

Eko-humanizm i systemy dynamiczne jako warunki wstępne dla zrównoważonego rozwoju

Eco-Humanism and Popular System Dynamics as Preconditions for Sustainable Development

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Abstract

This article is parallelly published by Luis T. Gutierrez in the Solidarity, Sustainability, and Non-Violence Research Newsletter – (<http://pelicanweb.org/solisustv03n11michnowski.html>). This article is an overview of a book by the author: "Vision of sustainable development society – future of the world from cyberneticist perspective" (in Polish), published by Polish Academy of Sciences, Committee for Futures Studies "Poland 2000 Plus", Warsaw Poland 2006 (Michnowski, 2006).. This book contains my conclusions from - *System of Life* reality conceptual model based - systems analysis of global crisis essence and world society sustainable development, especially information, conditions creating. The main thesis of mine is: to avoid global catastrophe, NO LIMITS TO WISDOM BASED GROWTH AND SUSTAINABLE DEVELOPMENT OF THE HUMANKIND.

Key words: global crisis, sustainable development, feedback, feed forward, economic planning, ecosystem management, social change, political science, interdisciplinary research, System Dynamics, dynamic monitoring

The next frontier for human endeavor is to pioneer a better understanding of environmental, economic, and social systems. (without system dynamics and knowledge about especially social systems basic properties - LM): (...) when the troubles increase, the efforts are intensified that are actually worsening the situation.
- COUNTERINTUITIVE BEHAVIOR
OF SOCIAL SYSTEMS
by JAY W.

FORRESTER. 1995.

"information is the key to (sustainability) transformation. When information flows are changed, any system will behave differently.
Meadows et. al., *Limits to Growth,*
The 30 -Year Update, 2004.

1. Introduction

The main thesis of mine is: to avoid global catastrophe, **no limits to wisdom based growth and sustainable development of the humankind.**

From *the System of Life* point of view the wisdom is the ability to:

- observe events in Earth - global ecosystem - and space environment;
- get knowledge about processes combined with these events;
- predict future of these processes;
- assess these processes in adequate way;
- support and amplify life-support processes, or
- diminish/decrease and/or eliminate processes dangerous for life (of observer and environment¹).

In order to overcome global crisis, world society will have to achieve sustainable development² – that is development without cyclically returning disasters and the short-sighted construction of new forms of social, technology and/or economic life on the ruins of former life-forms³. Sustainable development – which in a sustained way combines social development with economic development and environmental protection⁴. To carry out Millennium Development Goals - together with sustained economic growth⁵ -

¹ When I use the word “environment” it means social and/or natural environment.

² This is full Brundtland explanation of notion sustainable development: *Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.* (Brundtland, 1987, Part I, 2 p. 27). It puts main stress/accents on development as process. To control this process we need knowledge about its phases and stages as well as constraints that ought to be wisely removed.

³ Forms of life (life-forms): social relations, axiology (dominant values), economics, technology, diet, medicine, infrastructure, etc.

⁴ *Our challenge is to establish a people-centered framework for social development to guide us now and in the future, to build a culture of cooperation and partnership, and to respond to the immediate needs of those who are most affected by human distress. We are determined to meet this challenge and promote social development throughout the world.*

See: (United Nations, 1995)

“Accordingly, we assume a collective responsibility to advance and strengthen the interdependent and mutually reinforcing pillars of sustainable development – economic development, social development and environmental protection – at local, national, regional and global levels.” (United Nations, 2002, p. 5)

We reaffirm that development is a central goal by itself and that sustainable development in its economic, social and environmental aspects constitutes a key element of the overarching framework of United Nations activities. (...). (United Nations, 2005a, p. 10),

⁵ *We also recognize that broad-based and sustained economic growth in the context of sustainable development is necessary to sustain social development and social justice.* (United Nations, 1995, p. 29)

See also: (World Bank, 2006). It is strong UN opposition to “zero growth” conception.

we need to get/create ability to cross/transcend limits to growth in developmental way.

This will require human coexistence models that are qualitatively different from the present ones. The emergence of these new social models will be inter alia pre-condition of the transformation, of the rapid economic and civilization growth of societies which until recently were behind in their development, into a driving force of world society’s sustainable development.

The World is in crisis. We are exploiting our natural resources of minerals and fuels faster than we are gaining access to alternative sources. We are polluting the natural environment and soil faster than the environment can regenerate itself to reach the level suitable for human needs. We are also changing Earth climate and probably electromagnetic field unwisely, in dangerous way. Moreover, access to these valuable resources is fast becoming the object of war (even if fought with modern-day, often invisible, means).

This situation is also complicated due to demographic expansion, especially in those parts of the human family that are lagging in their development.

We are living nowadays/currently in quite/completely new situation: in the **State of Change/Flux and Risk (SCR)**. The changes in the life-conditions⁶ are proceeding very fast with the development of science and technology.

Obsolescing/getting obsolete/out-datedness - moral degradation - of the existing forms of life is currently going on faster than new forms, consistent with new life -conditions of humans and/or nature, are being introduced.

To live in this quite new life-state we have to get ability to develop in anticipatory way. To eliminate, in SCR, negative moral/obsolete destruction effects – feedforward control subsystem and more and more wisdom-based creative activity is essential.

This crisis results mainly in lack of adjustment of two dominating systems - the system of values and the economic system - to this state of rapidly going changes in the life-conditions of humans and nature.

To overcome such crisis we have as the first to change our mindset from social-Darwinistic death rivalry to mutually profitable (win-win) cooperation, from egoism, selfishness and individualism to eco-humanism.

Eco-humanism is a partnership-based co-operation for the common good of all people (rich and poor, from countries highly developed

⁶ Conditions of life (life-conditions): state of socio-economic environment, including natural resources accessibility, natural environment quality, intellectual-, science-technology- and war-potential level, etc.

and behind in development), their descendants, and natural environment - COMMONLY SUPPORTED BY SCIENCE AND HIGH TECHNOLOGY.

In this eco-humanistic approach “common good” means looking for common interest solutions⁷. For the survival of the human race we need to create as soon as possible social relations that encourage “development together with environment (social and natural)” instead of „growth at the cost of the environment”⁸. Simultaneously, the growth of science and technology – especially information technologies (ICT) – made such axiological change possible.

Eco-humanism is a condition for building an information basis for sustainable development policy and economy⁹. Such a basis will allow especially the formation of a qualitatively new economy guided by common good – common interest, in their broadest sense. Such an economy must be founded on a complex benefit-cost account embracing its social and environmental aspects, it should also show preference to ecosocially useful creativity.

At the same time, as the global crisis intensifies, there is no absolute deficit of material resources (minerals, fuels, ecological resources). However there is a lack of knowledge, technology, active intellectual potential and human conscience and time - the factors that are necessary for limiting the futile utilization of scarce resources (and destruction of nature), as well as for developing alternative sources, whilst the resources which are currently under exploitation are being drained/depleted. Approaching generally – there is a lack of popular wisdom and access to information that create such wisdom conditions.

This crisis not only constitutes a serious hazard for everybody; it also constitutes an opportunity. This opportunity will occur if we carry out a radical reconstruction of the mentality and social-, including information-, relations, which could create the possibility for sustainable development.

Currently two methods of overcoming the global crisis seem to be possible.

The first, traditional – “zero growth”¹⁰ and “steady state”¹¹ - method is based on decreasing the number of consumers of the resources that are in deficit. This method represents a pathology of social-Darwinism – mainly Orwellian type eco-fascism¹² - that leads to elimination of the weak, and subsequently - to the extinction of all humans.

The second, alternative method is based on the popularization of intellectual creative activity aimed at the common interest and supported by science and high, especially information (ICT), technology. This would be an eco-humanistic, sustainable development method.

