially-bound policies want to react in due time and adequate manner.

The first observation is, that the mode of intervention changed *from planning to managing*. Regionalization may have two effects: on the one hand it could lead to an increase in decision-making power on the regional level. On the other hand it could help to decentralize and fragmentate power when facing situations of intransparent hierarchies, overlapping competences and parallel structures of decision-making. Regional development involves various and often diverging interests. Behaviour of actors depend on their specific context. Actors are forced to enter strategic alliances. Conflicts between different objectives and therefore between different actors increase in number and complexity. Public regional actors are regarded as representatives of the public good. They should be impartial to special interests and have to enable the actors to bargain better. If public actors in federalism loose a part of their decision-making power, this can result in regional development policies or programmes to be altered. Ultimately, planning activities decrease and management activities increase (see Fürst 1993).

Second, the fragmentation of politics into a variety of policies and into a large number of issue-related networks needs a *coordinating framework*. Orientation, guidelines and focal goals become more significant in this context. If regional development is based on trust and confidence it is necessary to take the load off regional actors from quarreling about basic conflicts which should better be settled on higher levels of politics and administration.

Third, certain specific resources are required. Face-to-face-communication as a pre-condition to generate trust is found to be a crucial condition for regional actors to build stable networks and create innovative milieus. The flexibility of a system like a policy-network fundamentally depends on *the availability of non-specific resources* like linkages and informations. In general, many resources are earmarked for certain purposes and therefore loose their 'requisite variety'. Redundancy through unrestricted resources - especially in functional links - prevent a sub-system to be directly disturbed by external factors. On a regional level, two kinds of redundancy are significant: functional redundancy on an enterprise level and the redundancy of interlinkages on a regional level. To secure redundancy one need not to fix an optimal, quantitative level of redundancy. But it is necessary to specify case by case - in qualitative terms - the degree and amount of both types of redundancy. A second task could be to reconcile lean production or lean organization and redundancy. Otherwise the 'imperialism of instrumental rationality' will destroy the ability of regional networks to generate flexibility and innovations (see Grabher 1993).

3.4.2.4 New challenges for the behaviour of planners

Not only the uncertainty of assumptions about reality and development determines the behaviour of planners but also the political process of decision-

making, which can be descripted as “disjoined incrementalism” or “muddling through” (Hall 1988: see Koschitz 1993). Planners have to pay attention for example to informal structures of power, the dependency of politicians from the electorate, the actual mixture of analysis and value judgments or - in general - their impotence in the face of political structures. They no longer monopolize the shaping of the future.

Changes in the planning methodology are obvious. Planning is seen as a part of the logic of the decision making process. The notion of ‘bounded rationality’ is incorporated into planning. Assumptions, subjective by nature, become outspoken and thus facilitate public reflection, communication and verification.

There are different approaches which lead away from finalized planning to modular planning in comprehensible and manageable steps, which can be described as 'perspective incrementalism' (Ganser 1991: see Koschitz 1993). Planning goals in the sense of 'beacons' or ‘rules’ facilitate the building of consensus. For the people who are affected by the actual planning process, it needs the clarification about what is said and about what can be accomplished. On this basis, realistic projects can replace abstract programmes. As a prerequisite, there has to be a medium-term comprehensible scope of action, structured by manageable phases. Such a process has to complemented by necessary 'shelters' of communication instead of reference to legal-administrative regulations. The qualities needed in this kind of planning not only encompass specialized knowledge, but also know-how on communication and the way of involving planning in politics and administration (see Koschitz 1993).

Problems with planning are not only problems of problem-solving but also problems with the mechanisms of power and governance. The actor in charge of planning has power because he limits the scope of action while defining one kind of future as desirable and possible. He works with his specific language and arguments in his own structure of perception and value judgments. His power is well fixed by the institutionalized representation of planning interests in education and associations and the institutionalized interplay of forces between planners and decision-makers. The above described approaches of reducing complexity in planning need strategies to counterbalance power, to avoid general delegation, and strategies that enable people to participate in sharing of responsibilities and power (see Reuter 1983).

3.4.2.5 New perspectives in regional planning

All the above mentioned developments refer to territorial-specific policies in general. In regional planning, the respective shifts in goals and instruments can be divided in three fundamental lines of discussion.

The *fundamental goals* of regional planning changed in character. The main goal of regional planning is said to be the creation of equal living conditions. This

regional planning principle leads to the spatial concept of functional-balanced regions. Although enormous financial support has been generated, the aim has not been reached. Other considerations thus appeared, like the acceptance and even promotion of spatial functional division of labour. This culminated in concepts like ‘tourist region’, ‘industrial region’ or even ‘refuse disposal region’. The upcoming concept of endogenous regional development, stressing regional independence, meant a big shake-up for any top-down approach. Endogenous development aimed at allowing a region’s inhabitants a ‘satisfying’ standard of living, knowing that living conditions are not equal in every region. Living conditions vary according to specific natural and economic potentials, regional cultures and modes of institutional regulation. Such an approach comes close to the idea of equity in the needs-based global concept of ‘sustainable development’.

Spatial networking became an further alternative concept which stressed the differences between regions while maintaining a minimal standard of infrastructure. In such networks, cities or regions work together to strengthen territorially-specific economic or infrastructural effects. The concept is based on the assumption that some regions or towns do not have the ability of endogenous development; therefore they have to pool their specific resources (see Stiens 1994).

As an other feature in the debate on regional planning, the *view on spatial dimensions* widened. Since Christaller’s theory of Central Places, regional planning followed singular patterns of settlements. It was all about providing central goods and services and their supplying of the catchment areas. The problems of interconnections between town and surrounding area was seen most important. This view extended in a linear way by amplifying a system of axes of development. The hierarchically structured axes marked the interconnections in the exchange of outputs along the main transport links. Later the attention turned towards the problems of peripheral, rural and border regions. Recently, the specific spatial-functional interlinkages of cities added an even more extensive spatial perception. The focus on the degree and quality of networks between cities allows to promote or restrict certain regional developments. Public authorities declare that centres of development should be connected to other centres through physical, organisational, formal or informal interlinkages in such a way that the advantages can be multiplied and the disadvantages reduced. The view within a single agglomeration is to promote ‘decentralized concentration’ instead of ‘central deconcentration’, thus helping to spread development over the whole territory (see Bundesministerium für Raumordnung, Bauwesen und Städtebau 1993).

The *objects of regional planning* changed. For a long time regional planning was focussed on improvement of infrastructure in such a way that the market forces are allowed to meet the needs of the regional population. Regional planning

understood itself as delivering basic public needs. These high hopes did not materialize. The focus of planning shifted to the notion of development as a choice between different future opportunities. To the same extent as the concept of endogenous regional development gained recognition, the attention shifted from strong to weak factors of regional development. Additional elements beside roads, energy supply, real estate or qualified labour were considered important. Institutional and cultural approaches, regional information networks and their coordination, bottom-up initiatives and the most efficient use of resources became the new keywords (see Brugger 1984). And last, the objectives of regional planning gained more common ground with todays'' reflections in the concept of 'sustainable development'.

4 Sustainable Regional Development *(Ruggero Schleicher-Tappeser, EURES)*

Having reviewed the discussions concerning Regional and Sustainable Development in the previous chapters, now the two threads of discussion shall be compared in order to get a first idea what Sustainable Regional Development could be. The foregoing chapters have not been written along a common systematology, so before comparing it is necessary to develop some kind of a framework in which a comparison is possible.

4.1 General character of the discussion threads

What are we really going to compare? The two discussions include theories, policies, normative assumptions and conclusions in different mixtures and emphasis, with different scopes and different claims. Before trying to establish a systematology, it is useful to make a more intuitive and rough comparison.

4.1.1 The scope of SD and RD

Already the comparison of the terms “regional” and “sustainable” shows, that both concepts are not to be collocated on the same level. “Regional” designates a spatial level, whereas “sustainable” designates a certain quality. However, as we have seen in the previous chapters, the concepts have become much more complex than the short terms seem to indicate.

Chapter 2 has put into evidence that the concept of Sustainability stands for a vast paradigm shift which is taking place since decades, for a new way of looking at the development of human societies on this planet. This new approach not only provides new descriptions and explanations, it also implies that we may have to revise our value systems. From the new perspective the old ones do not seem coherent anymore. In the public discussion this normative aspect plays a prominent role. But the longer the discussion lasts, the more evident it becomes that the often requested clear-cut criteria for what is sustainable, cannot simply be given. Sustainability is not something like the digestibility of a mushroom, but

more a general concept like freedom.[51] The focus of the concept lies on the relationship between human societies and nature. However, the scope meanwhile also includes all kinds of societal aspects not necessarily connected with nonhuman nature. A consensus broadens, that besides environmental, also economic and social aspects have to be included. It covers all levels from the global to the individual ones and tries to look far into future. It is evident that when ideological oversimplifications are to be avoided, such a general claim does not allow to deduct simple recipes and checklists from the general concept. In this sense "sustainable development policies" are not conceivable. For its concretisation the concept of sustainability has to rely on established scientific disciplines and policy fields. Therefore, it is necessary to review traditional policies in the light of the new paradigm.

"Regional development", on the other hand, also is no single concept. As described in chapter 3, there is a series of theories that help to describe and understand the economic development of societies at the regional level, there are normative concepts and action-oriented theories that state what should be done in this respect, and there are established policies to support regional development at European, national and regional levels. Regional Development deals with regional issues and has not such a global claim as the much newer concept of Sustainable Development. The economic focus is still prevailing while other aspects as environment and culture play an increasing role. There are other theories concerning regional culture, regional planning, regional policy making which are all influencing this discussion. Although at different levels there are political institutions explicitly dealing with Regional Development (as DGXVI on the EU level), for its realisation the concept has to rely on a series of different policies, ranging from infrastructure over agriculture to vocational training.

The concept of sustainability has thus a much broader claim concerning its subject (humans and nature), concerning the scale (from individuals to the globe) and thereby its normative implications (conditions for survival). On the other hand the concept of regional development, by its focus on the regional level, is much more concrete. The longer history of this concept and its shorter scope in time have allowed for experience with models and practical policies.

4.1.2 The concepts of RD and SD as an answer to equity problems

The normative impetus of new approaches and paradigms diminishes with their degree of general acceptance. Therefore, it may not be easy to compare SD and RD today, since their development stage as concepts is not the same. In order to understand the differences better, it is useful to look historically at the situations when the concepts first appeared in the public political debate.

[51] See Homann 1996

It seems that equity considerations have played a major role in motivating the public debate to consider these concepts. Equality had been one of the big promises of the French Revolution whose individualist values were the basis of modern industrialism. During the evolution of modern economies periodically substantial changes in the regulatory framework have been introduced in order to reduce conflicts arising from disparities. During the last century and the first half of the present one, disparities between individuals have been at the centre of the debate. The virulence of the "social question" led to extensive labour legislation and to the installation of redistributional mechanisms within national states. At the same time the growth of spending power of large layers of society became the basis for mass production.[52] This was fully recognised after the big depression in the twenties which led to more explicit formulations of theories oriented towards development (Keynes etc., see chapter 3), and to redistributional policies successfully aimed at growth (Roosevelts New Deal). Only after the war disparities between countries and regions became a major political concern. With the Marshall Plan for Western Germany, a huge transfer programme for inducing development, the fordist and keynesian principles have been actively and successfully applied to whole national economies. Equally, since the last century equity between men and women was another issue that raised public debate and led to womens movements which strongly shaped our societies. Gender equity, just as social equity is a concept basically looking at individuals.

Originally the regional development question had been put forward since the first half of the last century by utopianist and anarchist writers concerned about social questions, then by regionalism and regional geography (around 1900) and developed only in the twenties into more systematic regional planning and regional economic development theories.[53] Only after world war II explicit regional development policies developed. In the sixties the goal of "equivalent living conditions" has been fixed by law in western Germany and financial transfer mechanisms between regions have been established. Similar endeavours can be found in other countries at that time, motivated by a growing discussion concerning disparities in living conditions and increasing streams of migration. Summarising we can say that the concern about inter-regional or more generally speaking spatial disparities was at the origin of active policies for Regional Development.

The term Sustainable Development had its appearance on the political stage essentially with the Brundtland Report in 1987.[54] The still vague concept of Sustainability seemed to be suitable to combine and to reconcile the endeavours of the environmental debate with the development debate in the UN system. The

52 Fordism: see e.g. Lutz 1984

53 see Weaver 1984, Hahne 1985, Hahne/Stackelberg 1994

54 WCED 1987

environmental question rather suddenly had become an issue of public concern in the early seventies, typically marked by the report “Limits to Growth”.[55] The environmental issue no longer was only an issue of advocates of nun-human nature, also from an anthropocentric point of view ecological problems became dangerous. The concern for “future generations” raised the problem of inter-generational or inter-temporal equity. Similarly, the international development debate and the concept of development itself are rather young ones. Roosevelt, by introducing the concept of “underdeveloped countries” into international politics in 1949, established the idea of a universal direction of “development” and called for international programmes to mitigate disparities between national economies.[56] Certainly, the free trade debate is as old as the development of international trade. However, with decolonialisation, increasing international trade, the growing importance of the UN system and the system competition between capitalism and socialism there was growing worldwide interest concerning the economic development in “developing countries”. The idea that resources (including the dump capacities of our atmosphere) considered essential for the western and strived for global lifestyle could be depleted within one ore two generations, obviously led to an intricate interrelatedness of equity problems which made it impossible to treat environmental and development issues separately in international negotiations. A comprehensive concept was needed. The Rio Conference in 1992 tried to establish one under the term “SD”.

Giddens has described modernity as a consequence of the separation of time and space.[57] With the concept of abstract time and abstract space and the development of corresponding institutions it became possible to perceive and to act over ever larger distances in time and space. With this process social systems have been disembedded from their local conditions and restructured in a way that allowed for interaction over growing time-space distances. Evidently this growing scope of interaction has created new equity problems. The very old social question was essentially the equity problem at one place and one time. Inter-temporal and inter-spatial equity problems arose with the development of modernity. In a certain sense one could say that the problem of sustainability is the modern version of the old problem of social equity which has to deal with much larger time and space distances. The concept of Regional Development was the answer to the spatial aspects of the disembedding processes. The concept of Sustainable Development has stressed the time aspects.

Summarising we can say that from this perspective, which may well be complemented by others, the concern about disparities and equity problems, and the way to define them are important elements of the concepts of RD and SD.

