Worldwide
Grid System Dynamics -
Why do we need it?

WISDOM CREATIVITY against OBSOLETE (MORAL) DESTRUCTION

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Palermo and Oxford
SDS Conferences papers
continuation

1. System Dynamics for humankind survival

World Summit on the Information Society - WSIS follow-up:

**D. & D. Meadowss: *information is the key* to (*sustainability*) *transformation*. *(…) When (…) information flows* are *changed*, any system will *behave differently*".

Yoshio Utsumi (ITU): *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.*

Kofi Annan: *This Summit (WSIS) must (…) push forward the outcome of the World Summit (New York 2005) (…) The hurdle here is more political than financial*.
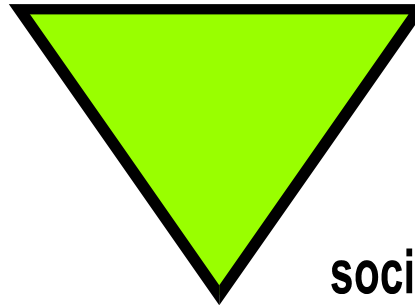
Main UN Goals: 1.2.

- Universal Declaration of Human Rights;
- Inclusive Globalization - fair globalization;
- full and productive employment and decent work for all;
- "digital divide" elimination;
- sustained economic growth;

\- „three pillars" sustainable development of the world society.

environmental protection   economic development

social development

For these ends:
- internalizing externalities (social and environmental);
- decoupling (the range of economic growth from the range of deficit natural resources depletion growth and degradation of environment), and
- coupling (the economic growth with social development - for general improvement in the quality of life), as well as
- world early warning system (of systems) building,
are essential

To achieve above goals
Worldwide GRID System Dynamics
is essential

1.3.

WSIS follow-up proposal:
to build
- **in multi stage way,**
continuously under development,
commonly accessible -
worldwide (net and **GRID**)
sustainable development information system for:
- **dynamic monitoring,**
- **long range forecasting**, and
- **measurable evaluation**
policy, economy, work and other **changes**
in the life conditions
(of human-beings and nature in general)
effects

Dynamic monitoring
(set: society–environment life-process):
collecting dates, that reflect this process, and **System Dynamics** transforming them into information about its quality, dynamics, and future.

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.

Dynamic monitoring is a basic **component of feedforward** control subsystem.

GLOBAL INFORMATION GOVERNANCE
(subsidiarity principle)

World Sustainable Development Strategy Center
(**WSDSC**, by UN Secretary General), including
UN Information Center for Sustainable Development Strategy
(**ICSDS**)

The main tasks

ICSDS:
- stimulation and coordination of
worldwide sustainable development information system building;
- world **dynamic monitoring** and **warning forecasting**
creating and disseminating.

WSDSC:

- **predicted dangers overcome methods
designing** and **disseminating,**
- other sustainable development world tendency fostering methods
designing **and** disseminating.

International research proposal 1.6.

1. How to get policy-makers - and societies - access to knowledge about complex (and FUTURE) effects of policy?

*2. How to **combine existing forecasting methods** in Worldwide Sustainable Development Information System?*

*3. How to **get access to** necessary **dates and knowledge**?*

*4. How to **transform statistical offices** into **offices for** statistic, **dynamic monitoring** and **warning forecasting**?*

*5, How to **build information bases of sustainable development-economy**?*

6. How to make possible dividing (sharing) effects of work social process proportionally to work ecosocial usefulness?

Conference I: Information efficiency, DYNAMIC MONITORING and warning forecasting as sustainable development-policy preconditions

Conference II: Long range forecasting as transcending limits to growth means

Conference III: Sustained economic growth stimulation information bases

To include SDS into above international research program.

WHY DO WE NEED
WORLDWIDE GRID SYSTEM DYNAMICS?

**Nowadays we are living in qualitatively new life-state
- STATE OF CHANGE AND RISK (SCR) –
a result of science-technology-organizational progress
(high and continuously accelerated rate of environmental
changes, big inertia, and not fully determined future –
chaos, catastrophes)**

**MAIN CAUSE of GLOBAL CRISIS:
INADAPTATION to SCR –
LACK of
FEEDFORWARD (control subsystem) and
WISDOM CREATIVITY.**

WISDOM CREATIVITY (POTENTIAL):

- **WISDOM** (including education and ethic) potential;

- **ARTIFICIAL INTELLIGENCE** (including simulation methods, **System Dynamics**) potential;

- **FLEXIBILITY** potential.

Flexibility:

- **subsidiarity** (organic) social infrastructure (**responsible liberty**);

- flexible **automation**.