The first, traditional method may seem effective, but only at first glance. Social-Darwinism does not allow the elimination of the crisis-provoking results/effects of the moral degradation (getting obsolete) - of the life-forms - that are not adapted to the new, quickly changing life-conditions.

The higher the level of development and the application of scientific and technological achievements, the faster is the pace of changes in life-conditions of people and nature. This implies a very large acceleration of moral degradation/getting obsolete pace for diverse, previously well-functioning forms of life. And this create necessity to develop science and technology in proper way. For this end we need more and more – not less – human, especially intellectual, work. This work must be motivated by the common good of both humanity and the human habitat, and enabled by information technology.¹³

Moral degradation/getting obsolete is as dangerous as the overexploitation of natural resources. This type of degradation, which is almost invisible, only to an insignificant extent depends on the number of people. It is caused mainly by the development of science and technology. This development cannot be stopped.

In order to eliminate the third factor of global crisis - the moral degradation/getting obsolete of life-forms, which in fact constitutes the basic factor - it is necessary to undertake stability-oriented solutions, which are radically different from traditional solutions.

These non-traditional solutions are:

I - increasing far-sightedness and the flexibility of the methods of human activities;

⁷ See: (Brundtland, 1987, Chapter II EQUITY AND THE COMMON INTEREST).

⁸ *To carry out sustainability transformation (and eliminate overshoot negative consequences (...) visioning, networking, truth-telling, learning, and loving is proposed: Individualism and shortsightedness are the greatest problems of the current social system (...) and the deepest cause of unsustainability. Love and compassion institutionalized in collective solutions is the better alternative.* (Meadows 2004).

⁹ For proper sustainable development policy shaping we need computer simulation methods and knowledge about main social systems properties. See: (Sage, 1977, p. 8), (Forrester, 1995). For world life-process forecasting we need large access to information that currently is possessed individually.

¹⁰ „Zero growth” – see: (Forrester, 1995, figure 8).

“Zero growth (...) an absolutely unacceptable idea for emerging economies and developing countries.” (Merkel 2007).

¹¹ See: Figure 2.

¹² See: (Uexkull, 1994)

¹³ In the light of *System of Life* model, it is impossible to create such big super-computer that surpass wise human aided by this supercomputer (or net/grid of such super-computers). Computers, cyborgs have not intuition and conscience. For life in the State of Change/Flux and Risk we need human wisdom aided by artificial intelligence.

II - supplementing calculations of the costs and benefits of social and economic activity with comprehensively/complex and long-range/farsighted assessed social and natural components;

III - implementing a system of eco-humanistic and intellectually creative activity stimulation and its popularization;

IV - nurturing and developing the wisdom /intellectual potential of the human race.

This requires inter alia the further development of:

- computer simulation methods, such as System Dynamics, for large-scale environmental and social (eco-social) systems);

- flexible automation of production and defense methods, and

- additional development of information and communications technology (ICT).

Also, in order to eliminate negative effects of moral degradation/getting obsolete we need inter alia popularization of the at least medium-level, comprehensive, holistic education of the youth, which would ensure intellectual independence, eco-humanistic approach, responsibility and the ability to participate in the development of science and technology.

It is impossible to prepare the appropriate economic statement without forecasting and a measurable assessment of comprehensive, broad/extensive in time and space, complex results of interdependent human activities and of the other changes in life-conditions of people and nature.

Without such knowledge it is impossible to achieve the Millennium Development Goals.

Less poverty and more work - without knowledge about complex, long-range, effects of work – simply means faster exhausting of natural resources and extinction of nature, i.e. faster pace to global catastrophe.

The information problem is a key issue in overcoming the global crisis and in the creation of socio-technology possibilities for sustainable development of the whole world society. Without access to knowledge about results of human activities and of the other changes in environment it is impossible to change value system into eco-humanistic one. At the same time, it is impossible to get access to above information as long as the eco-humanistic value system does not prevail.

For life in SCR, there is also a necessity of the parallel development of flexible automation of production and defense methods, advanced construction of diverse expert information systems, data bases, and creation of other intellectual, scientific, and technological reserves. These are indispensable in SCR for the quick elimination of the hazards, which were impossible to predict in advance.

The next key problem is harnessing people's wealth to make it serve creative, cognitive-innovative input to the common good. This is a potential for releasing enormous intellectual creative activity, which is so indispensable for eliminating in eco-humanistic way the deficits in material, environmental and spiritual life-resources.

Both contemporary as well as forecasted development of science and technology, especially of information technologies/ICT and System Dynamics, makes the possibility of a significant increase of the level of just sharing of human activity results more real

To overcome global crisis and reach sustainable development we need, as main precondition, to create – with help of System Dynamics – information bases of sustainable development policy and sustainable development economy. It allows to implement eco-humanistic, ultraintellectual evolution instead at present social-Darwinistic one. Instead of selection by the death of unfitted or damp useless commodity, we need to do pre-selection with help of ultraintellectual evolution mechanisms – i.e. in virtual reality by means of computer simulation methods and eco-humanistic valuation.

Introducing ultraintellectual evolution mechanisms will allow to get access to new sources of life-resources before the existing ones are depleted. It will make it possible to avoid catastrophes if they can be predicted in the appropriate lead time. It will then become feasible to build an eco-humanistic information society, instead of “zero growth”, Orwellian information society. It will make it possible to transform the currently unfolding, at times pernicious process of globalization into a new pattern of globalization: inclusive, fair, with human face¹⁴. And, especially, it will make it possible to transform the rapid growth of China and India into worldwide agents of world sustainable development. In brief, to overcome the current global crisis, a radical substitution of ultraintellectual evolution mechanisms for social-Darwinistic ones is essential.

At the same time – by substitution of intellectual creativity for biological creativity – overpopulation pressure will be decreasing.

2. Information bases of sustainable development transformation.

To build intellectual evolution mechanisms, transform value system from egoistic to eco-humanistic, attain the Millennium Development Goals, and – together with above - achieve

¹⁴ We strongly support fair globalization and resolve to make the goals of full and productive employment and decent work for all (...)(United Nations, 2005a). See also: (John Paul II, 2001), (CIA, 2002, 2004), (Merkel, 2007),.

sustainable development of the world society, we need to start as soon as possible large international science-technology and social operation.

The objective of this operation would be to create commonly accessible¹⁵ WORLDWIDE SUSTAINABLE DEVELOPMENT INFORMATION SYSTEM for purposes of:

- dynamic monitoring,
- computer simulation and long-range forecasting, and
- measurable evaluation (assessment), of policy, economic conditions, work, and other changes effecting the life-conditions of human-beings and nature in general¹⁶.

Dynamic monitoring means collecting statistical data, that reflect process of society and its environment life, and transforming them - by means of computer simulation (System Dynamics) - into information about its quality, dynamics, and future of this process. Dynamic monitoring predicts future of monitored process under condition, that any intervention into it will be undertaken. Dynamic monitoring delivers warning forecasting, i.e. long-term early warning information about up to date socio-economy activity negative consequences.

In the State of Change/Flux and Risk situations, life processes are strongly non-linear, usually exponential, chaotic and catastrophic. Thus it is impossible without dynamic monitoring to achieve developmental policy goals and other correct policies due to the unpredictability of global changes.

This Worldwide Information System (of systems) would be:

- net and GRID;
- continuously under development, and
- created with help of System Dynamics method in multi stage way (Nadler, 1969)¹⁷.

For developmental crossing/transcending of world's society limits to growth, centralized world information system can not be efficient. Delays with getting access to data (including new knowledge, that reflect rapidly changed global ecosystem), transforming it into predictions and sending them return to local societies, will make such system ineffective.