55 Meadows et al. 1972

56 See Sachs 1989

57 Giddens 1995

Going one step further in the historical analysis, one could now look at the results of the political reactions mentioned here and at their influence on the theoretical approaches. It would be interesting to show the correspondence of the paradigm shifts described in chapters 2 and 3 with the history of actual policies and their difficulties, but in this context that would lead too far.

4.1.3 Descriptivity and normativity

It emerges, that the concept of sustainability has two aspects:

- sustainability stands for a new way of perceiving the world in which we are living,
- sustainability also stands for a shift resp. a new set of values and priorities in decision making.

Obviously both aspects are strongly interconnected, however, for the following it might be useful to make this distinction. It seems that “Sustainability” is becoming the key word for a major paradigm shift which is under the way since several decades (cf. Basiago 1995, Khan 1995, etc.). As perception is always conditioned by concepts and values, description and valuation cannot be completely independent. Giddens has pointed out that self-reflexivity is a central element of modern societies, i.e. that the concepts developed in social sciences are themselves shaping perceptions and value systems and thereby are contributing to the transformation processes they are analysing. However, in the sustainability debate confusion between both aspects has led to unrealistic hopes concerning the possibility to simply deduct a hierarchy of values from a new view on development and environment.

Since several decades a more systemic view of our living conditions has gained importance. In many disciplines and policy fields the way of describing and explaining phenomena has increasingly taken into account complex interrelationships between economic, ecological and socio-cultural aspects. As shown in chapter 2 in many instances this resulted in an abandonment of sectoral and mechanistic approaches. New systemic[58] and epistemological[59] approaches allowed on one hand for the understanding of complex interrelationships and on the other for discovering new leeways for action in (autopoietic) subsystems. These approaches grew from the necessity to develop descriptions and explanations that enable us to deal with interrelationships whose neglect has caused serious problems.

[58] This is not the place to depict the different lines of thinking in this direction. However, the following authors stand for important developments: Jantsch, Varela, Maturana; Prigogine; Forrester, Meadows, Deutsch, Vester; Luhmann.

[59] Cf. Watzlawick 1986, Schmidt 1987

Based on these descriptions and explanations there is a need for valuation and for change. The broad consensus around the Brundtland Report´s definition of SD as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" is not sufficient to appraise present states and endeavours.[60] Discussions of the last years have shown that while a new consensus on the complex causal interrelationships is growing, a detailed agreement on "what should be sustained" is far from being reached. Gale and Cordray (1994) distinguish nine principally different answers to this question. However, the concept of sustainability from its history unequivocally stands for an anthropocentric approach as also clearly stated in the first principle of the Rio Declaration, thus discarding a series of approaches which are present in the environmental debate. Even more tricky is the question how to reach sustainability.

4.1.4 Levels of normativity

In the general debate concerning sustainability some still call for a concretisation of this concept so that it will be possible to decide unambiguously whether a state or an action is sustainable or not. This will never be possible in this absolute sense. Homann, who works on business ethics writes: *"Until now there is no sufficient definition of sustainability. It cannot exist, because already the search for it is erroneous. What sustainability is, resp. what can be meaningfully understood by this term, we will know somewhat better after a searching, learning and experiencing process that will take decades. But we will never know it in a definitive way. Just as a physician does not need an operational definition of health before beginning a therapy, an operational definition of sustainability is no precondition for politics."* [61] Much more than a concrete prescription, sustainability seems to be a "regulative idea" in the sense of Kant, an idea that can give a general orientation such as prosperity or freedom, which have to be interpreted concretely in every concrete situation.[62]

For gaining concrete orientations, it seems that we only can develop procedures in which a series of aspects have to be considered and weighted systematically. The difficulty to reach obliging statements can be guessed if we think of the long period that was needed to develop law systems that allow to gain valid interpretations of what "freedom" or "justice" mean in a concrete situation. Different cultures have developed different interpretations of general values like freedom and different procedures to assess them. The french, the german and

60 WCED 1987

61 Homann 1996

62 Homann 1996, Brand 1997, van den Daele 1993

the british law system are quite different and there may be different interpretations of generally shared values, as e.g. the different laws on abortion show.

So, the concept of sustainability can be discussed on very different levels. We can conceive the realm of norms as a complex and by no means rigid hierarchy which reaches from very general regulative ideas as “freedom” or “respoect for life” down to very concrete norms such as the maximum allowed NOX emission for cars. In between we find a multitude of intermediate norms which increase in number as the degreee of concretion augments towards the lower levels of the hierarchy. The relationships in this hierarchy are not fixed. Depending on the perspective within certain limits one or the other norm may be more important. Lower level norms cannot be easily deduced from the higher ones: conflicting aspects have to be ponderated, causal relationships have to be taken into account according to the present state of knowledge. Changing attitudes (such as icreasing acceptance of divorce), new circumstances (such as the increasing number of population or of cars) and new insights (such as the discovery of the threat to global climate by the greenhouse effect) continuously lead to a debate and renegotiation of norms in our societies. This system of norms, which can be interpreted in a more or less hierarchical way, corresponds somehow to hierarchies of causal relationships and to hierarchies of institutions which are involved in the negotiation and interpretation of these norms. At each level, at each node of this net, there is scope for interpretation and valuation.

Most changes in attitudes and interpretations of reality may have minor effects on a series of norms. The coming up of the regulative idea of sustainability, however, is so fundamental that can be considered as an earthquake in our system of norms that calls for a reconsideration and renegotiation of all relationships between norms on all levels. It may lead to considerable changes in the concrete norms at the lower levels of this hierarchy. Given the enormous complexity of our system of norms and the fact that innumerable institutions and individuals are involved in these negotiation processes, this will necessarily take a long time. Moreover, the new perspective proposed by the paradigm of sustainability will lead to new interpretations of causal relationships and thereby not only to new attitudes and new institutional settings but also to another view on the real world. The sustainability, the survival quality of our civilisations may depend on the timeliness whith which we will be able to carry out this reinterpretaion and renegotiation process of our norms. Hopefully, the INSURED project will contribute to provide some useful instruments and procedures for organising this process.

Different cultures have always produced systems of norms that are more or less different. This is also valuable for the interpretation of the regulative idea of sustainability and much more for the more concrete consequences under discussion. This cannot be avoided. Considering the different institutions involved in this process of negotiating norms, we discover that applying the principle of

subsidiarity, will inevitably lead to different interpretations in different regions and different realms.

On the basis of these considerations it seems senseless to call for a more or less complete and lasting set of indicators of sustainability. Only provisional sets of indicators reflecting the present state of the debate or tentative indicators illustrating a specific (minority) position are conceivable. If their realm of validity shall comprise different cultures, they must necessarily be more general than when they are addressing one specific region.

4.2 Basic principles of sustainability

From the outline of the general character of both discussion threads it emerges that the concepts of SD and RD cannot be compared in a symmetrical way putting one on the same level as the other. As SD has a much broader scope and claim, it makes sense to develop a systematology of the basic elements of the concept of sustainability as we understand them now, and then to check whether and to which extent the new developments of RD theories and policies are pointing in this direction.

The foregoing considerations have shown that the concept of SD is very complex. It cannot be simply described by the extension of well-known concepts into one or the other direction. Additionally, we can find very different interpretations. As explained in the introduction we understand sustainability as a concept that in a specific historical situation has attracted a large political consensus and which needs to become more precise and meaningful through public debate and scientific research. Therefore it is useful to start with the interpretation formulated in the declaration of the UN Conference on Environment and Development in Rio 1992. In the following development of a systematology we will refer to the basic understanding of sustainability expressed in this document.

The attempt to categorise the 27 principles of the Rio declaration shows that they concern very different dimensions. In the literature we can distinguish three basic approaches to define sustainability by a series of elements. However, none of them covers the complexity of the Rio approach.[63]

- The approaches originating from the international development policy discussion put the aspects of equity into the foreground. The Brundtlandt report cited earlier, which has produced the most known and concentrated formula, is an example for this view.

[63] See Appendix III

- A more simple way to put it, is to ask: what do we want to sustain? Over the last years a large consensus has grown, that sustainability should not only embrace environmental but also economic and socio-cultural aspects.[64] Understanding sustainability as the "conservation of the capacity to generate human well-being for generations to come",[65] there is general agreement that a healthy environment, a functioning economy and satisfying social relationships are the basis for human well-being now and in the future.
- A third perspective puts into the foreground the new concepts for analysing and structuring our world, which the paradigm shift from a mechanistic to a more systemic view has brought. Adopting systemic principles should help us to be able to deal with the interrelatedness of a wide variety of problems and to be open for learning.

We think that it is necessary to look at the concept of sustainability at least from these three points of view.

In principle we are asking three simple questions:

- What do we want to sustain?
- How shall we deal with different interests, needs and opportunities?
- Which systemic approaches can help us to solve these problems?

4.2.1 Development dimensions

Concerning the question "What do we want to sustain?" one can note a growing consensus on a general level. The broad approach of the Rio Declaration that besides environmental aspects also economic and social aspects have to be considered is widely accepted. In one interpretation these three aspects can be associated with the conservation and further development of natural capital, man-made capital and human/ organisational capital. However, there are further connotations:

- Environmental aspects should include a deep respect for ecological systems which are the basis and precondition for all life. Bearing in mind that our landscapes in Europe have been strongly shaped by human activities in the course of thousands of years, environmental aspects also should include the man-made environment, the care for traditional landscapes and the built cultural heritage.

64 This is the so-called "three-column-approach", see UBA 1995

65 Pinter 1996

- The economic dimension includes the way of dealing with any kind of scarce resources. Efficient use of natural, man-made and human capital is the essential principle of economy.
- Social aspects, finally, are the most difficult to grasp as they include 1. the satisfaction of all kinds of social needs such as communication, support and security, love and care, recognition and distinction etc. 2. the respect for the different cultural forms in which societies have organised themselves and 3. the general call for some kind of equity or equal opportunities. As equity concerns will be dealt with separately in this context, we will consider the satisfaction of social needs and the conservation and development of socio-cultural heritage as the main elements of the social dimension of sustainable development.

Very generally speaking we can formulate the following principles concerning the different development dimensions:

- Respect for ecological integrity and the heritage of man-made environment (environmental dimension),
- Satisfaction of human needs by efficient use of resources (economic dimension),
- Conservation and development of human and social potentials (socio-cultural dimension).

4.2.2 Equity dimensions

The question how to deal with different interests, needs and opportunities of individuals or groups, is not only, but mainly a question of equity. Equity questions, as described above, have played an important role in the development of the concepts of RD and SD. There is widespread consensus that social equity, international equity and inter-generational equity are essential to sustainability. Several authors only distinguish between inter-generational and intra-generational equity. However, this categorisation neglects the spatial aspect. The concept of social equity could be combined with the idea of gender equity, which also looks at individuals. Based on the above considerations we propose the following set:

- Inter-individual equity (social and gender),
- inter-spatial equity (inter-regional and inter-national),
- inter-temporal equity.

The inter-spatial and inter-temporal dimensions can be further subdivided according to larger or smaller scopes. For our purposes the inter-spatial equity is of particular interest because in RD we will deal in particular with the regional dimension and we will have to clarify its relationship to the national and global

levels. In practice we will therefore distinguish between inter-regional and international equity.

4.2.3 Systemic principles

The emerging, more systemic way of looking at our world, not only has sharpened our view for the problems that the dominant development model has created over the last two hundred years, for the necessity of a more integrated approach. It also gives some indications how to avoid mistakes and cul-de-sac´s although being in a situation of uncertainty and very limited knowledge about the details of the systems we are influencing. As described in chapter 2, since several decades a more systemic way of describing our living conditions is gaining consensus, taking into account multiple interrelationships. The primary shift in the perspective concerns the way of looking at interrelationships and organisational patterns. New concepts have emerged concerning systemic principles which are seen to be essential for vital systems and relationships. They have been developed focusing on different aspects of the vast realm of subjects covered by the concept of sustainability. At difference to the development aspects mentioned above, these principles do not describe specific aspects of our life on this planet or specific development problems, rather they constitute general approaches to reality, tools for describing, understanding and structuring. The underlying idea is, that systems that follow these systemic principles in a balanced way, will probably be able to evolve and to behave sustainably.

Different systematisations have been discussed by various authors. Without referring in detail to the scientific discussion we propose to consider the following set of systemic principles as essentials.

- diversity,
- subsidiarity,
- partnership,
- participation.

Diversity is a concept originating from biological ecology. The diversity of subsystems and organisms is essential for ecosystems in order to be able to adapt to changing conditions and to develop new dominant patterns. The evolution of life on earth strongly accelerated when sexual reproduction allowed for greater diversity. Biodiversity is regarded as a most important indicator for the stability of ecosystems. At the Rio Conference a special convention has been dedicated to biodiversity. The concept of sustainability sustains that diversity is not only a value in the realm of biology, but also in human societies. Also, in culture and in economy diversity is an essential prerequisite of vitality. However, according to the systemic view, diversity cannot be understood as an absolute value. As every system can be understood as subsystem of a larger one, there is

always a tradeoff between autonomy and integration.[66] The principle of redundance, which gives stability to systems, is strongly linked to the principle of diversity, in fact it could be regarded as a special case of diversity. Diversity of subsystems finds its limits where it disrupts the coordinating capacity of the larger system. In this sense the concept of diversity is strongly linked to the next principle: subsidiarity, which stresses more explicitly the dialectic tension between autonomy and integration addressing the interrelationship between a series of system levels. Whereas the concept of diversity originates from natural sciences, the concept of subsidiarity stems from the social sciences, more precisely it has its origins in the catholic social doctrine. According to this principle decision making competencies and power should be allocated to the lowest possible level in the hierarchy of policy making and be delegated upwards only if tangible advantages for all parties concerned are to be expected.

The emerging more systemic, holistic view which emphasises co-evolution, complementarity and interdependence instead of fierce competition, exclusiveness, hierarchy and domination, stresses the importance of partnership in human and institutional relations and of participation of individuals in decision making processes by which they are concerned.

The concept of partnership concerns the character of relationships between individuals and between institutions in a horizontal dimension. It has to do with trustful cooperation in a common framework and with mutual respect. Giddens has shown how much the development of modern society relies on trust. It emphasises the common responsibility of all parties involved. Partnership includes the strive for fair and peaceful resolution of conflicts.

Participation, finally, speaks about the relationship between individuals and institutions. It means that the individuals concerned should be involved in decision making about their future. Participation, therefore, concerns the vertical dimension of societal relationships, the legitimacy of hierarchies. In this sense it is linked to the concept of partnership which concerns horizontal relationships.