In the process of building above world – integrated, distributed, having large information potential - information system additional benefits will be generated:

– if we start to dynamic monitor, we will open “white map” of our ignorance. This will allow us conducting research in a more effective way – in order to get access to the required knowledge.

– when we get warning forecasts, we can try to develop science and technology in such a way, that can enable us to eliminate (or at least mitigate) predicted dangers or decrease its negative effects.

To initiate and coordinate proposed international program of sustainable development-policy and sustainable development-economy information basis building, it would be useful to create **The United Nations Information Center** (POLISH COUNCIL ... , 2003).

The main tasks of this UN Information Center would be:

- creation and coordination of WORLDWIDE SUSTAINABLE DEVELOPMENT INFORMATION SYSTEM facility;
- worldwide dynamic monitoring, including warning forecasting - as well as computer simulation (including backcasting) methods - creation and dissemination.

This UN Information Center would be an element of **UN World Center for Sustainable Development Strategy (UN Strategy Center)** , under the UN Secretary General (Polska Inicjatywa ..., 1997)¹⁸.

The main tasks (subsidiary principle based) of the UN World Center for Sustainable Development Strategy:

- designing and disseminating methods to overcome/mitigate predicted dangers,;
- designing and disseminating other methods of fostering global sustainable development..

The main UN Strategy Center method of promoting world society sustainable development would be information method: specifically, the dissemination of warning forecasts and proposals of ways to overcome/mitigate them

Without this kind of global information and alerts facility converting currently Pernicious Globalization (CIA, 2000) into Inclusive Globalization – fair, with human face - as precondition of achieving world society sustainable development - will not be possible.

The Worldwide Sustainable Development Information System needs to be built in the following sequence:

¹⁵ „in the new world of infinite information resources, one country's creation of wealth based on information can be shared by all. The value of information increases, the more it is shared.” (Utsumi 2005).

¹⁶ Justification of his proposal: (Michnowski, 2002, 2004, 2006a,b).

¹⁷ This initiative is very close to Takeshi Utsumi proposal of large computer simulation methods implementing into world policy, inter alia to avoid wars and support sustainable development policy (GSEED): (Utsumi, 2003, 2006)

¹⁸ From many years this proposal of mine (Michnowski, 1995) has been supported by many of Polish intellectuals: (Polska Inicjatywa..., 1997), (Memorial, 2003), (Polish Council, 2003). See also:

We are focusing on the medium-term because we want action. But it is in the nature of the agenda of sustainable development that we should not lose sight of the long term – not only in our thoughts but also in our decisions. (...) not only on 2015 but also on 2050 (...).(OPENING ADDRESS 2002)

I -.World Dynamic Monitoring and Warning Forecasting System (that include UN world early warning system¹⁹);

II - World Computer Simulation System - for aiding policy design and assessing technological, organizational and environmental changes.

III - Information/knowledge basis for the sustainable development-economy.

To take the first steps towards building a World Dynamic Monitoring and Warning Forecasting System we ought to use resources that already exist in this field.

Therefore it is proposed to:

- update the Meadows's (System Dynamics) type world warning forecasting (and comprehensive monitoring of Earth) year by year (Meadows et al, 1972, 1993, 2004);

- include into World Dynamic Monitoring and Warning Forecasting System, the Global Earth Observation System of Systems (GEOSS) and other early warning systems²⁰.

- transform global, regional and national statistical offices into offices for statistics, dynamic monitoring and warning forecasting (i.e. long range early warning),

- build an international system of mutual access to forecasting methods, data, knowledge, and forecasts that are necessary for global and local dynamic monitoring, warning forecasting, other computer simulations and changes evaluation.

To realize/implement the above proposal it would be timely to convince International Telecommunication Union and UN leadership and specialists that Meadows's-Forrester System Dynamics warning forecasting method, done annually and in developing way, ought to be included into UN program of the world early warning system facility²¹.

We recognize sustainable development requires a long-term perspective and broad-based participation in policy formulation, decision-making and implementation at all levels.(...), (United Nations, 2002).

¹⁹ It is not enough "(f) To work expeditiously towards the establishment of a worldwide early warning system for all natural hazards (...)". See: (United Nations, 2005). We also need precautions when faced with man made hazards and/or disasters.

There are two kinds of early warning systems: long-term early warning systems and short-term early warning systems. To avoid tsunami-like catastrophes we need short-term early warning systems. To avoid for example climate changes negative consequences we need long-term early warning system. Meadows's-Forrester early warning system is a long-term one. Good long-term early warning system as well as dynamic monitoring create prognoses that require a change of policy which allow to avoid predicted negative consequences of current policy

²⁰ It would be useful to include also Takeshi Utsumi Globally Collaborative Environmental Peace Gaming project (with a globally distributed computer simulation system), into above program realization (Utsumi, 2003, 2006).

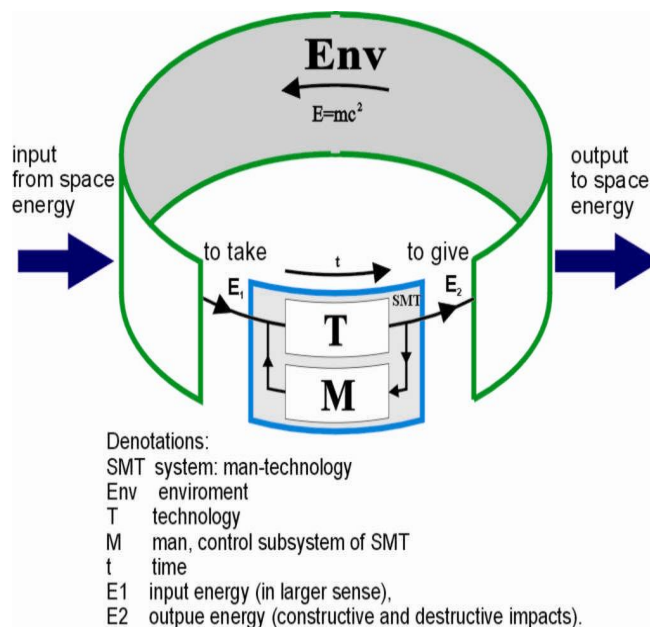
²¹ See above no 21 note.

3. International sustainable development information research program – for life in the state of change/flux and risk

To respond to UN calls for sustainable development, social justice, sustained economic growth, fair globalization, and Millennium Development Goals (MDGs) as well as WSIS follow-up²², we ought to initiate a sustainable development information research program that integrates all phases and stages of life in the State of Change/Flux and Risk. .

This research program ought to test the following theses:

Figure 1. Global ecosystem as a man-technology-environment (SMTEnv) open system



²² "67. We are firmly convinced that we are collectively entering a new era of enormous potential, that of the Information Society and expanded human communication. In this emerging society, information and knowledge can be produced, exchanged, shared and communicated through all the networks of the world. All individuals can soon, if we take the necessary actions, together build a new Information Society based on shared knowledge and founded on global solidarity and a better mutual understanding between peoples and nations. We trust that these measures will open the way to the future development of a true knowledge society." (United Nations, 2003).

I – the main cause of global ecosystem degradation is rapidly accelerating moral/obsolete degradation of existing forms of life - not aligned to the new rapidly emergence life-conditions;

II – it is impossible to eliminate above moral degradation negative effects, overcome global crisis, achieve sustainable development and stop defense terrorism – while continuing social-Darwinistic world social relations;

III –developmental crossing/transcending of limits to growth, as well as wisdom based growth and sustainable development are possible and essential for avoiding global catastrophe and achieving sustainable development of world society.

IV – without building information bases of sustainable development-policy and sustainable development-economy realization/achieving of above the main United Nations goals is impossible.