4.2.4 Proposal for a systematology of sustainability principles

The groups of basic principles of sustainability developed above represent different perspectives. Obviously in each of them elements of the others are included. The question is now, whether it makes sense to combine them in order to have a set of principles that covers the different aspects of the concept of sustainability as it emerges from the discussions of the last years. The principles should complement each other. As we are trying to reduce the number of basic elements we could leave out a perspective which is completely included by another one. A rough analysis of the interrelationships between the different

[66] See Varela 1979

perspectives shows that all three are giving valuable and complementary contributions to the description of the concept of sustainability. No one of them can be omitted without losing important aspects. Checking the 27 principles of the Rio Declaration against the ten basic element developed here, we found that only the first principle which states that sustainability is an anthropocentric approach, is not covered by one of the basic elements proposed above.[67]

On the other side a review of the sustainability principles proposed in the most known statements of international organisations shows that most of the principles proposed there can be included in the ones proposed above.[68] However, we also can find a long series of more specific principles which propose actions and instruments which could contribute to the more general principles. At first sight an intriguing principle seems to be the call for "Ensuring a sustainable level of population" which can be found among the "strategic imperatives" listed by the WCED.[69] A second look at this problem shows that the intriguing question does not lie in the principle itself, which is a consequence of relating environmental and economic aspects, but in the question who shall take decisions on this issue - a problem that in a similar way also arises with other principles.

As a consequence the collection of principles developed above seems to be a useful set of core principles of sustainability. A complete list is shown in Table 1.

Sustainability Principles

- development dimensions
  - Respect for ecological integrity and the heritage of man-made environment (environmental dimension)
  - Satisfaction of human needs by efficient use of resources (economic dimension)
  - Conservation and development of human and social potentials (socio-cultural dimension)
- equity dimensions
  - inter-individual equity (social and gender)
  - inter-spatial equity (interregional and international)
  - inter-temporal equity
- systemic principles
  - diversity/ redundance
  - subsidiarity
  - partnership/ networking
  - participation

Table 1 Ten Principles of Sustainability

67 See Annex III

68 For an overview see e.g. Department of Justice Canada 1996, Appendix B

69 WCED 1987

4.3 Regional development paradigm shifts in the light of sustainability

Adopting the view outlined above, the discussion concerning regional development is an element of a much broader discussion which eventually led to the concept of SD. Two questions are of prominent interest now. The first one asks, to which extent present theoretical and practical regional development approaches are actually in compliance with the basic elements of sustainability. The second question is looking more at the dynamics, it asks to which extent the developments in RD theory and policy as reviewed in chapter 3 correspond in their orientation to the basic elements of sustainability.

As answers to the second question promise to give a better understanding of the present discussion, we will deal with them first. However, we must be aware that while the meta-dynamics, i.e. the evolution of approaches, may point in the right direction, present policies may still lead to problematic developments. Because of the multitude of existing approaches (see chapter 3) the first question will not be analysed in depth in this paper. The top-down analysis of regional policies in this research project (task 4a) will give a more detailed picture.

An answer to the second question can be given by analysing to which extent the three paradigmatic shifts described in 3.2.3. are supporting the elements of sustainability developed above. This appraisal which will be carried out in the following, must necessarily remain rather generic since these paradigm shifts themselves are an abstraction from a large series of theoretical and practical approaches none of which will show these characteristics in a complete or pure form.

4.3.1 Stronger consideration of the different development dimensions

Environmental aspects have gained much stronger attention through the shift towards endogenous approaches because environment itself is regarded as an endogenous potential in many cases. The specificities of the regional environment have to be examined and conserved more carefully in order to build development strategies on them.

Similarly, the shift from location to development approaches allowed for a more specific consideration of the regional conditions. However, the conditions for innovation and the new attention for growth dynamics are at the centre of this shift, environment is not an essential aspect in this context.

The shift of the focus from abstract factors towards regional actors stresses the importance of networks and the social embeddedness of the circumstances which allow for innovation. This means that the environmental aspect may play a role

when local actors consider it as an important element of their living conditions. Local networks which are conscious of their leeways in shaping the development of local living conditions may show active responsibility towards their regional environment.

Economic aspects anyway play a most important role in regional development. However the understanding of the very specific local conditions of economic development has improved by all these shifts which take a closer and more differentiated look at the regional conditions and interrelationships.

The socio-cultural dimension is most directly emphasised by the third paradigm shift. Also the closer look at endogenous potentials strongly emphasises the role of specific human and social potential for regional development.

The necessity of an integrated approach including all three dimensions is strongly emphasised by all three shifts. Because it is more directly addressing environmental issues the first paradigm shift is the most important in this sense.

paradigmatic changes in RD **SD development dimensions**	From exogenous to endogenous approaches	From location to development approaches	From factor-oriented approaches to approaches focusing on regional actors
environmental	++	+	+
economic	+	+	+
socio-cultural	++	+	++

Table 2 Paradigmatic changes in Regional Development and SD development dimensions

4.3.2 Equity dimensions

As shown in section 4.1.1 equity considerations are at the very origin of regional development theories and policies. Interregional disparities, which have been considered as too large, have been the motivation for introducing regional policies at the national and later at the European level. The paradigm shifts have not diminished the attention for equity questions, but for the inter-spatial dimension this concern has not further increased significantly. The shift form exogenous to endogenous approaches may have ambiguous effects on inter-spatial equity as discussed earlier when looking at the consequences of diversity and subsidiarity for inter-spatial equity. Slightly increased has probably the concern for social equity, since all paradigm shifts consider strong social disparities as an impediment to innovation, vocational training and adequate use of human capital. Also the role of women (gender equity) tends to be appreciated in a new way. All

shifts have brought an increasing concern for inter-temporal equity since all of them imply an increased attention for the specific local conditions.

paradigmatic changes in RD **SD equity dimensions**	From exogenous to endogenous approaches	From location to development approaches	From factor-oriented approaches to approaches focusing on regional actors
Inter-Individual Equity	+	+	+
Inter-regional Equity	?		
Inter-national Equity	?		
Inter-temporal Equity	+	+	+

Table 3 Paradigmatic changes in Regional Development and SD equity dimensions

4.3.3 Systemic principles

The “systemic principles” represent a different view than the “develoopment dimensions” examined above. On one hand these categories are considered as important in order to describe and understand development conditions. They stand for a “new” way of looking at things. On the other they already contain a valuation, in the sense that their intensification is considered essential in order to reach a more sustainable development.

Diversity is an alien category to classical industrialist thinking which stressed mass production, homogenisation and hierarchical unification. All three paradigm shifts in regional development emphasise the importance of diversity. The specificity and uniqueness of the characteristics of a region is looked at as the starting point for development endeavours. Especially the increased attention for endogenous potentials and regional actors stresses the independence of relatively independent subsystems. The co-evolution of different regional economies which complement each other is the new vision. The role of bio-diversity in stable ecological systems somehow corresponds to the idea of flexible specialisation.

The principle of subsidiarity is being strongly and explicitly advocated by the paradigm shift towards endogenous approaches. To a lesser extent the shift of emphasis from location to development also supports devolution tendencies. The third shift also puts a strong emphasis on the embeddedness of innovation and development conditions and on the decision making leeways of regional actors, thereby supporting the sustainability principle.

All three paradigm shifts in regional development promote approaches which include a stronger emphasis on partnership and participation. However, there are

slight differences. Partnership relations between regional actors are particularly important in a view that emphasises the importance of networking between these local actors. Partnership between regions and nations in is tendency also supported by a networking approach. On the other hand participation can be assumed to be most strongly supported by shifting from exogenous to endogenous approaches, where the whole human potential with its creativity , its knowledge of local conditions and its responsibility for regional living conditions plays an important role. However under the labels of “endogenous” “development-oriented” or “actor-oriented” approaches we may well find examples of theoretical and practical approaches which limit the principles of partnership and participation to certain aspects or social groups, easily leading to conditions which may be unacceptable from a more general point of view.

paradigmatic changes in RD **SD systemic principles**	From exogenous to endogenous approaches	From location to development approaches	From factor-oriented approaches to approaches focusing on regional actors
Diversity	++	+	++
Subsidiarity	++	+	+
Partnership	+	+	++
Participation	++	+	+

Table 4 Paradigmatic changes in Regional Development and SD systemic principles

4.3.4 Conclusions

Summarising, it can be stated that the paradigm shifts in RD are in compliance with the basic elements of sustainability. This means that the overall direction of the evolution of RD approaches is compatible with RD. However, whether single approaches really consider all necessary elements, must be assessed in detail.

4.4 Reviewing the elements of Sustainability in the regional context

The systemic approach on which the concept of sustainability is based, implies that perception depends on the perspective one can have from a specific point of view. In this sense the basic elements of Sustainability elaborated above gain specific meanings in the context of regional development.

The aim of this section is

- to investigate more in detail what the concept of Sustainability means for regional development,
- to look at the normative implications of this approach,
- to extract some general normative statements concerning Regional Development (SRD) which can be utilised for the assessment of RD policies.

As Sustainability is a holostic concept where the integration of different perspectives and an openness for learning are essential elements, the ten basic principles of sustainability developed above cannot be seen separate from one another. The innovative approach of sustainability lies in their integration. More concrete indications for sustainability can therefore be gained by combining these principles. Considering the enormous scope of the concept of sustainability it is not astonishing that, while trying to become more concrete, we get an enormous number of statements. Already combining the ten principles in couples, we get 55 different combinations, taking triples, we arrive at several hundreds. The scope of the items raised by the concept of sustainability is so large that a serious discussion of all relevant crosslinks is impossible here. The attempt has failed, to get a reduced number of considerably more concrete principles by crossing the ten principles in a 10 x 10 table and dropping meaningless combinations: senseless combinations could not be found.

To give a first impression on the implications of the principles of sustainability for regional development, in this paper we limit ourselves to a crossing of all ten principles with the three development dimensions, i.e. the first three principles. With equal right other combinations could have been selected.

Before going through systematically the combinations of principles and looking at ther implications for regional development policies, some considerations are necessary concerning the different possible perspectives that regional development policies can have.

4.4.1 Top-down and bottom-up approaches in regional development

Always there have been two kinds of regional development policies. On one hand there are top-down policies at supra-regional levels (European, national, sometimes at subnational levels as the German Länder), which try to promote development in the regions for which they are responsible. Usually they are originally motivated by regional disparities as e.g. the regional policy programmes of the European Union. On the other hand there are bottom-up initiatives which are coming from the regions themselves and which are aimed to foster their own regional development, essentially without caring about others. Some decades ago the emphasis was strongly on the top-down side and a distributional approach dominated these policies. Local and regional policy-makers often saw their task mainly in lobbying for a good share of the centrally administered distribution programmes. After the paradigm shifts described in chapter 3, the general approach payed much more attention to the regional conditions and potentials. Regional policies at supra-regional levels are increasingly aimed at helping the regions to develop their own characteristics and potentials. However, to ensure a certain degree of inter-regional equity remains a central task of present supra-regional regional development policies. Besides coordination functions (e.g. in spatial planning), the supply of centrally managed services (such as technology transfer) and setting frameworks that guarantee equitable development chances (as in agricultural or telecommunication policies), redistributional systems (as the structural funds in the EU) still play an important role in supra-regional regional development policies.

An analysis of regional development policies therefore has to differentiate between different levels of policy making. The concept of subsidiarity will play a central role in understanding the interrelationships beteween the different levels.

Whereas it has been relatively easy to assess the paradigm shifts in RD in terms of their compliance with sustainability, it will be much more difficult to assess actual policies. One difficulty is that with an increasingly integrated approach an increasing number of policies has to be evaluated. At the end of the day all policies have local impacts. The point of reference of regional development policy is the focus on the regional dimension in terms of socio-cultural collectivity, of political and administrative unit, of economic system and of environmental space. In the introduction we have tried to explain why a focus on this level is particularly interesting today.

Regional development policies in the following will be understood as policies aiming at change (development) of human living conditions, focusing at the regional level by taking into consideration the specific and differing conditions that characterise various regions as well as their clearance for action.

4.4.2 Development dimensions at the regional level

The first group of sustainability principles tells us which aspects of regional development have to be considered from a sustainability point of view. This can be stated in rather conventional terms. However, an integrated view of these aspects cannot be taken for granted and in practice will require considerable efforts.

4.4.2.1 The environmental dimension

To take care of the natural and man-made environment is a transversal issue which touches many policy fields. There is a common understanding that respect for ecological integrity requires, at a minimum, conservation of the earth´s "life-support systems"[70]. These include the earth´s climate, maritime systems, smaller ecological systems as forests, lakes etc., the capacity of delivering renewable resources and the capacity of assimilating wastes. In other terms, natural capital, which is composed by all preconditions necessary to perform life-supporting functions, shall not deminish or deteriorate. Biodiversity has been identified as a most essential element of the natural heritage of which whe should take care in order to preserve development opportunities for future generations.

The aspects to be considered at the regional level include the quality of ecological systems as well as human activities affecting them:[71]

- quality of environmental media: air, water, soil,
- ecological systems: forests, lakes, etc.,
- biodiversity,
- human activities: waste disposal, energy supply, use of non-renewable resources, land use etc.

Combining the principle of "respect for ecological integrity and the heritage of man-made environment" with the principle of "satisfaction of human needs by efficient use of resources" (the economic dimension) can lead to serious conflicts. Unlimited human needs, even with a most efficient use of resources, cannot be satisfied with regard to a limited environment. In a regional context difficult questions arise: which levels of resource use in the region are acceptable in the long run? to which extent can a region rely on fereign resources (this touches the principle of interregional equity)? How urgent are changes from the present situation? How shall regions deal with population growth?

Combining the environmental dimension with the socio-cultural dimension, we may discover that some behavior and consumption patterns which strongly shape

70 IUCN 1991

71 An attempt to list the aspects to be considered has been made in task 2 of the INSURED project.

our social relationships (such as the use of private cars) would have to be changed.

4.4.2.2 The economic dimension

Traditionally economic aspects have been the main focus of regional development policies. Looking at economic aspects per se, no new characteristics are added by sustainability. Elaborate information and indicator systems have been implemented. The most important indicator remains the GDP.

The combination of the economic and the environmental dimensions has alredy been shortly discussed above.

How to combine the economic principle of efficient satisfaction of human needs and the socio-cultural principle of conservation and development of human and social potentials is an old and difficult question which permanently asks for new solutions. The changes in societal structures caused by economic dynamics have been debated over the last two centuries. On the other side social structures and cultural heritage shape the specific human needs and define the objectives in relation to which efficiency is measured. The series of questions which can arise when we have to weigh up these dimensions in a concrete situation, is long. The most challenging seem to be at the moment:

- how can regional characteristics and social tissues be maintained and developed in an increasingly internationalising economy?
- how can we reconcile the accelerating pace of economic and technological change with the slowness of social innovations?