V – to adopt world society to life in the State of Change/Flux and Risk, System Dynamics popularization and further – inter alia in GRID way - development is essential.

If these theses prove valid, then we ought to build a world information system that is designed for the purpose of recognizing and developmental crossing/transcending world society's limits to growth.

This research ought to give us answers also to the following questions:

1. How to provide policy-makers - and societies – with access to knowledge about complex (and future) effects of current policy (their own and other policy-makers)?
2. How to get access to data and knowledge that are necessary for dynamic monitoring, warning forecasting and elimination of negative moral/obsolete degradation effects?
3. How to combine existing statistic and knowledge bases as well as forecasting systems and projects into Worldwide Sustainable Development Information System?
4. How to transform global, national and regional statistical offices (e.g. EUROSTAT) into offices for statistics and dynamic monitoring, including warning forecasting?
5. How to build the information basis for sustainable development-economy?
6. How to make possible comprehensive/complex accounting of benefits and cost of socio-economic activity (including natural and social - human components)?
7. How to make possible dividing of effects of work social process proportionally to ecosocial usefulness of individual and/or collective work?

4. Sustainable development and the global crisis in the system of life view.

Having defined the requirements for a social system to be a life-system, and the scenario for such a life-system to be in the State of Change/Flux and Risk (SCR), the following subsections elaborate on sustainable development and the kind of information systems that will be required to support sustainable development.

4.1. Conclusions based on conceptual systems analysis.

The above conclusions follow from systems analysis that was done by means of conceptual model of reality - *System of Life (SoL)*²³. The *System of Life* is a complex systems model. It was built in the axiomatic way²⁴. The *System of Life* reflects general static and dynamic properties of life-systems different types/kinds. Life-systems are: open systems with homeostasis ability²⁵, natural systems²⁶, dynamic systems²⁷, autonomous systems²⁸, information systems under development²⁹.

System of Life reflects common properties - for example: societies, industrial corporations, other organizations, and/or systems: man (human)–technology–environment (SMTEnv – figure 1³⁰), as well as its supersystems (sets: life-system – environment, i.e. including global ecosystem) and subsystems.

Environment Is the life-system too. The *System of Life (SoL)* reflects especially the essence, logic and conditions of life-systems development and regression.

World society - in the *SoL* approach system: man - technology (SMT) is a subsystem of the global ecosystem – Earth. Other societies/social systems – also SMT - are subsystems of world society. For them the environment consists of social and natural life-systems. Earth – the global ecosystem – is subsystem of the Universe. Both the

²³ This model was built according to A.P. Sage condition of proper systems engineering-based policy formulation process. (Sage 1977, p.8.)

The large part of the *System of Life* conceptual model description, as well as justification of necessity to introduce it into politics has been explained inter alia in papers presented in Palermo, Oxford and Nijmegen System Dynamics Society conferences papers (Michnowski 2002, 2004, 2006a). See also: (Michnowski, 1995).

²⁴ According to J. M. Bochenski it is possible and useful to transform philosophical knowledge in axiomatic way. Axiomatic method in systems analysis was also proposed in: (Forrester, 1961).

²⁵ See: (Bertalanffy, 1952).

²⁶ See: (Laslo, 1972).

²⁷ See: (Forrester, 1961).

²⁸ See: (Mazur, 1999).

²⁹ See: (Michnowski, 1989). Compare: (Wiener, 1971).

³⁰ Compare (Commoner, 1971).

Universe and the Earth are life-systems too. Planet Earth arose during the natural evolution process from cosmic/space energy (Bing Bang hypothesis). This space energy continuously supports life of Earth as a global ecosystem. The Earth, as well as all social systems, are changing continuously and irreversible.

To support life, a social system must obtain energy (substantial and waves) from its environment and transform it by work for:

- eliminating negative environmental impacts on it;
- eliminating negative impacts of its own activity;
- adapting its own structure to the changing environment;
- transforming itself in the developmental way.

When a social system is “young” – i.e. on a low level of development and inertia – then it can do this work using only feedback control. When a social system is much more/largely developed - and has big inertia – this work must be done using feedforward control in addition to feedback control, i.e. in pre-emptive development way.

When a social system is “young” and therefore has small outer destruction potential and when environment is in a development state, such social system can live and grow “at the cost of environment”. “Young” social system under development can and must take from environment “more”, than “give” to it.

But when the social system has matured and has grown so large and powerful that it can destroy the life of its environment - its life support agent - it has to change its life-support activity patterns in such a way that it allows support of the socio-natural environment (inter alia, the biosphere, which is the human habitat) for it to remain alive and healthy. This requires its “giving” to the environment “more” than it “takes” from the environment. Otherwise, the destruction of the environment is inevitable. “Taking” from environment “more” than it is “given back” is unwise and in due time will induce the collapse of the entire social system.

Large, highly developed social system must substitute “development together with (socio-natural) environment” life-pattern for the obsolete/moral destructed “growth at the cost of environment” until now efficient life-pattern.

To “give” the environment “more” than is taken from it, and at the same time realize own development is theoretically a very difficult task. To achieve such effect of life, world society needs create popular wisdom, eco-humanistic axiology and very efficient information (including science) support system.

To combine own development with rapidly changing environment is an enormous information challenge.

The social system - SMT - consists of two subsystems: **the human subsystem and the**

technology subsystem. The human subsystem is an SMT control subsystem. It includes only those humans that fulfill functions of knowledge developers, innovative designers and/or life-process decisions makers. The technology subsystem includes not only “pure” technology, but also those humans that fulfill passive role in society's life-process – mainly as work force controlled by the human subsystem.

As the range and intensity of environmental changes increase, more humans ought to be transferred from the technology subsystem to the human subsystem. It also means real humanization of work conditions.

4.2. Elements of the System of Life (SoL) conceptual model

This section provides the axiomatic basis for *SoL*, as well as a description of the *SoL* life-systems properties.

4.2.1. The basic *SoL* axioms

The life-system is built from energy (in the broadest sense, including energy in both substantial and waves form³¹) –

$$E = mc^2.$$

The main axiom, that is the basis for this model is:

$$i = B(n,q)1/s$$

where:

i - the level of information (Wiener, 1971) – conceptual measure of life-system development (and organization, as well as the quality of life-system) level; ;

s - the level of ecosocial entropy (Michnowski, 1995, 2006) as well as the level of development-reserves of life-system;

n - the number of its elements;

q - quality of elements of life-system, and

B(n,q) - some function connected with quantity and quality of life-system elements.

The higher life-system quality, higher its longevity is and the more differentiated elements and higher elements quality it includes.

Eco-social entropy (isomorphic similarity to thermodynamic entropy) is:

$$s = k \ln w,$$

where:

k – some constant, life-system kind conditioned;
w – number of different time-space configurations of set: life-system–environment, elements that allow to reach this same life-system quality state (for example – this same life-span/longevity and/or creative efficiency).

³¹ Compare (Sedlak,1985, Bogdanski, 1985)

The Universe is a system (Bertalanffy, 1968). Its subsystems and elements are mutually interdependent in accordance to:

$$\frac{dQ_1}{dt} = f_1(Q_1, Q_2, \dots, Q_n)$$

$$\frac{dQ_2}{dt} = f_2(Q_1, Q_2, \dots, Q_n)$$

.....

$$\frac{dQ_n}{dt} = f_n(Q_1, Q_2, \dots, Q_n)$$

where n is the number of Universe elements.

The Universe is infinite: $n = \infty$.

4.2.2. The basic SoL life-systems properties

Consider the expression

$$Is = \langle E, Ri, Re, \Theta, i, t \rangle$$

where:

Is – life-system;

E – Is elements;

Ri – internal relations;

Re – external relations;

Θ – Is life-span, longevity;

i – level of Is development (and information);

t – time.

The main goal of life-system is to support the life of the supersystem, i.e. its own and environment's. The life of the life-system – an open system - depends on the life, high quality and adequate form of environment – life-support main agent.

The life-system is firmly connected with environment. The life of the life-system depends on the mutuality between life-system and environment. For life-system life, environment should have high its life-quality and appropriate form – adequate to life-system life-needs and structure. When the environment changes, the life-system structure must be changed adequately too.

The life-system have homeostasis ability to defense life in supersystem (set: life-system – environment) and cooperate for supersystem development.

Life-system structure consists of microstructure and macrostructure. Microstructure is a structure of the life-system elements. Macrostructure combines – by means of feedbacks – the life-system elements in system wholeness. Its microstructure is changing nearly continuously. Macrostructure is changing periodically.

The life-process is information creating- and entropy growth opposing- process.

The creation of information (in Wiener sense) depends on proper work that causes such less-probable changes in time-space configurations of set: life-system – environment, elements that it allows to put up life-system quality. Together with its longevity of the life-system, and its creative efficiency also grows.

The life-process is strongly non-linear, usually exponential, chaotic and catastrophic – In any case, not fully predictable. It is irreversible too.

Life of the life-system depends therefore on the efficient creation of information in set: life-system – environment, (information in Wiener's sense) and/or putting down the intensity of entropy process that inevitably coexist with all life-support activities.

Life-span/longevity of life-system is finite but not determined. It is possible to increase its life-span by proper developmental policy (the one that causes growth of life-system information level). The higher the life-system's information level, the greater its longevity and creative efficiency are.

In order to sustain life, humankind needs to keep enhancing also all forms of access to reflection information, i.e. information that adequately reflects changed static and dynamic of above set (past and future - data, knowledge, prognoses, etc.)

The life-system – for example system: “man-technology” (SMT, figure 1) - takes life-support energy (in larger sense) from environment, transforms it for support its life and development, and – after that, already internally useless (getting relative entropy growth) - emits this energy into environment.

This energy emitted to environment, if it is appropriately processed – up-graded adequately to environment life-needs – will support life of environment and create environment impacts positive for life-system.

The form of this out-put energy, its negentropy creative potential, depends on life-system structure, its accessibility to reflection information, changes power, and its value-system.

The environment is changing permanently. The life-system is inertial system. The more developed a life-system is, and the more elements it is built of, the higher the system inertia is. To adapt a life-system structure to new environmental impacts on it, this adaptation ought to be done on the basis of predictions of new environment states to come. To adopt properly life-system external impacts (on environment), it is necessary to continuously predict future environment life-needs and start life-system adaptive transformations in pre-emptive way. It is necessary also to control permanently future environment impacts on life-system to avoid negative consequences of environmental changes.

It shows how more and more reflection information, as well as ICT and flexible automation (cyborgs, flexible manufacturing systems, and other flexibility technology means) is needed to predict future of humankind chaotic life-process and support its development (when catastrophe changes are also possible). How big amount of reflection information and general information potential humanity ought to create for sustainability, if the set: humankind – environment, is probably infinite?

To maximize humankind life-span/longevity we have therefore to enlarge humankind active intellectual creative potential and information efficiency. For this end we need also to speed up humankind integration, as well as wisely enlarge human population and wisdom activity intensity.

Wiener's information premise (axiom), and my own interpretation, indicate that **the ability of humankind to survive is connected with wisdom, which is to be continuously pursued by all human beings, as it is indispensable for human development.**

Furthermore, if and when humanist crosses the real carrying capacity of the Earth – **the human race, if it wants to survive, ought to expand into Cosmos. And - if other cosmos civilizations exist - to integrate with them in eco-humanistic way.**

4.2.3. Why do we need sustainable development instead of steady state?

The life-process consists of both development and regression. The development process causes life-

system's longevity and creative efficiency growth. The effects of regression process are opposite.

Positive synergetic effects of appropriately integrating – with development – properly (in complementary way) differentiated elements into new elements is the main agent of development

In the period of life-system's life - as a result of life-process - there are different life-system's life-states: developmental, and regressive.

In developmental life-state the life-system can be successively:

- internally constructive and externally destructive (immature life-systems. 1st stage of development), and (as a next)
- internally and externally constructive (mature. 2nd stage of development).

In regressive life-state the life-system can be:

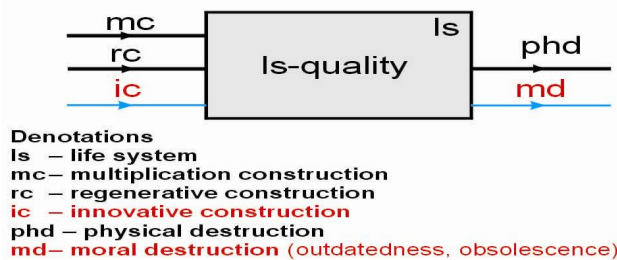
- internally destructive, externally constructive (1st stage of regression), or
- internally and externally destructive (2nd stage of regression).

(Constructiveness – when positive (negative entropy) impacts prevail negative (entropy) one. To be externally constructive, means „to give (environment) more than to take”. **Synergy is the main means of constructiveness.**

A “young” life-system - still under early, 1st stage of development - grows and develops “at the cost of the environment”.

Mature life-system – i. e. highly (not only science-technologically, but also ethically) developed - can be constructive both internally and externally, contributing to strengthening the life-giving capability of the environment (Kozłowski, 2000). (This maturity is conditioned on wisdom, access to adequate

Sustainable development conditions Creation over destruction sustained surplus



Development (Is quality growth)

$$mc + rc + ic > phd + md$$

Regression

$$mc + rc + ic < phd + md$$

Steady state

$$rc + ic = phd + md$$

Figure 2. Sustainable development, regression, and steady-state conditions

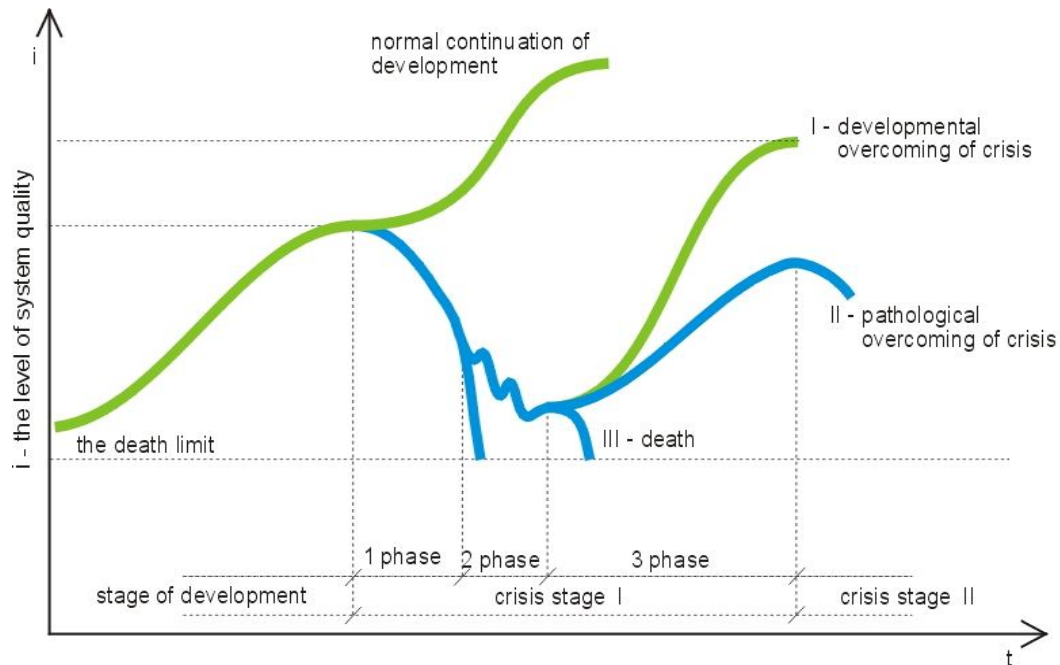


Figure 3. Life-system development and phases of crisis

reflection information and system's skill/ability to use this information in way appropriate for mutual development).