4.4.2.3 The socio-cultural dimension

Culture (in its large sense) is a strong differentiating element between regions. As outlined above, cultural characteristics of regions play a role of growing importance concerning the opportunities for further economic development. Regional culture also includes specific ways of dealing with the regional environment. The aspects to be considered in regional development include:[72]

- Preservation of cultural traditions,
- Openness and innovativeness,
- Education and vocational trainig,
- Knowledge and skills,
- Communication patterns, networks,

[72] See footnote 101

- Policy making styles,
- Consumer preferences,
- Political attitudes,
- Dominating organisational patterns (networks, hierarchies, degree of centralisation etc.).

4.4.3 Systemic principles

In the following we will not only look at the systemic principles themselves which have rather abstract meanings. We will mainly explore what they mean when they are applied to the development dimensions.

4.4.3.1 Diversity

4.4.3.1.1 Diversity and the environment

As already outlined above, diversity is a fundamental concept of ecology. It has to be seen in the dialectics between autonomy and integration.[73] A certain degree of diversity seems to be a prerequisite of ecological systems. The preservation of existing biodiversity has been identified as a fundamental issue for the future evolution of life on earth.[74] This does not only hold for the earth as a hole but also for the ecological stabiity of regions. Regional development policies therefore have a strong responsibility to preserve and to develop the diversity of species and of habitats in their scope. Diversity as opposed to monotony is also an aesthetic value.

4.4.3.1.2 Diversity and the economy

Diversity has proven to be an essential element of economic development as well from the point of view of company strategies as concerning regional and national economic development policies. In all cases a balance has to be found between the advantage of stability and flexibility that diversified structures bring about and the perhaps better performance opportunity offered by specialisation. Especially in the last decades this view has gained growing acceptance. Economic diversity allows for a larger degree of autonomy and also allows to reduce long-range material flows. Diversity in economic structures is auspicable within regions as well as between regions in a national and European context. Therefore diversity is an important issue for regional development policies at all levels. The

[73] Jantsch 1979, Varela 1979

[74] The importance of this issue is characterised by the fact that one of the three conventions signed at the UNCED in Rio 1992 is the Convention on Biological Diversity

industrialist development model has had the tendency to foster standardisation of materials, products and production processes in order to achieve cost reductions by mass production, and thereby to reduce and limit diversity. The threat of biodiversity on all continents has been the consequence of the introduction of industrialist methods in agriculture. Since the seventies more flexible production structures drawing on more diversity have shown considerable vitality, creativity and success.[75] The paradigm shifts in regional development described in chapter 3 show that the importance of diversity and redundance is increasingly acknowledged. However, in a short term perspective the option for diversity is mostly not the most efficient choice. In economy, just as in other realms, opting for diversity is an investment for the future, and a strategy, as old as evolution, to deal with uncertainty.

4.4.3.1.3 Diversity and socio-cultural aspects

Variety and diversity of social and cultural structures and traditions are an important value in itself as long as a minimum of social cohesion is ensured. The homogenisation of lifestyles, social structures and traditions, which in a series of aspects can be observed since decades, represents a loss of cultural wealth - however, tendencies towards more differentiation can be noticed at the same time. The regional level is most important in this sense. Differentiable regional identities seem to grow in importance in an increasingly interconnected world. Regional development policies at all levels therefore should sustain socio-cultural diversity within and between regions.

4.4.3.1.4 Diversity of policy and management approaches

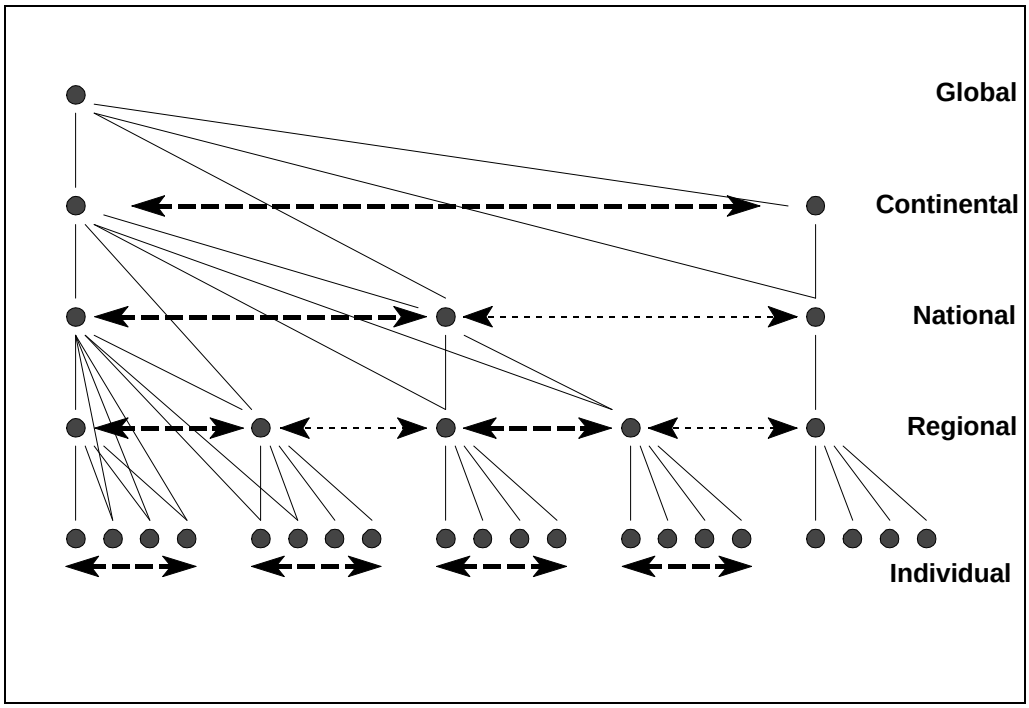
The concept of diversity can be applied to the regional development policies themselves. Since the impact and the outcome of policies are not completely predictable, a diversity of approaches may be useful. This does not mean that different approaches should be applied at the same time on the same issue - this could even make it impossible to evaluate them. However, regional development policies at all levels should leave reasonable clearence for lower decisionmaking levels to choose between different approaches in order to allow for comparisons and learning processes. This directly leads to the idea of subsidiarity.

4.4.3.2 Subsidiarity

The principle of subsidiarity requires that competencies should only then be delegated from a lower level to a higher one, if this really results in better solutions. Actually, this principle leaves a wide clearence for interpretation.

[75] See e.g. Piore/Sabel 1984

However, concerning regional development policies which concern different sizes of territorial units and which are formulated at different policy making levels, this concept is of crucial importance. Therefore it is necessary to have a closer look at possible interpretations and implications. A series of theoretical discussion threads contribute to a systemic understanding of subsidiarity: network theory, regime theory, welfare economy, organisational sociology, functionalist approaches and the economic theory of federalism.



The concept of subsidiarity conceives different decision making levels from bottom up. If coordination is needed between different units of the same level, they create a higher level at which common rules are defined. In Fig. 1 different coordination levels are depicted. How strongly these levels are empowered, to which degree they gain the possibility to enforce decisions against the will of the subunits, depends on the opportunities of the subunits to leave the system, depends on the competition between systems. Each unit or system develops a regime of regulations, to which the subsystems are bound. The question is now, for which issues coordination is necessary and at which levels. In principle that depends on decisions from bottom up and we can see that in history very different answers have evolved in different places. Setting aside very centralistic dictatorial solutions which rely on relatively closed systems with no exit option and little access to information of the subunits (we have just experienced the break-down of such systems in eastern Europe), three approaches for allocation decision-making competencies can be differenciated. We sustain that it makes sense to apply them one after the other.

- From a functionalist view it can be recommanded which should be the highest level to be involved. Looking at environmental problems it seems to make sense that a global problem, such as global climate change, should be addressed at a global level, whereas the protection of a small forest could be dealt with at a regional level. However, things might get more complicate if the endangered forest can be seen as part of a larger economic problem concerning, lets say, large parts of Africa. In this case some international coordination may be useful.
- The economic theory of federalism argues that most efficient solutions can be found at the lowest decisionmaking level. Therefore it seems necessary to make careful distinctions which general rules can be useful at higher levels without preventing local levels from using most efficient ways for meeting the agreed objectives. Climate protection policy is an example: Internationally agreed goals for emission reductions, national committments and policies e.g. concerning the legal framework of the energy system, regional structural policies influencing energy consumption / production patterns and local actions concerning energy conservation investments in public buildings can complement each other. This approach urgers for a permanent search for possibilities of devolution.
- A third approach considers the allocation of competencies under the perspective of the availability of appropriate problem treating capacities. It may be necessary to have very specialised knowledge in order to appreciate problems which are of local character. The importance of some local specimen of an endangered species may not be fully appreciated by members of a small city council deciding on land use planning. This may be a case for the intervention of a higher level authority.

Simple answers are not to be found. However, in a changing world it is necessary to put regularly the question whether traditional distributions of competencies correspond to the concept of subsidiarity. Each policy needs a justification why its aims cannot be fulfilled equally well by actions at lower decisionmaking levels. Competency allocations in regional development policies on all levels and concerning all development aspects are particulary questionable under the perspective of subsidiarity.

The consequent utilisation of this systemic view has consequences for the significance of regional policy making in general. The traditional view is characterised by a duality between the state and the single economic actor (be it a natural or a legal person). The political and economic debate is still strongly shaped by concepts of individual liberty on one hand and state intervention on the other. Fierce debates between right and left wing contrahents are still being faught along these lines. The subsidiarity concept denies this duality and consequently proposes a multi-level approach. There is nothing like a free market without regulations. Every bilateral bargainig, be it between individuals,

companies, regions or states, takes place in some regulatory regime defined by a higher cooperation level. Provided a certain degree of competition at each level is ensured by these regimes, economic mechanisms between individuals are very similar to those between regions or states. This will be discussed further below when considering equity issues. In the view of networking theory, politics is about how to catalyse coordination processes at different levels and how to construct appropriate institutions. If the coordination instances are conceived as organisations which provide some service to their members there is also a competition between coordination instances at different levels. This may set into motion considerable political dynamics when new preferences and new opportunities appear. The strengthening of the role of the EU and the devolution processes which we are witnessing in a series of European countries (Italy, France, Spain) can be interpreted in such a way. This approach allows to see the development of regional policies in a dynamic way. Coordination functions evolve with their attractiveness and their ability to deliver convincing services. In most countries the regional level has no strong institutional shape. Therefore regional development policies aimed at strengthening regional networks and regional competencies must put an emphasis on convincing their potential constituency of the utility of coordination at this level. The evolution of regional identities is an important prerequisite for such a process. However, from a network theory perspective, a neat delimitation of regions for all kinds of regional issues, as regionalist movements are claiming, does not seem to be necessary for strengthening the regional coordination level. Overlapping networks for different tasks are conceivable.

As outlined in chapter 3 new tendencies in regional policy theory and practice strongly correspond to the concept of sustainability. This tendency may be reinforced in the next future by the introduction of orgnisational principles in public services which have been developed in the business world in recent years. However, the aims of business should not be confonded with the aims of politics, where equity considerations are essential.

4.4.3.3 Partnership and networking

In a world view which understands evolution primarily as co-evolution[76] and as an ongoing search for win-win solutions instead of conceiving life as a fight for survival and basically as a zero-sum-game, cooperation in search for new approaches becomes more important than destructive competition and hierarchical decisions about distribution problems. Partnership and networking therefore are a very basic principle for horizontal relations between actors at all levels.

[76] Prigogine/ Stengers 1984, Jantsch 1979, Watzlawick 1986

4.4.3.3.1 Partnership and environmental aspects

Especially the spatial aspects of environmental issues, which are the ones that regional development policies should be concerned about, offer very large opportunites for cooperation and networking. As they are location-specific and are not covered by general environmental policies, they involve specific actors, such as companies, local action groups, regional planning authorities, neighboring regions, water basin authorities etc.. Unless serious distributional problems are involved, networking and cooperation in partnership have proved to be most effective and efficient ways to find problem solutions. In terms of the step theory of environmental policy,[77] the more advanced and effective the approaches are the more innovation and cooperation is needed.

4.4.3.3.2 Partnership and economic aspects

The concept of diversity opens clearence for cooperation on economic issues on all levels. As noted above new tendencies in regional development policies anyway strongly emphasise this aspect.

As economy causes flows of goods and materials which may damage ecological systems, random networking around the globe cannot be a healthy development. Also from an economic point of view this would not lead to stable structures. Having identified regional systems as an essential structure and as a potential stabilising element of European economy, differentiated networking patterns would be desirable. They should strengthen relationships within regions in order to allow for a certain degree of autonomy, stability and identity, concerning external relationships they should focus on those which offer special opportunities. Differentiating between the exchange of material goods and the exchange of information would allow for keeping material flows at modest levels while not impeding the spread of information and innovation.

The spirit of partnership and the capability to build networks is also important in business enterprises themselves. Organisational structures have to be adapted, personal skills have to be developed.

Internal and external competition is an essential element of networks and contributes to their dynamics and capacity of innovation.

4.4.3.3.3 Partnership and socio-cultural aspects

The spirit of partnership as a basic attitude in the relationship between social (often collective) actors is an essential element of sustainability as outlined

[77] Prittwitz 1993

above. It must be rooted in the socio-cultural realm in order to be effective in other fields. Regional development policies at all levels therefore should be aimed at strengthening this spirit. Education and vocational training should put a strong emphasis on developing the corresponding personal capabilities. In order to be able to cooperate across cultures, mutual understanding is essential. Cultural and professional exchange programmes as well as comparative research can contribute to this.

4.4.3.3.4 Partnership and networking as policy approach

Cooperation in a spirit of partnership and network building can also be conceived as a policy approach which is necessary in order to improve sustainability. In order to integrate the various development aspects which should be considered in sustainable regional development, intensive cooperation between different policy fields and administrations is necessary. This cannot be achieved by hierarchical regulations. A spirit of partnership and the capability for communication and decisionmaking in networks is essential in order to deal with the multitude of interrelationships that have to be considered. Sustainable regional development requires definitely an increased capability of politics to deal with complexity. This can only be achieved by more sophisticated and flexible cross-link, feed-back and self-correction features than most political and administrative systems present until now. Cooperation and networking therefore should not only be objectives but also inherent features in regional development policies. In political theory and practice the concept of incorporation of the aims of one policy field such as environmental policy into others has been developed and investigated,[78] in reality multidiemensional incorporation or networking is necessary

4.4.3.4 Participation

Whereas the principle of partnership and networking looks at the horiziontal relationships between actors in development, participation is more dealing with the vertical aspect of relationships between different policy levels.