Every act of life-system itself or environment life-systems simultaneously causes two opposite effects on the life-system: **positive (negative entropy) and negative (entropy)**. The total effects of these acts create developmental or regressive impacts on every life-system that make up the supersystem (set: life-system – environment). The net effect of these negative regressive impacts may be the destabilization of the life-system. Then it becomes necessary to undertake another homeostasis developmental act that is essential to support life-system development. Therefore the trajectory of life system development is not really so smooth, as it will be shown on Figures 3 and 4.

The life-system develops, when positive impacts on it, surpass negative ones (figure 2). In this figure, the effects of different kind life-system's actions – their influence on life-system's life process are shown.

On the left side of this picture are shown only positive effects components of three different kinds of actions. On the right side of this picture there are shown summarized effects of these different actions: physical destruction and obsolete/moral destruction. Life-system development is conditioned upon total positive component impacts surpass over total negative impact on it. Figure 2 does not show environmental impacts on the life-system that can be positive or negative.

The life-system develops in sustained way when it avoids lasting/durable periods of regression. When life-system is in crisis there are some periods of life-process when it quasi-develops – in phase 2 and 3 of crisis (figure 3).

To reiterate: A precondition of sustainable development is creation (positive effects) over destruction (negative effects) sustained surplus.

Positive development impacts on the life-system (figure 2) can be the result of:

- proper multiplication of existing life-system elements number;
- regeneration of only physically degraded life-system structures and/or elements;
- innovation activity, adequately modernizing life-system and/or environment structure.

These positive impacts can be also the result of environment's improvements.

There are two kinds of negative impact effects on life-system:

- physical destruction, and
- moral/obsolete destruction.

Moral/obsolete destruction (physically not destroyed life-forms but not adequate to new life-conditions) is a result of environment changes. The higher environment changes rate, the higher intensity of moral/obsolete destruction is.

For short-term supporting life-system life we need at least elimination of negative for it effects of above physical and moral/obsolete destruction. It includes restricted adaptive activity that allow only temporarily to continue life in the new life-

conditions. As a result, the life-system is kept in "steady state".

To support life-system life in the long-term way we need additionally developmental activity that allows developmental surplus creation.

Developmental surplus – which is an effect of internal life-system constructiveness – is used for:

- adapting life-system forms of life to new life-conditions;
- changing forms of life-system life into forms, which are more efficient, less destructive;
- changing environment into form more friendly for life-system;
- accumulating life-reserves for dealing with the "unknown/unforeseeable".

This developmental surplus is essential for life-system ultrastability and limits to growth developmental crossing/transcending. Sustained developmental surplus is the essence of sustainable development.

In the State of Change/Flux and Risk (SCR) any crisis can cause – in catastrophe way – global collapse. To eliminate negative consequences of rapidly, in SCR, pacing moral degradation/getting obsolete, we must put down every other forms of humankind degradation. It is inter alia a complex System Dynamics problem.

To put down the rate of physical destruction, we ought - at first glance - to diminish the rate of consumption, as usually called for by ecologists. But "prestige" consumption is very strong factor of creative activity stimulation. "Efficiency" consumption is also basic factor of building active intellectual potential of weaker parts of world society. Such form of consumption increases every one creative potential. Therefore for sustainable development we need sustained economic growth stimulated by means of distributive relations based on principle of ecosocial justice. Who (matured) more give to humankind wealth, he/that can and ought take more from this commonly built wealth.

The way to become wealthy is to put/give more for the common good than you take from it; else, society will inevitably be destroyed.

It follows that, from a, *System of Life* point of view, overcoming global crisis by keeping the world society in "steady state" may stabilize it for an indeterminate period of time, but in the long term would make impossible such life-system survival in the midst of rapid, often chaotic and catastrophic, environmental changes. .

World society in "steady state" (figure 2) would have not possibility to adequately multiply humankind intellectual potential and accumulate life-reserves - for dealing with the "unknown/unforeseeable".

Furthermore, in order to survive and attain sustainable development we have to create a world life-process control system, that does not allow for "overshooting".

To overcome negative effects of developmental "overshoot" we need "backcasting", i.e. to get knowledge about limit to growth that was crossed in pathological way and create means of transcending it properly (figure 3). To properly control world life-process we need inter alia knowledge about the behavior patterns of the world society in all phases and stages of development. The longer a crisis lasts, the more difficult restoring development will be (Figure 3). A crisis always causes degradation of the life-support agents.

4.4. Phases of life-system development

The life-process, as well as development process, is going through its phases and stages.

There are two kinds of development process phases. .

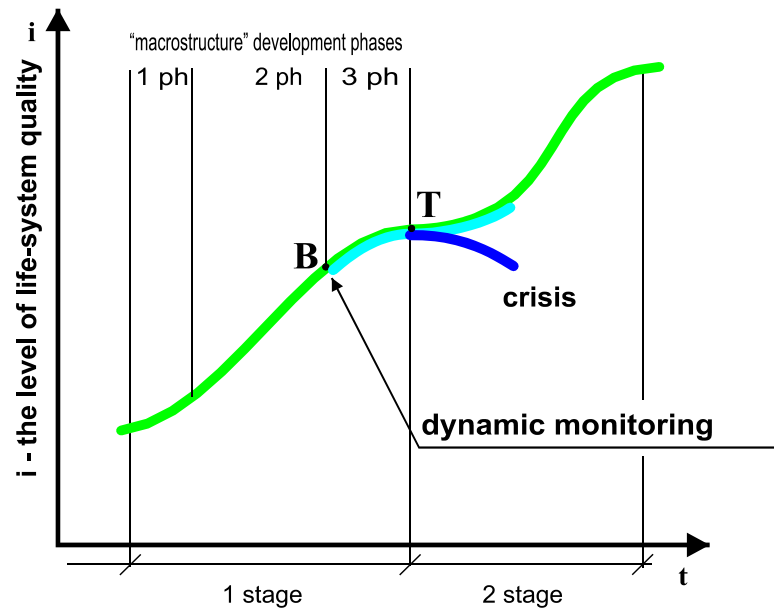
The "microstructure" development phases are the phases of development connected with changes of life-system microstructure:

- the first phase, the number of its elements grows;
- the second phase, life-system elements becomes different and achieves maturity;
- the third phase, different and matured elements are integrated into new elements.

The "macrostructure" development phases are the phases of development, connected with impacts of life-system macrostructure (figure 4), are:

- the first phase, when new form of macrostructure is getting mature;
- the second phase, when already matured macrostructure stimulates rapid development of microstructure;
- the third phase, when existing form of macrostructure is morally destructing/getting obsolete and life-system approaches to limit to growth..

No Limits to WISDOM Based GROWTH



B - the beginning of the next macrostructure transformation
 T - the point of the limit to growth transcending

Figure 4. Wisdom-based sustainable development

In every of above “macrostructure” development phases the rate of development is different. In the first phase – slowly accelerate. In the second phase – is very fast, as a result of microstructure development. In the third phase – the rate of development is slowing up to stop.