4.4.3.4.1 Participation and environmental aspects

Participation of all concerned citizens and of correspondig NGO´s is most important for dealing with environmental issues. This means that also acces to relevant information must be ensured. Citizens groups have proved to be very imporatant for early perception of environmental problems and for finding innovative approaches. Personal responsibility for the own regional environment,

[78] Hey 1996

an essential prerequisite for an individual behaviour that takes care of the environment, can only grow when participation is possible. Regional development policies therefore shold be aimed at strengthening the direct responsibility of citizens for their environment by ensuring and enhancing citizens participation and access to information. On higher levels regional development policies must guarantee that the regional representatives have opportunities to participate in decisionmaking processes.

4.4.3.4.2 Participation and economic aspects

Concerning economic aspects, participation plays a similar role. Regional development policies at all levels should enhance the participation of companies, chambers and trade unions in the process of defining development objectives and models. The degree of openness of administrations strongly affects the capability for innovation. In the business enterprises themselves participation opportunities for the employed have a strong influence on their motivation as well as the on flexibility and capacity for innovation of the company. Regional development policies therefore should enhance participation and access to information at all levels.

4.4.3.4.3 Participation and socio-cultural aspects

As with partnership, the spirit of democratic participation is a feature of the general socio-cultural environment. Participation must be learned and actively lived by all actors concerned, it cannot be introduced by a simple decision. Education therefore plays an important role in this sense. Regarding the access to and the availability of information, regional development policies have the responsibility to ensure that adequate regulations and information systems are in place.

4.4.3.4.4 Participation and policy approaches

Participation can be considered as a general politics approach which should help to ensure that policies do not miss their objectives. An early warning about problems, a multiface information on needs and interests, a multiple feedback on policy impact and an instrument for continuous correction of policies and management strategies seem to be most useful and essential for effective policies in a complex and changing environment.

4.4.4 Equity dimensions

4.4.4.1 Inter-individual equity

4.4.4.1.1 Social and gender equity and environmental aspects

Social problems caused by bad working conditions are at the origin of environmental legislation in many countries.[79] The spatial aspect of environmental issues has always been linked to social questions, upper class residential areas have always been in the less polluted and quiet quarters, whereas industrial pollution in pupular quarters was much more frequent. Regional development policies may deliver an important contribution to providing a healthy environment for all citizens.

Concerning gender equity it has been argued that a more equitable distribution of power between men and women would essentially contribute to more respect for the environment and a more caring attitude towards nature. Especially concerning technology development there are good arguments that a stronger female influence could have avoided particularly harmful technological paths.

4.4.4.1.2 Social and gender equity and economic aspects

Social equity has always mainly be seen as an economic question. Regardless of redistributional systems at national levels, regional development policies play an important role in shaping regional economic structures which contain social disparities within acceptable limits. Extreme differences contradict the principles of partnership and participation, cause communication problems and conflicts, impede innovation and lead to a bad use of human potential by strongly limiting the opportunities for large parts of the population. Similar is valid for gender equity.

4.4.4.1.3 Social and gender equity and socio-cultural aspects

Social and gender equity are also a question of culture and education. Regional development policies have a strong influence on the degree of social segregation through housing, land use planning and structural policies. Equal opportunities in the educational and vocational training system are essential for diminishing social and gender disparities.

4.4.4.2 Inter-spatial equity

In section 4.1.2. it has been outlined that a more intense perception of the problem of interspatial equity has been a main driving force for the introduction of

[79] See e.g. Haigh 1995

regional development policies. However, in chapter 3 we have seen that despite considerable transfer payments the original promises of equality could not be fulfilled and that the different potentials had to be recognised. So inter-spatial equity remains a relative concept, leaving clearance for diversity.

In section 4.4.1. we have seen that Inter-spatial equity has not the same meaning at different political levels. Every level has foremost to be concerned about equity between its subunits.

As Fig. 1 shows, we can distinguish between two basic kinds of relationships that have to be considered: Horizontal relationships based on negotiations and vertical relationships defining the affiliation to some system of governance. Horizontal relationships between units at each level (individual economic actors, regions, nations etc.) are governed by rules established at higher coordination levels (regime). At every level we find market-like bilateral bargaining where each unit seeks its own advantage (conventional trade between individual business enterprises, international negotiations between national states etc.). Equity between the negotiating parties must be ensured by a system of rules established at higher levels to which the parties are bound by belonging to the range of competence of a certain unit at a higher level. Equity problems in horizontal relationships can arise when the negotiating parties belong to very different regimes which have very different social, environmental or human right standards. An important element of regimes therefore is to regulate how to deal with external relationships.

As outlined in section 4.4.3.2. concerning subsidiarity, common goods which are shared between different territorial units, need some common regime (this can also be bilateral if only two parties are concerned) which regulates how they can be used. This regime will only fix general rules, the specific implementation of general principles can be left to lower levels. These in turn are partners in the network which defines the common rules and can therefore try to propose and to apply standards before they are generally valid.

The definition of rules for the exchange and thereby of a possible functional division of burdens between different territorial units is particularly intricate concerning environmental issues. The functional dedication of small scale areas as waste dumps or as nature protection zones are generally not considered to be a fundamental problem. The segregation of large landscapes into heavily loaded areas with urban settlements and intensive agriculture on one side and nature protection areas on the other meets increasing criticism. The use of tropical timber in industrialised countries or the export of hazardous waste has been qualified as most questionable in recent years. However good arguments can be found in favour of a responsible timber production in the tropics and against the attempt to compensate highway building by special protection of “biotopes” elsewhere.

In the discussion concerning these problems two approaches can be distinghuished:

- to contain the functional segregation of space at all levels,
- to reduce the scope (and intensity) of material flows.

In the discussions of the last years spatial units of the size of regions below the national level have often been proposed as particularly adequate for giving some orientation in this sense: Regions are large enough to contain areas for most spatial and ecological functions needed, to comprise economic structures which fulfill basic material needs and to have a socio-cultural communication system that shows a certain diversity, competence and completeness in order to be able to ensure a certain autonomous self-regulating capacity of the region. The other level that has strongly gained in importance as spatial frame for orientation and as decisionmaking level, is the continental one.

Regional development policies, therefore, are not only important concerning the economic aspecs of spatial equity, they also have a central role in ensuring spatial equity in environmental issues. Moreover, we can argue that spatial equity in environmental questions is a precondition for people to directly feel responsible for their environment. Therefore regional development policies are a key issue for the whole concept of sustainable development.

4.4.4.3 Inter-temporal equity

Environmental and inter-temporal equity problems have been at the origin of the debate concerning sustainability. Therefore these aspects are those which have been discussed most intensely in the last years. In our perspective this is an important aspect of sustainability but not the only one.

4.4.4.3.1 Inter-temporal equity and environmental aspects

In the discussion concerning inter-temporal equity two important strands can be distinguished: One considers the use of resources, the other considers the problem of dealing with risk.

The concept of resources can be applied to a very wide variety of environmental problems when also dump capacities are considered as resources. Looking at the availability of resources, sustainable resource use can be understood in a strict way as the requirement not to diminish any single resource. In a larger interpretation the question arises to which extent specific resources can be substituted by others. Resource economics have lead to consider the capital stock which will be available to future generations. It is composed of natural and man-made capital. Classical economics do not see any need to restrict the use of natural capital since it is assumed that it can be substituted by man-made

capital and that techical progess will lead to more efficient use. However this can be questioned. As physical production always relies on some kind of natural resources man-made and natural capital are in many regards complementary and not substitutable. Natural capital stocks therefore can only be consumed to an extent in which it can be substituted by other kinds of natural capital or by man-made capital. Again, different definitions are possible: “Resource-Sustainability” requires a minimum level of natural resources, “service sustainability” requires not to reduce the services that can be produced considering the available technologies. The second approach shows the difficulty of arguing in representation of future generations: what will their choices in terms of requested services and adopted technologies be? They may valuate resources in a quite different way than we do today.

From a regional development point of view the question arises, at which spatial scale resources have to be conserved. The allocation of responsibilites for specific resources is a matter of subsidiarity and has been treated above.

The foregoing considerations assume that there will be a certain continuity in the functioning of environmental and social systems. However, risk has become a central element of our living conditions.[80] It has appeared that human impact on environmental sytems has become such that we must consider the risk that catastrophic changes in system behaviour may occur, such as nuclear accidents, severe changes in climate patterns, hazardous increase in ultraviolet radiation due to ozone depletion or dramatic increase of allergies caused by genetic engeneering. The precautionary principle requires that risks be kept low and that in cases of doubt action must be taken to stop or not to start activities with a potentially hazardous impact. As risks cannot completely be avoided, error-friendly technologies and resilient environments are important in order to contain possible damages. Resilience is strongly linked to diversity. Technology assessment theory has produced different approaches to assess risks. One interesting approach is to consider the width and the depth of the impact of the use of technologies[81]. The width of an impact can be exemplified by the extent to which romans deforestated the mediterranean area for energy and building purpouses: cutting a single tree is no problem, to cut a large proportion of the existing ones can lead to a breakdown of ecological systems. Nuclear and genetic engeneering on the other side are examples of deep interventions into natural systems: a single operation which touches very old basic layers of ecological systems on which subsequent evolution has built, can disrupt large ecological systems because it may alter basic preconditions of life (absence of nuclear radiation, barriers between species etc.). Especially technologies with a high depth of intervention may imply high long-term risks and must be dealt with very carefully. As regional development policies have a certain influence on the

80 Beck 1986, Kollek et al. 1986

81 See Gleich et al. 1992

technologies adopted in their territorial scope, risk considerations must be an issue.

4.4.4.3.2 Inter-temporal equity and economic aspects

Also under the aspect of economic inter-temporal equity capital stock considerations are essential and to a large extent identical to those discussed above. An important aspect not yet discussed is the risk of depreciation of man-made capital. In addition to the risks considered usually until now, environmental risks probably have to be considered more carefully. Especially long term public investments ruled by regional development policies such as transport infrastructure are exposed to an increasing risk that the conditions for their use may change during their calculated lifetime. Even more generally speaking, spread out settlement structures which depend heaviliy on private motorised transport, will more likely be subject to depreciation than compact structures, when transport costs are rising because of climate problems. Regional development policies will have to develop appropriate instruments for estimating and taking into account such risks.

4.4.4.3.3 Inter-temporal equity and socio-cultural aspects

Also here we can use the economic concept of capital. Without far-sighted care for human capital long-term regional development policies are not possible. Good educational and vocational training systems are essential for every kind of sustained development. From the above considerations it follows that general skills as communication ability, autonomy, structuring of problems, flexibility and openness as well as an understanding for the specificites of regional networks and potentials may be more important as basic long-lasting competences than specific technical skills which are subject to life-long learning because of ever accelerating depreciation.

Socio-cultural traditions and peculiarities which have developed in specific landscapes as well as the historic built environment are to be looked at as important potentials for developing local and regional identities and perhaps specific economic patterns. Continuity of traditions into the future is a central stabilising element for human communities. In terms of preserving potentials for future generations we should take care of them also if they do not immediately seem functional in the present world.

4.5 Assessing RD policies

The review of the basic principles of sustainability in the last section shows the wide variety of issues raised by the principles of sustainabiity. They cannot be answered in a general way. The principles of sustainability do not relieve us from the necessity to have trade-offs and to make choices. In different European cultures and regions the emphasis will lie on different aspects. It seems that things are not becoming more easy if we try to go more into the details from a general perspective. In order to reduce complexity, a promising approach seems to reinterpret the general principles starting from single problem fields or policy areas.

The set of sustainability principles that we have developed above comprises a series of values which are not new. In assessing Regional Development Policies in terms of sustainability we should therefore look most carefully at the elements of the sustainability concept which are new and which have to be integrated into traditional approaches without necessarily overruling them. The innovative aspects of the concept of sustainability, as opposed to the dominant development model of the last two centuries, seem to be:

- the acknowledgement of the limitedness af natural resources,
- the systematic advocacy for future generations,
- the systemic view that calls for a permanent effort ot integrate different aspects and to ensure openness for learning.

In assessing Regional Development Policies it will be most important to bear in mind possible cross-links between different principles. In this sense the following list of guiding principles for Sustainable Regional Policies which results from the above cross-linking exercise is only one, and necessarily not complete, attempt to interpret the sustainability principles more concretely in a handy format.

Discussions about Sustainable development in a European context show that besides the different interests put forward by different kinds of stakeholders such as industry, labor unions or environmental groups, the concept of sustainability is perceived differently in different European cultures. To reach a consensus has proved to be much more difficult on a European level than in a national context. There is a long way to find out communalites and differences, or better convergences and divergences in a dynamic process of changing views. A common grid for the evaluation of policies in different European regions must therefore leave enough leeway for different interpretations.

The exercise of actually assessing regional development policies in five European regions on the basis of this approach, which will be the next step in this research project, shall not only lay the basis for the identification of useful instruments and strategies for SD, but shall also be understood as an empirical step for refining

the approach developed until here. In this sense it should give us indications about:

- the differences in interpretation of the concept of sustainability in different European cultures,
- the difficulties in discussing a broad European approach with decisionmakers and stakeholders at the regional level,
- the possibilities of simplifying and concretising the general approach,
- the possibilites of reducing complexity by focusing on single policy fields without loosing the general context.

Table 5 Guiding Principles for SRD policies

Guiding Principles for SRD policies

1. The environmental dimension

- SRD policies respect ecological integrity
- SRD policies conserve and develop the heritage of man-made environment
- SRD policies define limits for the use of natural resources

2. The economic dimension

- SRD policies promote the satisfaction of human needs by efficient use of resources
- SRD policies sustain long-term efficiency by promoting creativity and innovation

3. The socio-cultural dimension

- SRD policies take care of the conservation and development of human and social potentials

4. Diversity

- SRD policies preserve and develop the diversity of species and of habitats within their scope.
- SRD policies at all levels enhance diversity in economic structures.
- SRD policies sustain socio-cultural diversity within and between regions.
- SRD policies allow for diversity in policy approaches.

5. Subsidiarity

- SRD policies at all levels are based on a justification why similar results cannot be obtained at lower decisionmaking levels

6. Partnership and networking

- SRD policies are aimed at searching for win-win situations
- SRD policies at all levels are aimed at enhancing cooperation between individuals, companies, regions. They actively support the formation of intra-regional and inter-regional networks and the elaboration of differentiable regional identities.
- In order to incorporate all necessary aspects into SRD policies intensive networking between policy fields is necessary

7. Participation

- Adequate participation procedures are established in all SRD policy fields.
- SRD policies actively support a general environment where participation can be learned and lived.
- Openness for participation is used as an essential instrument for stimulating policy innovations.