As a result, during the “macrostructure” development phases going through/crossing, the life-system inertia grows and the rate of environment changes grows also. Together with it, life-system reaches the limit to growth, the existing macrostructure is getting obsolete, and a new macrostructure form is needed, if development is to continue.

Next, the third “macrostructure” development phase unfolds, and the life-system – if it cross the limit to its growth in developmental way – enters new stage of development. An appropriately shaped new form of macrostructure will stimulate further life-system development.

If the life-system, after reaching of above mentioned limit to growth, does not change its macrostructure or changes it inappropriately, then the life-system crosses this limit to growth in a pathological and/or self-destructive way. This is the so-called developmental “overshoot” which leads to crisis and eventually life-system death (figure 3).

The phases of crisis – see figure 3.

4.5. Sustainable development information conditions

It is reiterated that sustainable development (figure 3 and 4) is the kind of development that avoids crises. It allows for life without necessity to restore (in very costly way) development by building new forms of life on the ruins of the old ones.

To achieve and support sustainable development we need inter alia knowledge about quality and dynamic of life-process.

How to recognize whether dynamically monitored society is in development-, or regression- state? General statement that development state is confirmed by the growth of society information level is in practice not enough. Therefore we need additional development indicators. These indicators should be more specific.

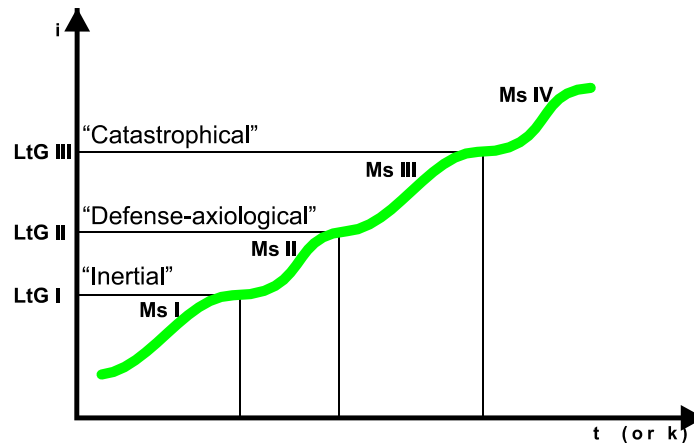
The state of development could be confirmed by:

- moving away (into the future) or transcending the limit to growth (p-t T, Figure 4), and

- **increasing** biological as well as **internally and externally constructive** society population life-span

These are still conceptual development indicators but provide a basis to formulate more specific indicators. To acquire knowledge about the quality and dynamics of the life-process as a first step we need to build – as it was already said above - a World Dynamic Monitoring and Warning Forecasting System. This global information system ought to deliver as inter alia such information:

- what quality of global ecosystem (system: humankind – nature: Earth) and particular parts of world society life-process currently exist: is it development or crisis and/or regression?
- in what phase of development (or regression) is the global ecosystem?
- what is the rate of above society development or regression?
- is that rate slowing or accelerating?
- what kind of dangers this society ought to overcome?
- when will this society reach its limit to growth (with actual form of macrostructure, i.e. socio-economic relations or other form of its infrastructure)?



Denotations:
 i - level of information, development and quality of SMT;
 t - time;
 k - size of SMT
 Ms - SMT macrostructure
 LtG - SMT limit to growth

Figure 5. Fundamental limits to growth of highly developed life-system as system: man-technology (SMT)

- is this limit to growth approaching or going away?

By means of such dynamic monitoring – if we are in development state - we ought to get information, when third macrostructure phase of development starts – figure 4, p-t B. At this time it is necessary to recognize new macrostructure adequate to new life-condition and start to form it - in pre-emptive way..

Similarly this global information system would help to recognize crisis, its phase and stage and restore development.

4.6. Fundamental stages of sustainable development

For sustainable development it is not enough to get information about limit to growth approaching. It is necessary also to recognize this limit to growth and project/design transformation from existing macrostructure to new proper one.

There are three types of qualitatively different fundamental limits to growth – figure 5.

These limits to growth must be consecutively faced and developmentally crossed/transcended by initially “young” - i.e. immature, externally destructive – but relatively high developed life-system, for example: western civilization, as system: man – technology (SMT - figure 1 and 5).

The first limit to growth of such highly developed, but ethically immature socio-economy system (SMT) is the “inertial” limit. This “inertial” limit to growth arises, when the volume of SMT inertia and rate of environment changes – as a result especially of technology (and organization) development - are so high, that SMT adaptation to rapidly changed (socio-natural) environment, when based only on the feedback control principle³², will not be sufficient to assure SMT life-support.

³² In this case feedback control principle depends on social system adaptation based on observing in praxis changes in its life-conditions and after that adapting forms of life to the new life-conditions.

When such SMT observes these changes and try to adapt itself to new form of environment – the environment takes a new form. To overcome this limit to growth SMT must implement additional **feedforward control subsystem** (feedforward). It means the necessity to create capability of environment changes prediction and starting adaptation to new life-conditions on such pre-emptive basis.

Feedforward allows to finish this adaptation when new environment form arises.

It means also to get skilled to act very flexible. Enlargement of flexibility is additional essential condition for life of large, big inertia SMT in rapidly changing environment. For feedforward implementation new value system is essential too. It is necessary to include into intellectual – cognitive and innovative – activity a passive until now elements of SMT: human beings that until now were used as simple workforce, only technology. It needs to reorganize society according to the subsidiary principle. It enables the SMT elite to engage in farsighted strategic activity,

The second limit to growth is limit “defense-axiological”.

This “defense-axiological” limit to growth arises when this “young” SMT (that was until now normally egoistically motivated and externally destructive) - reach a powerful ability to get life-resources from environment as well as totally destruct environment. This environment destruction would be the result of its unreasonable its external impacts. To stay in this egoistic (at the cost of environment) form of life it would be dangerous for both environment – as SMT life-support agent - and SMT itself.

To transcend this limit to growth it is especially necessary to change highly developed, SMT’s egoistic value system into ego-altruistic – eco-humanistic - one.

An ego-altruistic value system is based on the awareness about interdependence between life of such highly developed SMT and life of environment, that ought to be – for supporting SMT life - high quality and appropriate form. Developmental crossing/transcending this limit to growth means that highly developed SMT reach its full maturity (not only science-technological, but also ethical – 2nd stage of development), create its external constructiveness and continue its development in qualitatively new way: **“together with environment”**.

This new, ego-altruistic value system allows to include gradually weaker societies from the social environment into intellectual – cognitive and innovative – creative activity. This new, ego-altruistic value system allows therefore to get gradually access - with the help of weaker societies from environment - especially to data and knowledge necessary to human activity effects

prediction and valuation. It allows also radical intensity of proper innovative activity Of humankind. And, very important, it enables change from egoistic economy into ego-altruistic economy, namely sustainable development-economy. This new, sustainable development economy is precondition of proper stimulation of humankind creative activity.

To developmentally cross/transcend this limit to growth, highly developed SMT has to change not only its value-system into ego-altruistic one, but also to attain a capability for environment life-process defense control.

The high skill of matured, highly developed SMT to environment defense control is especially caused by other still “young” (therefore still egoistically motivated) societies that exist in social environment. Therefore, already matured SMT – continuing development on the principle “together with environment” ought to have defense potential that is necessary disallow being damaged by other still “young” (externally destructive) societies from environment. The second reason of such defense control is to reduce probability of future unpredicted negative effects of other environment impacts on this SMT.

The third limit to growth is the “catastrophic” limit.