8. Social and gender equity

- SRD policies provide a healthy environment for all citizens
- SRD policies aim at containing social differences within acceptable limits
- SRD policies provide equal opportunities for men and women
- SRD policies provide equal opportunities in the educational system

9. Inter-spatial equity

- SRD policies at every level ensure inter-spatial equity within their scope
- SRD policies at every level ensure that trade with other units does not endanger their own social and environmental standards
- SRD policies contain the functional segregation of space at all levels
- SRD policies are aimed at reducing the scope (and intensity) of material flows

10. Inter-temporal equity

- SRD policies are aimed at maintaining the natural capital stock
- SRD policies consider and contain risks arising from the use of technologies
- SRD policies are aimed at maintaining or increasing the man-made capital stock considering all possible risks
- SRD policies are aimed at increasing the human capital by investing into education
- SRD policies preserve cultural heritage

4.6 Conclusions

"Sustainable Development" as a general approach can only be conceived as a "regulative idea". No concrete rules for behaviour can be deduced stringently from this general idea without further assumptions.

More concrete guidelines and specific norms will have to be developed in a societal discussion and decision making process for the specific contexts shaped by the cultural, economic, environmental and political-administrative conditions. Subsidiarity, which can be regarded as one of the main principles of sustainability, must be applied to this process itself. Therefore, sustainability will always have to be interpreted and reinterpreted in different national, regional, local or other more problem-oriented contexts.

In this view the regional level has to play an increasingly important role. The emerging concepts for a shift toward a more sustainable development stress the importance of regional policies. Consensus grows that these policies will have to play an eminent role in implementing the general idea of sustainability. On the other side an analysis of the paradigm shifts that can be observed in regional development theory and practice over the last two decades shows that they are compatible with the emerging concept of sustainability.

The discussion about sustainability has proven to be a particularly difficult one. Early hopes for unambiguous answers to urging problems have been disappointed. One main difficulty of this discussion process is that it is a self-reflexive process. The idea of sustainability is so comprehensive that results of this discussion process considerably influence the framing of the discussion itself.[82] The challenge, therefore, is not to find a generally valuable definition or ultimative checklist for sustainable development, but to develop differentiated procedures by which sustainability of developments, policies or lifestyles can be assessed. However, also these procedures to a certain degree will have to depend on the cultural context and will evolve over time. In this sense, developing a more differentiated understanding what sustainability means and developing procedures for assessing and implementing sustainability can be regarded as two inseparable aspects of the same issue.

To develop these procedures will be a historical task for the years to come in all kinds of societal organisations. We can guess the enormous dimension of this task if we think about the efforts it took to develop assessment and implementation procedures for the more or less successful concretisation of other

[82] "The real challenge of sustainability is to reframe the challenge" (Norgaard 1994:23)

regulative ideas such as public health or freedom. We will therefore have to be modest in our expectations concerning individual contributions to this process.

Presently we find ourselves at a rather early stage of this discussion and transformation process. How the general idea of sustainability will evolve and differentiate in different cultures and which kinds of strategies, procedures and institutions will be implemented is still largely open and subject to an intense and dynamic debate. In this context two principally different ways of approaching the discussion are conceivable:

1. to propose a high-profile highly normative framework which cannot gain consensus yet, but which has some convincing consistency and enough elements of consensus in order to be useful as a reference point in fruitful controversial discussions.

2. to propose a low-profile conceptual framework as a minimum consensus in which different standpoints and valuations can be located, steadily refining this framework with the development of a more concrete and consistent consensus among the communities considered.

In the INSURED project which has been conceived as an intercultural project involving five European countries, we have opted for the second approach. In this paper we have developed a rather large conceptual framework which should enable us to evaluate and compare different European approaches and experiences. While focusing on the regional level which emerges to be crucial for the whole approach of sustainability, the complexity of the issue is still enormous, as we have seen in the last chapter. The complexity at the regional level is exacerbated by the fact that we are witnessing a very dynamic evolution of regional policies and competencies in most European countries. We are in the middle of a process where the idea of subsidiarity is being experimented and is gaining concreteness. The empirical analysis of the way in which the general sustainability principles are being interpreted, concretised and implemented in the model regions of the INSURED project, will hopefully give a more clear idea of commonalities, differences and common perspectives in European regional sustainable development approaches. Besides refining the general framework, a systematic analysis of actual regional practice should show opportunities for mutual learning on the way towards a more sustainable regional development.

5 Annexes

Annex I: Three paradigmatic changes - an overview

rather exogenous oriented **rather endogenous oriented**

Theorem of comparative cost-advantages (Ricardo 1817)
theory of land-using (v. Thünen 1875)
Theorem of comparative cost-advantages (Heckscher 1919, Ohlin 1930)
theory of industrial location (Weber 1922, Predöhl 1925, Isard 1956)
theory of long waves (Kontradieff 1926)
theory of central places (Christaller 1933)
(post)keynesianic- economical model (Keynes 1936, Domar 1946, Harrod 1948)
theory of market-netwoks (Lösch 1944)
theory of sectoral development (Hoover 1948, Fourastié 1954)
export- based models (Sombart 1907, Duesenberry 1950, Andrews 1953)
balanced growth- model (Nurkse et al 1953)
economic base theory (North 1955)
model of circulous cumulative processes (Myrdal 1957)
theory of polarisation (Hirschman 1958)
unbalanced growth- model (Hirschman 1958)
center - peripherie- model (Prebisch 1959)
product cycle theory (Vernon 1950, Hoover/Vernon 1959/60)
model of stages (Rostow 1960)
theory of agglomeration and industrial structure (Chinitz 1961)
theory of locational structure (v. Böventer 1962)
theory of agglomeration economies (Marshall 1890, Scitowsky 1963)
neoclassic- economical model (Smith, Borts & Stein 1964)
basic innovations (Schumpeter 1964)
growth poles (Perroux 1964)
further development growth poles (Pottier 1963, Paelinck 1965, Boudeville 1966)
theory of spatial diffusion of innovations (Hägerstrand 1966)
theory of industrial location and behaviour (Pred 1967)
Kaldor- model (Kaldor 1970)
theory of mobility: goods and services (Ohlin 1931, Siebert 1970)
spatial price theory (Samuelson 1952, Takayama/Judge 1971)
theory of interindustry linkages (Czamanski 1971, Nijkamp 1972)
theory of mobility: factors of production (Siebert 1970/77, Richardson 1973)
theory of urbanisation and clusters (Lasuèn 1973)
concepts of basic needs (Seers 1969, Chenery et al 1974, Friedmann/Douglass 1978)
center - peripherie- model (Friedmann 1973)
theory of self- reliance (Senghaas 1977)
theory of selective spatial closure (Stöhr/Tödtling 1977)
dependence theory (Frank 1978)
polarisation- reversal- hypothesis (Richardson 1980)
theory of industrial districts (Piore/Sabel 1984)
concept of embeddedness (Granovetter 1985)
theory of endogenous regional development (Stöhr 1980, Hahne 1985, Bassand et al 1986)
theory of the national system of innovation (Freman 1988, Lundvall 1988)
new growth- theory (Lucas 1988, Romer 1990)
diamond- concept (Porter 1990)
theory of regional milieu (GREMI, Aydalot/Keeble 1988, Läpple 1991, Freemann 1991)
theory of entrepreneurship and regional development (Sweeney 1987, Suarez-Villa 1991)
theory of regional networks (Williamson 1975, Håkanson 1989, Camagni 1991)
theory of untraded interdependencies (Storper 1995)

Rather oriented towards location **rather oriented towards development**

Theorem of comparative cost-advantages (Ricardo 1817)
theory of land-using (v. Thünen 1875)
Theorem of comparative cost-advantages (Heckscher 1919, Ohlin 1930)
theory of industrial location (Weber 1922, Predöhl 1925, Isard 1956)
theory of long waves (Kontradieff 1926)
theory of central places (Christaller 1933)
(post)keynesianic- economical model (Keynes 1936, Domar 1946, Harrod 1948)
theory of market-netwoks (Lösch 1944)
theory of sectoral development (Hoover 1948, Fourastié 1954)
export- based models (Sombart 1907, Duesenberry 1950, Andrews 1953)
balanced growth- model (Nurkse et al 1953)
economic base theory (North 1955)
model of circulous cumulative processes (Myrdal 1957)
theory of polarisation (Hirschman 1958)
unbalanced growth- model (Hirschman 1958)
center - peripherie- model (Prebisch 1959)
product cycle theory (Vernon 1950, Hoover/Vernon 1959/60)
model of stages (Rostow 1960)
theory of agglomeration and industrial structure (Chinitz 1961)
theory of locational structure (v. Böventer 1962)
theory of agglomeration economies (Marshall 1890, Scitowsky 1963)
neoclassic- economical model (Smith, Borts & Stein 1964)
basic innovations (Schumpeter 1964)
growth poles (Perroux 1964)
further development growth poles (Pottier 1963, Paelinck 1965, Boudeville 1966)
theory of spatial diffusion of innovations (Hägerstrand 1966)
theory of industrial location and behaviour (Pred 1967)
Kaldor- model (Kaldor 1970)
theory of mobility: goods and services (Ohlin 1931, Siebert 1970)
spatial price theory (Samuelson 1952, Takayama/Judge 1971)
theory of interindustry linkages (Czamanski 1971, Nijkamp 1972)
theory of mobility: factors of production (Siebert 1970/77, Richardson 1973)
theory of urbanisation and clusters (Lasuèn 1973)
concepts of basic needs(Seers 1969, Chenery et al 1974, Friedmann/Douglass 1978)
center - peripherie- model (Friedmann 1973)
theory of selective spatial closure (Stöhr/Tödtling 1977)
theory of self- reliance (Senghaas 1977)
dependence theory (Frank 1978)
polarisation- reversal- hypothesis (Richardson 1980)
theory of industrial districts (Piore/Sabel 1984)
concept of embeddedness (Granovetter 1985)
theory of endogenous regional development (Stöhr 1980, Hahne 1985, Bassand et al 1986)
theory of the national system of innovation (Freman 1988, Lundvall 1988)
new growth- theory (Lucas 1988, Romer 1990)
diamond- concept (Porter 1990)
theory of regional milieu (GREMI, Aydalot/Keeble 1988, Läpple 1991, Freemann 1991)
theory of entrepreneurship and regional development (Sweeney 1987, Suarez-Villa 1991)
theory of regional networks (Williamson 1975, Håkanson 1989, Camagni 1991)
theory of untraded interdependencies (Storper 1995)

rather factor-oriented **rather oriented towards regional actors**

Theorem of comparative cost-advantages (Ricardo 1817)
theory of land-using (v. Thünen 1875)
Theorem of comparative cost-advantages (Heckscher 1919, Ohlin 1930)
theory of industrial location (Weber 1922, Predöhl 1925, Isard 1956)
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(post)keynesianic- economical model (Keynes 1936, Domar 1946, Harrod 1948)
theory of market-netwoks (Lösch 1944)
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export- based models (Sombart 1907, Duesenberry 1950, Andrews 1953)
balanced growth- model (Nurkse et al 1953)
economic base theory (North 1955)
model of circulous cumulative processes (Myrdal 1957)
theory of polarisation (Hirschman 1958)
unbalanced growth-model (Hirschman 1958)
center-periphery-model (Prebisch 1959)
product cycle theory (Vernon 1950, Hoover/Vernon 1959/60)
model of stages (Rostow 1960)
theory of agglomeration and industrial structure (Chinitz 1961)
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neoclassic- economical model (Smith, Borts & Stein 1964)
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theory of interindustry linkages (Czamanski 1971, Nijkamp 1972)
theory of mobility: factors of production (Siebert 1970/77, Richardson 1973)
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theory of regional networks (Williamson 1975, Håkanson 1989, Camagni 1991)
theory of untraded interdependencies (Storper 1995)

Annex II: The Rio Declaration and Basic Elements of Sustainability

Principles of the Rio Declaration	Basic elements of Sustainability as defined in chapter 4.1.3
Principle 1: Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.	Sustainability is anthropocentric
Principle 2: States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.	Culture Diversity Subsidiarity
Principle 3: The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.	All equities
Principle 4: In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.	Environment
Principle 5: All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.	Social Equity Interrnational Equity
Principle 6: The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.	International Equity

Principle 7: States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.	Partnership International equity
Principle 8: To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.	Economy Culture
Principle 9: States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.	Economy/ Culture
Principle 10: Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.	Participation

Principle 11: States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.	Environment Economy Integrated approach
Principle 12: States should cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.	Economy International equity
Principle 13: States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.	Environment social equity International equity
Principle 14: States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.	Environment International Equity
Principle 15: In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.	Environment Intertemporal equity

Principle 16: National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.	Environment
Principle 17: Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.	Environment
Principle 18: States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.	Environment International equity
Principle 19: States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.	Environment International equity
Principle 20: Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.	Culture Participation
Principle 21: The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.	Culture Partnership Participation
Principle 22: Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.	Diversity Subsidiarity Culture Participation

Principle 23: The environment and natural resources of people under oppression, domination and occupation shall be protected.	Partnership
Principle 24: Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.	Partnership Environment
Principle 25: Peace, development and environmental protection are interdependent and indivisible.	Partnership
Principle 26: States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.	Partnership
Principle 27: States and people shall cooperate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.	Partnership

6 Literature

6.1 Chapter 2

Adriaanse A. (1995), “In Search of Balance”, in *Accounting for change*, The New Economics Foundation, London

Ansoff I. (1987), *Corporate Strategy*, Penguin Books, Middlesex

Baker P. (1993), “Chaos, Order and Sociological Theory”, in *Sociological Inquiry*, n. 63

Basiago A. D. (1995), “Method of Defining Sustainability”, in *Sustainable Development,* V.3 n.3

Bateson G. (1972), *Steps to an Ecology of Mind*, Chandler, San Francisco

Bauman Z. (1993) , *Postmodern Ethics*, Blackwell, Oxford

Beck U. (1992), *Risk Society: Towards a New Modernity*, Sage, London

Blauner R. (1964), *Alienation and Freedom*, Chicago University Press, Chicago

Briggs J. (1993), *L’estetica del caos*, Red edizioni, Como

Clegg S. R. (1990), *Modern Organizations*, SAGE Publications, London

Commoner B. (1972), *Il cerchio da chiudere*, Aldo Garzanti Editore, Milano

Comte A. (1830-1842), *Cours de philosophie positive*, Rouen, Paris

Daly H. E. (1973), *Towards a Steady State Economy*, Freeman, San Francisco

Daly H. E. (1974), “The economics of the steady state”, in *American Economic Review*