The change of highly developed, mature SMT its relations with social – until now underdeveloped - environment into friendly one (based on principle “development together with environment”) causes radical acceleration of these weaker societies development. As a result of it. these underdeveloped and “young” until now societies reach also – with the help of highly developed SMT – its full maturity. It causes big development acceleration of both highly developed SMT and these until now underdeveloped societies. It causes also big changes acceleration of natural environment and obviously the entire global ecosystem, as well as rapid exhausting of previously accessible sources of resources.

Together with such acceleration new, “catastrophic” limit to growth arises. In such rapidly changing situation numerous unpredicted catastrophes might occur. To developmental cross/transcend this “catastrophic” limit to growth it is necessary to build a capability for assuring effective mutual life-support, based on a symbiotic cooperation in the set: humankind – natural environment. This requires the ability of including natural homeostasis potential into global ecosystem life-support activity.

Highly skilled life-reserves creation is also essential for life beyond this “catastrophic” limit to growth.

Such symbiotic cooperation is very difficult from information point of view. To adopt humankind/world society life-forms to natural

environment life-needs - when this environment is changing very rapidly – humankind ought to have access to information about these also changing future natural environment life-needs.

During developmental crossing/transcending all above three fundamental limits to growth, first highly developed SMT, next all world society ought to enlarge its far-sightedness, flexibility and life-reserves creation potentials. Together with this transformation, homeostatic properties (including informational efficiency and control system) have to be improved too. In addition, the volume of natural environment that should be cared has to be adequately enlarged.

As a result of above mentioned three fundamental limits to growth developmental crossing/transcending, highly developed SMT will exist in environment that is not only developing but also externally constructive. In such situation, environment homeostatic activity will radically help to support further development of originally highly developed SMT. It allows highly developed SMT to keep a solid and stable strongly strategic control position.

5. Conclusions

The global crisis is caused by the world society pathological crossing – especially by its highly developed part – at least two first fundamental limits to growth: “inertial” and “defense-axiological”.

Therefore, if especially highly developed part of the world society unwisely crossed above mentioned limits to growth – “overshoot” them – to restore world society development we ought to upgrade lagged behind societies instead of putting them – in social-Darwinistic way - “beside the board”.

As a result of big science technology progress world society lives in qualitatively new life-situation: in **the State of Change/Flux and Risk**. The rate of environmental changes is so high, that currently – generally feedback control based - short-sighted economy and politics not allow for proper, anticipative, in pre-emptive way, changing humankind life-forms to adopt them to new rapidly emerging, often qualitatively new life-conditions. **Therefore the world society – moreover based on egoistic axiology - is unfitted to life in this new State.**

In the State of Change/Flux and Risk moral/obsolete degradation of life-forms not adapted to new life-conditions is the main agent of global crisis. The main cause of global crisis lies in the lack of ability to efficiently eliminate moral/obsolete destruction effects. We also lack the skill (and political will) to decrease intensity of unwise physical destruction (wars, wrong patterns of consumption and production, unemployment,

homelessness, natural environment destruction, and so on).

It is impossible to stop moral/obsolete destruction intensity acceleration. To eliminate negative effects of moral/obsolete degradation, eco-humanistically motivated science-technology (including organizational) progress is essential. But this progress contributes to further growth of the moral degradation/getting obsolete rate. For this reason, to overcome global crisis, we need a radical growth of wisdom and intellectual creativeness as complement to science-technology progress. To live in the State of Change/Flux and Risk, we need also to create – with System Dynamics - information basis of sustainable development-policy and sustainable development-economy.

In the State of Change and Risk social-Darwinism is obsolete. It is very costly form of life. Darwinistic selection – by death of unfitted - means big intensity of Earth socio- and bio-diversity destruction, But/meanwhile this diversity is the main synergetic agent of development.

For life in the State of Change/Flux and Risk we have to substitute slogan “bed/wrong wisely into good transform” for “bed/wrong, by means of good, put to the down” - decreasing Earth diversity with such even victorious fight.

Therefore we have to create as soon as possible – instead of Darwinistic intellectual evolution mechanisms – ultrintellectual evolution mechanisms, based on popular wisdom, artificial intelligence and eco-humanistic axiology.

For support development in the State of Change and Risk/Flux – especially for moral/obsolete destruction consequences eliminating - we need more and more human beings wisely and efficiently working for common good – common interest. To overcome the global crisis we have to maximize appropriate cognitive and innovative activity of world society. These are preconditions to cross consecutive limits to growth in developmental way.

Therefore “zero growth” and “steady state” conception - that human population ought to reach some maximal volume and stop growing in number of human brains (basic factor of humankind wisdom) – are false. In the *System of Life* conception, it is obviously undesirable and unwise to have limitless growth in the number of human beings. But growth is still essential to provide adequate life support for humankind. Therefore this growth ought to be based on world society limits to growth developmental crossing/transcending ability.

Fulfillment of vision of a world society sustainable development – that integrate social development with economy development and environmental protection - as basis of MDG implementation, ought to be seen as the main world society goal. To realize this vision we need new

political philosophy. This philosophy can be based on *System of Life* conceptual model which shows how the fundamental limits to growth of human society can be transcended. The model also provides guidance on how to shorten the transition period to sustainability.

To avoid global catastrophe we need intercultural dialogue based on forward approval three fundamental eco-humanistic values: common good – common interest, solidarity and subsidiarity.

To achieve sustainable development of the world society we need wisdom based society instead of just a knowledge based society. A wisdom society is one that is based on ultrintellectual evolution mechanisms and popular access to information concerning the future consequences of current human activity. A wisdom society will use this information and high technology in eco-humanistic way - for the common good of humanity, including taking good care of the human habitat..

To get access to knowledge necessary for implementing “three pillars” sustainable development vision, a large-scale international science-technology and social operation is necessary for shaping an appropriate world information infrastructure.

A commonly accessible, net and GRID, continuously under development, **WORLDWIDE SUSTAINABLE DEVELOPMENT INFORMATION SYSTEM**, with System Dynamics analysis capability, ought to be built with help of United Nations as follow-up to WSIS..

This information system - built step by step - together with popular wisdom education. will allow radically enlarge the range of far-sightedness/long-sightedness, flexibility and reserves creativity of the world society. It makes it possible to change egoistic axiology into egoaltruistic – eco-humanistic - one.

To start building of an appropriate world information system, international research program is proposed. The main task of such program is to verify thesis that limits to growth transcending is possible and describe the conditions and methods of creating for this end comprehensive Worldwide Sustainable Development Information System.

Without creating access to knowledge about human work complex (including FUTURE) effects it will be impossible to:

- save environment;
- get access to new resources;
- eliminate unemployment;
- narrow “rich – poor” gap and achieve all the MDGs);
- bring about a new era of ecosocial justice.

Without this access, it will be not possible to avoid global catastrophe and achieve sustainable development of the world society

In the State of Change/Flux and Risk, FEEDFORWARD - based on eco-humanism, System Dynamics and profound wisdom and creativity, are necessary to eliminate negative consequences of the increasing **moral/obsolete degradation, which is the main cause of global crisis.**

To overcome the global crisis, we need to find ways of helping world society to adapt to the State of Change/Flux and Risk. For this end, the first step is **to convince world power elites that limits to growth developmental crossing is possible and is in their own, basic survival interest.**

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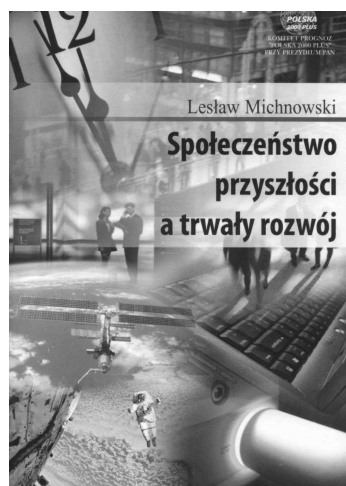
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