Daudi P. (1990), “Con-versing in Management’s Public Place”, in *Scandinavian journal of management*, V.6 n.4

De Jouvenel B. (1968), *Arcadie. Essais sur le mieux-vivre*, Futurible, SEDEIS, Paris

Drucker P. F. (1993), *La società post-capitalistica*, Sperling & Kupfer Editori, Milano

Edel A. (1995), *Ethical Judgment*, Transaction Publishers, New Brunswick, New Jersey

Freitag M. (1994), “L’Amérique: une société de transition”, in *Société*, n. 12/13

Garrat B. (1994), *The Learning Organization*, HurperCollins Publishers, London

Gelatt H. B. (1991), *Creative decision making*, Kogan Page , London

George S., Weimerskirch A. (1994), *Total Quality Management*, John Wiley & Sons, New York

Giarini O., Stahel W. R. (1993), *I limiti della certezza*, Etas Libri, Milano

Giddens A. (1990), *The Consequences of Modernity*, Polity Press, Cambridge

Gouillart F. J., Kelly J. N. (1995), *Transforming the Organization*, McGraw-Hill, New York

Grint K. (1991), *The Sociology of Work*, Polity Press, Cambridge

Gutiérrez-Espeleta E. E. (1995), “The Approximated Sustainability Index”, in *Accounting of Change*, The New Economics Foundation, London

Haeckel E. (1866), *Generelle Morphologie der Organismen*, Verlag von Georg Reimer, Berlin

Hammer M., Champy J. (1994), *Reengineering the Corporation*, Nicholas Brealy Publishing, London

Handy C. (1993), *Understanding Organizations*, Penguin Books, Middlesex

Handy C. (1994), *The Empty Raincoat*, Hutchinson, London

Handy C. (1994), *The Age of Paradox*, Harvard Business School Press, Boston

Harrison P. (1993), *The Third Revolution*, Penguin Books, Middlesex

Hassard J., Parker M. (1993), *Postmodernism and Organizations*, SAGE Publications, London

Hawley A. (1944), *Human Ecology*, revised edition in 1950

Hays S. (1994), “Structure and Agency and the Sticky Problem of Culture”, in *Sociological Theory*, n. 12

Hickling A. (1975), *Managing Decisions*, Mantec Publications, Rugby

Hobsbawm E. (1994), *Age of Extremes*, Michael Joseph, London

Jacobs M. (1991), *The Green Economy*, Pluto Press, London

Jameson F. (1984), “Postmodernism, or the Cultural Logic of Late Capitalism”, in *New Left Review*, n. 146

Kaku R. (1996), “Il *Kyosei* delle imprese”, Il Sole 24 ore, 31 July 1996

Karas J. et al. (1995), *New Directions for Structural Funds*, The New Economics Foundation, London

Kennedy P. (1988), *The Rise and Fall of the Great Powers*, Collins Publishing Group, London

Khan M. A. (1995), ” Sustainable Development: The Key Concepts, Issues and Implications”, in *Sustainable Development,* V.3 n.2

Lash S. (1990), *Sociology of Postmodernism*, Routledge, New York

Lyotard J. F. (1984), *The Postmodern Condition*, University of Minnesota Press, Minneapolis; (1991), *La condizione postmoderna*, Feltrinelli, Milano

Kosko B. (1993), *Fuzzy Thinking: The New Science of Fuzzy Logic*, Hyperion

Macgillivray A. (1995), ed., *Accounting for Change*, The New Economics Foundations, London

Malthus T. R. (1798), *Essay on the Principle of Population*, first published in 1798

Martell L. (1994), *Ecology and Society*, Polity Press, Cambridge

Marx K. (1859), *Critique of Political Economy*, first published in 1859

McHugh et al. (1995), *Beyond Business Process Reengineering*, John Wiley & Sons, New York

Meadows D. (1972), *I limiti dello sviluppo*, Mondadori, Milano

Mill J. S. (1857), *Principle of Political Economy*, Parker, London, republished in 1968

Milton K. (1996), *Environmentalism and Cultural Theory*, Routledge, London

Minc A. (1993), *Le Nouveau Moyen Age*, Gallimard, Paris

Morin E. (1994), *Terra-Patria*, Raffaello Cortina Editore, Milano

Mullins L. J. (1993), *Management and Organisational Behaviour*, Pitman Publishing, London

Nonaka I. (1991),” The Knowledge-Creating Company”, in *Harvard Business Review*, November - December

Norbert E. (1939), *The Civilizing Process*, first published in 1939

OECD (1993), *Territorial Development and Structural Change*, Paris

OECD (1996), *Integrated advanced logistics for freight transport*, Paris

O’Neill J. (1995), *The poverty of postmodernism*, Routledge, London

Osborne D., Gaebler T. (1992), *Reinventing Government*, Addison-Wesley, Reading

Pantaleoni M. (1913), *Definizione dell'economia. Una prolusione*, Castellani, Roma

Paolucci G. (1993),*Tempi postmoderni*, Franco Angeli, Milano

Park R. E., Burgess E. W. (1936), "Human Ecology", in *American Journal of Sociology*

Pasmore W. A. (1994), *Creating Strategic Change*, John Wiley & Sons, New York

Pearce et al. (1990), *Sustainable Development: Economics and Environment in the Third World*, Elgar, Aldershot

Perman R. et al. (1996), *Natural Resources & Environmental Economics*, Longman, New York

Peters T. (1994), *Crazy Times Call for Crazy Organizations*, Pan Books, London

Peters T. J. , Waterman R. H. (1982), *In Search of Excellence*, Harper & Row

Pigou (1920), *The economics of welfare*, MacMillan, London

Ranchor Prime (1994), *Hinduism and Ecology*, Motilal Banarsidass Publishers, Delhi

Ritzer G. (1996), *Modern Sociological Theory*, The McGraw-Hill Companies, New York

Robertson J. (1985), *Future Work*, Gower Publishing Company, Hants

Robertson J. (1993), *Economia compatibile*, Red edizioni, Como

Rossi P. (1991), Civiltà*, Enciclopedia delle Scienze Sociali,* Treccani, Roma

Samson P. (1995), *The Concept of Sustainable Development*, in Internet "mailto:gci@unige.ch", Copyright &copy, Green Cross International

Senge et al. (1994), *The Fifth Discipline Fieldbook*, Nicholas Brealey Publishing, London

Serageldin I. (1993), *Developmental Partners: Aid and Cooperation in the 1990s*, SIDA, Stockholm

Simon G. (1993), "Amiamo per poter lavorare", in *Die Zeit*, Italian translation in *Internazionale* (28-12-93)

Smith A. (1776), *Wealth of Nations*, Random House, New York

Smith N. I. (1994), *Down-to-earth strategic planning*, Prentice Hall, Sydney

Strati A. and F. (1990),"Active employment policies in Europe", in *Social Policy & Administration*, V.24 n.2

Strati F. (1987), *Politiche del lavoro e iniziative locali per l'occupazione*, Regione Toscana, Firenze

Tiwari D. N. (1995), "Measurement of Sustainability Indicators", in *Accounting for Change*, The Mew Economics Foundation, London

Toffler A. (1981), *The Third Wave*, Bantam, New York

Touraine A. (1984), *Le retour de l'acteur*, Fayard, Paris

Touraine A. (1992), *Critique de la modernité*, Fayard, Paris

Touraine A. (1994), *Qu'est-ce que la démocratie?*, Fayard, Paris

Turner R. K. et al. (1994), *Environmental Economics*, Harvester Wheatsheaf, Hertfordshire

Wallace R. (1761), *Various Prospects of Mankind, Nature and Providence*, first published in 1761

Washington Post, *World's richest people live on tiny Pacific isle*, 3 July 1970

Welford R. (1995), *Environmental Strategy and Sustainable Development*, Routledge, London

Wilson E. O. (1994), "An interview with the father of biodiversity", in *Nature Conservancy*, July - August

World Bank (1986), "Environmental aspects of bank work", in *The World Bank Operations Manual Statement OMS .36*

Wolfe A. (1989), *Whose Keeper? Social Science and Moral Obligations*, University of California Press

WWF (1993), *Sustainable Use of Natural Resources: Concepts, Issues and Criteria*, WWF, Gland

REFERENCES relating to the paragraph "Ecological constraints and sustainable development" (by E. Tiezzi)

(i) sustainable development and natural capital

Costanza R. ed., *Ecological Economics: the Science and Management of Sustainability*; Columbia University Press, New York, 1991.

Daly H.E., *Steady State Economics: the Economics of Biophysical Equilibrium and Moral Growth*, W.H. Freeman and Company, San Francisco 1977.

Daly H.E., *Lo stato stazionario,* Sansoni, Firenze 1981.

Daly H.E. and Cobb J.B. jr., *For the Common Good*, Beacon Press, Boston 1989.

Daly H.E., *Towards some operational principles of sustainable development*, Ecological Economics, 2, 1990, pp.1-6.

Daly H.E., *Steady State Economics*, second edition, Earthscan 1992.

Daly H.E., *Operationalizing Sustainable Development by Investing in Natural Capital*, *ISEE Conference*, Stockholm 1992.

Martinez-Alier J., *Ecological Economics* Blackwell, and refs therein, 1987.

Tiezzi E., *Il capitombolo di Ulisse*, Feltrinelli, Milano 1991.

Tiezzi E., *L'equilibrio,* Cuen, Napoli 1995.

Tiezzi E., *Fermare il tempo. UnÕinterpretazione estetico-scientifica della natura*, Raffaello Cortina, Milano 1996.

(ii) integrating ecology, economics and thermodynamics

Amir S., *The Role of Thermodynamics in the Study of Economic and Ecological Systems*, Ecological Economics, 10, pp. 124-142, 1994.

Binswanger M., *From Microscopic to Macroscopic Theories of Entropic Aspects of Ecological and Economic Processes*, Ecological Economics, 8, pp. 209-234, 1993.

Georgescu-Roegen N., *The Entropy Law and the Economic Process*, Harvard University Press, 1971.

Prigogine I., *Introduction to thermodynamics of irreversible processes*, Wyley, New York, USA 1967.

Rossi C. and Tiezzi E. (editors), *Ecological Physical Chemistry*, Elsevier Science Publishers, Amsterdam, 1991.

Ruth M., *Integrating Economics, Ecology and Thermodynamics*, Kluwer Academic Publishers, Dordrecht 1993.

(iii) ecological-economic indicators

Jorgensen S.E., *Exergy and ecology*, Ecological Modelling, 63, pp.185-214, 1992.

Jorgensen S.E., *Integration of ecosystem theories: a pattern*, Kluwer Academic Publishers, The Nederlands 1992.

Odum H.T., *Systems Ecology,* Wiley-Interscience, 1983.

Odum H.T., *Self-organization, transformity and information*, Science, 242, pp.1132-1139, 1988.

Tiezzi E. (scientific coordinator), *SUS.T.E.E. Sustainability Through Ecological Economics*, EC Environmental Research Programme 1991-1994, Research Area III, Economic and Social Aspects of the Environment, Contract. no. EV5V-CT92-0152.

Ulgiati S., Odum H.T. and Bastianoni S.: *EMergy Use, Environmental Loading and Sustainability. An EMergy Analysis of Italy*, Ecological Modelling, 73, pp. 215-268, 1994.

6.2 Chapter 3

Abart-Heriszt, Lore (1995): Nachhaltigkeit und Wirkungsbezug - neue Paradigmen der Raumplanung. DISP, 1995, April, 31. Jg., S. 6-12.

ARL (1994): Akademie für Raumforschung und Landesplanung: Raumordnungspolitik in Deutschland. Hannover, Arbeitsbericht , 1994 (ARL Forschungs- und Sitzungsberichte Bd. 197).

Arrow, Kenneth J. (1962): The Economic Implications of Learning by Doing. Review of economic studies, 1962, Vol. 29, S. 155-173.

Brugger, Ernst A. (1984): “Endogene Entwicklung”: Ein Konzept zwischen Utopie und Realität. In: Informationen zur Raumentwicklung Heft 1/2.1984, S. 1-19.

Bundesministerium für Raumordnung, Bauwesen und Städtebau (1993): Raumordnungspolitischer Orientierungsrahmen. Bonn: BfLR

Camagni, Roberto P., (Hrsg.) (1991): Innovation networks: spatial perspectives. London/New York: Belhaven, 1991 (on behalf of GREMI (Groupe de Recherche Européen sur les Milieux Innovateurs)).

Castells, Manuel (1995): Regionale Ungleichheiten im Informationszeitalter. In: Lehner, Franz; Schmidt-Bleek, Friedrich & Kilper, Heiderose (Eds.): Regiovision. Neue Strategien für alte Industrieregionen. München: Mehring. S. 34-46.

Cheshire, Paul & Carbonaro, G. (1996): Urban Economic Growth in Europe: Testing Theory and Policy Prescriptions. Urban Studies, 1996, Vol. 33, No. 7, S. 1111-1128.

Crevoisier, Olivier (1996): Proximity and territory versus space in regional science. Environment and Planning A, 1996, Vol. 28, S. 1683-1697.

Fürst, Dietrich (1993): Von der Regionalplanung zum Regionalmanagement?. Der öffentliche Sektor - Forschungsmemoranden, 1993, Heft 13, S. 552-559

Gertler, Meric S. (1995): "Being there": Proximity, Organization, and Culture in the Development and Adoption of Advanced Manufacturing Technologies. Economic geography, 1995, 71. Jg. Nr. 1, 1-26.

Grabher, Gernot (1993): Effizienz durch Redundanz. Die Bedeutung für Regionalpolitik. WZB-Mitteilungen, März 1993, 59, S. 3-5.

Granovetter, Mark (1985): Economic action and social structure: The problem of embeddedness. American Journal of Sociology, 1985, Vol. 91, No. 3, November , S. 481- 510.

Hahne, Ulf & Stackelberg, Klaus v. (1994): Regionale Entwicklungstheorien. Freiburg: EURES, 1994 (EURES Discussion Papers, Nr. 39)

Harrison, Bennett (1992): Industrial Districts: Old Wine in New Bottles?. Regional Studies, 1992, Vol. 26, Nr. 5 , S. 469-483.

Hausmann, Urs (1996): Neither Industrial District or Innovative Milieu: "Entrapreneurs" and their Contexts - An Actor-oriented Framework and Case Studies from Greater London and Zurich. Paper presented at the 36th Congress of the European Regional Science Association, Zurich, Switzerland, 26-30 August 1996.

Huber, Wolf (1993): 'Paradigmenwechsel' in Raumordnung und Regionalpolitik? - Veränderungen in den Sichtweisen der räumlichen Dimension staatlichen Handelns. Der öffentliche Sektor - Forschungsmemoranden, 19. Jg., Heft 4/1993, S. 1-29.

Johannisson, Bengt, u.a. (1994): Beyond anarchy and organization: entrepreneurs in contextual networks. Entrepreneurship and regional development, 1994, Vol. 6, Nr. 4, 329-356.

Koschitz, Peter (1993): Zur Darstellung raumplanerischer Problemsituationen. Prozess und Produkt der Klärung komplexer Probleme im Kontext der Raumplanung. Zürich:vdf (Institut für Orts-, Regional- und Landesplanung, ETH, ORL-Bericht 90/1993).

Krugman, Paul (1991): Increasing Returns and Economic Geography. Journal of political Economy, 1991, Vol. 99, No. 3 , S. 483-499.

Krugman, Paul (1991): Geography and trade. Leuven: Leuven University Press.

Krugman, Paul (1994): Complex landscapes in economic geography. The American economic review, 1994, Nr. 2, S. 412-416.

Lundvall, Bengt-Ake, (Hrsg.) (1992): National systems of Innovation: Towards a theory of Innovation and interactive learning. London: Pinter, 1992.

Malecki, Edward J. (1991): Technology and economic development: the dynamics of local, regional, and national change. Harlow: Longman Scientific & Technical, 1991.

Malecki, E.J. (1983): Technology and regional development: A survey. International regional science review, 1983, Vol.8, S. 89-125.

Marshall, Alfred (1961): Principles of economics. 9th edition, London: MacMillan (1st edition 1890).

Nelson, Richard R. & Winter, Sidney G. (1982): An evolutionary theory of economic change. Cambridge/London: The Belknap Press of Harvard University Press, 1982.

Nijkamp, P., Lasschuit, P. & Soeteman, F. (1992): Sustainable development in a regional system. In: Breheny, M.J., (Hrsg.): Sustainable Development and Urban Form. London: Pion, 1992 (European Research in Regional Science, Nr. 2), p. 39-66.

Piolle, Xavier (1991): Proximité géographique et lien social, de nouvelles formes de territoralité?. L'espace géographique, 1991, Vol. 19/20, Nr. 4, S. 349-358.

Piore, Michael J. & Sabel, Charles F. (1984): The Second Industrial Divide. Possibilities for prosperity. New York.

Ratti, Remigio (1991): Small and medium-sized enterprises. local synergies and spatial cycles of innovation. In: Camagni, Roberto P., (Hrsg.): Innovation networks: spatial perspectives. London/New York: Belhaven, 1991 (on behalf of GREMI (Groupe de Recherche Européen sur les Milieux Innovateurs)), p. 70-88.

RERU (Revue d'Economie Régionale et Urbaine) 81993): Numéro Spécial "Economie de Proximités". No. 3, p. 357-608.

Reuter, Wolf D. (1989): Die Macht der Planer und Architekten. Stuttgart, Berlin, Köln: Kohlhammer. (Reihe Facility Management 1).

Richardson, Harry W. (1978): The State of Regional Economics: A Survey Article. International regional science review, 1978, Vol. 3, No. 1, S. 1-48.

Romer, Paul M. (1990): Endogenous Technological Change. Journal of Political Economy, 1990, Vol. 98, Nr. 5, Part 2, October, S. S71-S102 .

Rosenberg, Nathan (1982): Inside the black box. Technology and economics. New York: Cambridge University Press, 1982.

Schätzl, Ludwig (1992): Wirtschaftsgeographie 1. Theorie. 4, Paderborn u.a.: Schöningh (UTB für Wissenschaft).

Stiens, Gerhard (1994): Veränderte Entwicklungskonzeption für den Raum ausserhalb der grossen Agglomerationsräume. In: Informationen zur Raumentwicklung Heft 7/8.1994, S. 427-443.

Storper, Michael (1995): The resurgence of regional economies, ten years later: the region as a nexus of untraded interdependencies. Revue d'economie régionale et urbaine (RERU), 1995, No. 4, pp. 605-644.

Storper, Michael & Harrison, Bennett (1991): Flexibility, hierarchy and regional development: The changing structure of industrial production systems and their forms of governance in the 1990s. Research Policy, 1991, Vol. 20, p. 407-422.

Suarez-Villa, L. (1991): The evolution of regional economies: Sectoral restructuring and regional development over the long term run. In: Boyce, D. E., Nijkamp, P., & Shefer, D., (Hrsg.): Regional Science. Berlin: Springer-Verlag, 1991., S. 279-316.

Sweeney, Gerry, P. (1987): Innovation, Entrepreneurs and Regional Development. London: Frances Pinter, 1987.

Thomas, Morgan (1985): Regional economic development and the role of innovation and technological change. In: Thwaites, A.T. & Oakey, R.P., (Eds.): The regional economic impact of technological change. London: Francis Pinter, 1985, S. 13-35.

Von Hippel, E. (1988): The sources of innovation. New York/Oxford: Oxford University Press, 1988.

Willke, Helmut (1992): Die Ironie des Staates. Grundlinien einer Staatstheorie polyzentrischer Gesellschaft. Frankfurt am Main: suhrkamp

WZB (1995): Zimmermann, Klaus W. & Kahlenborn, Walter: Umweltföderalismus. WZB-Mitteilungen, März 1995, 67, S. 28-31.

6.3 Chapter 4

Basiago, Andrew D. (1995): Methods of Defining `Sustainability'. In: Sustainable Development, S. 109-119.

Beck, Ulrich (1986): Risikogesellschaft. Auf dem Weg in eine andere Moderne. Frankfurt: Suhrkamp.

Brand, Karl-Werner (Hrsg.) (1997): Nachhaltige Entwicklung. Eine Herausforderung an die Soziologie. Opladen: Leske + Budrich. (= Soziologie und Ökologie Bd. 1)

Daly, Herman E. (1992): Vom Wirtschaften in einer leeren Welt zum Wirtschaften in einer vollen Welt. Wir haben einen historischen Wendepunkt in der Wirtschaftsentwicklung erreicht. In: Goodland, Robert et al. (Hrsg.): Nach dem Brundtland- Bericht: Umweltverträgliche wirtschaftliche Entwicklung. Hrsg. Deutsches Nationalkomitee für das UNESCO-Programm `Der Mensch und die Biosphäre' (MAB) und Deutsche UNESCO-Kommission. Bonn, S. 29-40.

Gale, Richard P./ Cordray, Sheila M. (1994): Making Sense of Sustainability: Nine Answers to `What should be sustainded?'. In: Rural Sociology Heft Nr. 2, S. 311-332.

Giddens, Anthony (1995): Konsequenzen der Moderne. (1.), Frankfurt am Main: Suhrkamp.

Gleich, Arnim von (1989): Der wissenschaftliche Umgang mit der Natur. Über die Vielfalt harter und sanfter Naturwissenschaften. Frankfurt/ New York: Campus.

Gleich, Arnim von (1994a): Forschungs- und Technologiepolitik in der Regionalentwicklung. Ökologische Modernisierung in einer strategischen Allianz. Freiburg i.Br.: EURES-Institut für Regionale Studien in Europa KG. (= EURES discussion paper dp- 40. ISSN 0938-1805) [59 S. DM 20.-]

Gleich, Arnim von/ Lucas, Rainer/ Schleicher, Ruggero/ Ullrich, Otto (1992): Blickwende in der Technologiepolitik. Naturumgang, Bedürfnisse und räumliche Entwicklungsperspektiven der Region Bergisches Land. Opladen: Westdeutscher Verlag. (= Sozialverträgliche Technikgestaltung, Materialien und Berichte Band 32. Hg: Ministerium für Arbeit, Gesundheit und Soziales NRW)

Hahne, Ulf (1985): Regionalentwicklung durch Aktivierung intraregionaler Potentiale. Zu den Chancen "endogener" Entwicklungsstrategien. München. (= Schriften des Instituts für Regionalforschung der Universität Kiel, Bd. 8)

Hahne, Ulf/ Stackelberg, Klaus von (1994): Regionale Entwicklungstheorien. Konkurrierende Ansätze zur Erklärung der wirtschaftlichen Entwicklung in Regionen. Freiburg i.Br.: EURES- Institut für Regionale Studien in Europa KG. (= EURES discussion paper dp-39. ISSN 0938-1805)

Haigh, Nigel (1996): "Sustainable Development" in the EU treaties. London: IEEEP, Institute for European Environmental Policy. (Paper accepted for publication in International Environmental Affairs May 1996)

Haigh, Nigel (1996): Climate change policies and politics in the European Community. In: O'Riordan, Tim/ Jäger, Jill (Hrsg.): Politics of Climate Change. A European Perspective. London: Routledge. S. 155-185.

Hey, Christian (1996a): The Incorporation of the Environmental Dimension into Freight Transport Policy. The EU Study. Freiburg: EURES-Institute for Regional Studies in Europe. (Contract EV 5V- CT94-0378, Sponsored in the Framework of the SEER Programme of the European Commission, DG XII)

Homann, Karl (1996): Sustainability: Politikvorgabe oder regulative Idee? Vortrag auf der Tagung `Ordnungspolitische Grundfragen einer Politik der Nachhaltigkeit', Freiburg 19-20. 3. 1996. BMWI, Bundesministerium für Wirtschaft, o.O. (Manuskript)

IUCN, International Union for Conservation of Nature/ UNEP, United Nations Environment Programme/ WWF, World Wide Fund for Nature (Hrsg.) (1991): Caring for the Earth. A Strategy for Sustainable Living. CH-Gland.

Jantsch, Erich (1979): Die Selbstorganisation des Universums. Vom Urknall zum menschlichen Geist. München: Hanser.

Khan, Adil (1995): Sustainable Development: The Key Concepts, Issues and Implications. Keynote Paper given at the International Sustainable Research Conference 27-29 March 1995, Manchester, UK. In: Sustainable Development Heft Nr. 3, S. 63-69.

Kollek, Regine/ Tappeser, Beatrix/ Altner, Günter (Hrsg.) (1986): Die ungeklärten Gefahrenpotentiale der Gentechnologie. Dokumentation eines öffentlichen Fachsymposiums vom 7.-9. März 1986 in Heidelberg. München: J. Schweitzer Verlag. (= Gentechnologie, Chancen und Risiken 10)

Kuhn, Thomas S. (1967): Die Struktur wissenschaftlicher Revolutionen. Frankfurt.

Luhmann, Niklas (1985): Soziale Systeme. Grundriß einer allgemeinen Theorie. 2. Auflage. Frankfurt: Suhrkamp. (Erstauflage 1984)

Lutz, B. (1984): Der kurze Traum immerwährender Prosperität. Eine Neuinterpretation der industriell-kapitalistischen Entwicklung im Europa des 20. Jahrhunderts. Frankfurt/ Main.

Maturana, Humberto R./ Varela, Francisco J. (1987): Der Baum der Erkenntnis. Wie wir die Welt durch unsere Wahrnehmung erschaffen - die biologischen Wurzeln menschlichen Erkennens. Bern, München, Wien: Scherz. (Originalausgabe 1984)

Meadows, Donella H./ Meadows, Dennis L./ Randers, Jorgen/ Behrens, William W. (1972): Limits to Growth. A Report for the Club of Rome's Project on the Predicament of Mankind. London: Potomac Associates.

Norgard, Richard B. (1994): Development betrayed. The end of progress and a coevolutionary revisioning of the future. London.

Pinter, Laszlo (1996): De-mystifying Sustainable Development through Performance Measurement. Prepared for presentation at the Tom Slick

Conference on "Sustainable Development - Implications for World Peace" Austin TX, 27-29 March, 1996. Winnipeg: IISD / WWW.

Piore, Michael J./ Sabel, Charles F. (1984): The Second Industrial Divide. Possibilities for Prosperity. New York.

Prigogine, Ilya (1982): Vom Sein zum Werden. Zeit und Komplexität in den Naturwissenschaften. 3. Auflage. München: Piper. (Erste Auflage 1979)

Prigogine, Ilya/ Stengers, Isabelle (1981): Dialog mit der Natur. Neue Wege naturwissenschaftlichen Denkens. München: Piper.

Prittwitz, Volker von (1990): Das Katastrophenparadox. Elemente einer Theorie der Umweltpolitik. Opladen: Leske und Budrich.

Prittwitz, Volker von (Hrsg.) (1993a): Umweltpolitik als Modernisierungsprozeß. Politikwissenschaftliche Umweltforschung und -lehre in der Bundesrepublik. Opladen: Leske + Budrich.

Prittwitz, Volker von (1993b): Katastrophenparadox und Handlungskapazität. Theoretische Orientierungen der Politikanalyse. In: Héritier, Adrienne (Hrsg.): Policy-Analyse. Kritik und Neuorientierung. Opladen: Westdeutscher Verlag. S. 328-355. (= PVS-Sonderheft 24)

Prittwitz, Volker von (1994): Politikanalyse. Opladen: Leske+ Budrich.

Sachs, Wolfgang (1989): Zur Archäologie der Entwicklungsidee. o.O.: Entwicklungspolitischer Informationsdienst des Ev. Pressedienstes. (Teile I-VI in epd-Entwicklungspolitik: Aktueller Beitrag 1/ 89, 2/ 89, 3/ 89, 6/ 89, 9/ 89, 11/ 89, 13/ 89)

Schmidt, Siegfried J. (Hrsg.) (1987): Der Diskurs des radikalen Konstruktivismus. Frankfurt: Suhrkamp. (stw 636)

UBA, Umweltbundesamt (1995b): Das Leitbild der nachhaltigen Entwicklung in der wissenschaftlichen und politischen Diskussion. In: Texte Heft Nr. 43/ 95.

Varela, Francisco J. (1979): Principles of Biological Autonomy. New York/ Oxford: Elsevier North Holland.

Vester, Frederic (1984): Neuland des Denkens. Vom technokratischen zum kybernetischen Zeitalter. 2. Auflage. München: dtv. (Erste Auflage 1984. Originalausgabe Stuttgart 1980)

Watzlawick, Paul (1986): Wie wirklich ist die Wirklichkeit? Wahn, Täuschung, Verstehen. München: Piper. (Erste Auflage 1976)

WCED, World Commission on Environment and Development (1987): Our Common Future. Oxford: Oxford University Press.

Weaver, Clyde (1984): Regional Development and the Local Community: Planning, Politics and the Social Context. Chichester, New York: John Wiley & Sons.

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