Wisdom is ability to:
- **observe** events in global ecosystem and space environment;
- **get knowledge about processes** combined with these events;
- **predict** future of these processes;
- adequate **assess** these processes;
- **support** life-support processes, or
- **eliminate** processes **dangerous** for life.

Agents of wisdom **(in SCR):**
- **intellect**;
- **knowledge** (also **about future**), and
- life-support **activity power**.

In the State of Change and Risk (SCR)
OBSOLETE (MORAL) DESTRUCTION
(life-forms not adapted to
new life-conditions)
is

MAIN LIFE DESTRUCTION FACTOR

To eliminate, in SCR,
negative obsolete (moral) destruction effects -
FEEDFORWARD and more and more WISDOM
creative activity is essential.

Sustainable development conditions

Creation over destruction sustained surplus

Denotations
ls — life system
mc — multiplication construction
rc — regenerative construction
ic — innovative construction
phd — physical destruction
md — moral destruction (outdatedness, obsolescence)

Development (ls quality growth)
$$mc + rc + ic > phd + md$$

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

Steady state
$$rc + ic = phd + md$$

Life-system – complex system: organization, society, ecosystem, Earth (global ecosystem) and its active elements and over-systems.

Life-system development effects:
- **life-system longevity (life expectancy. durability) increasing;**
- **life-system elements life quality increasing, and**
- **life-costs decreasing.**

Use of developmental surplus for:
- **life-system efficiency increasing;**
- **environment friendly forming;**
- **UNKNOWN FUTURE RESERVES CREATION.**

No Limits to WISDOM Based GROWTH

i - the level of life-system quality

T

B

crisis

dynamic monitoring

1 stage　　2 stage

t
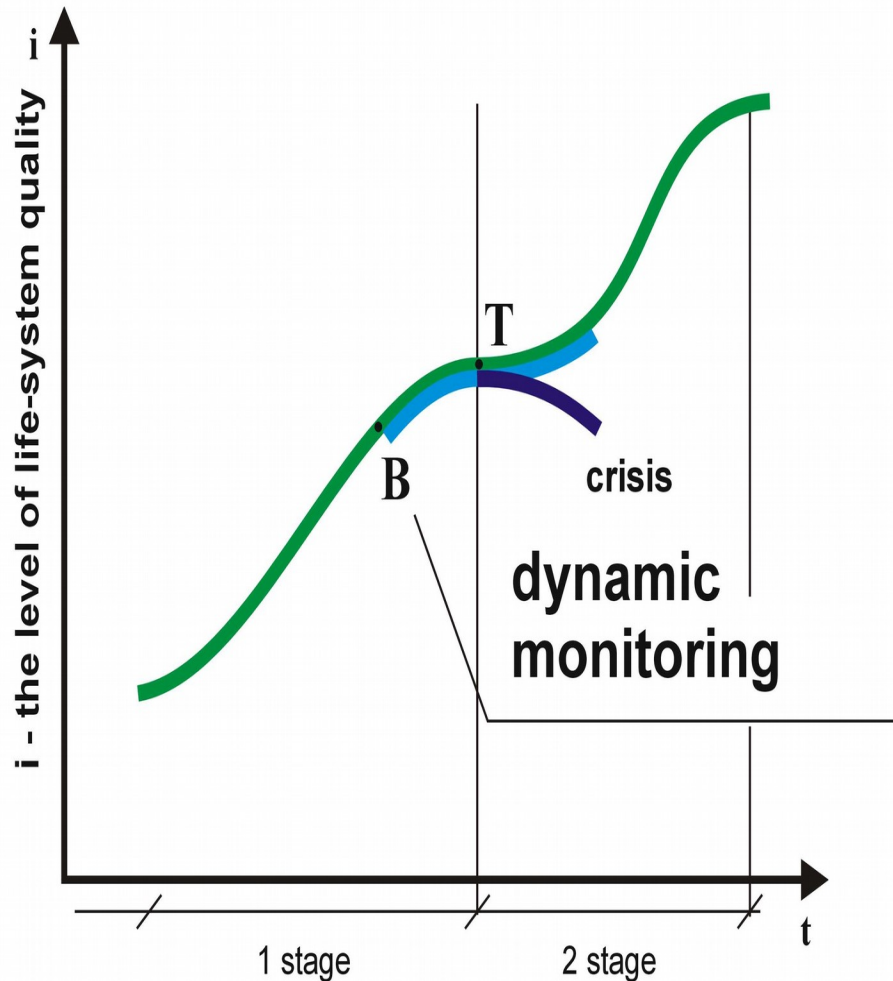
B - the beginnig of the transformation
T - the limit to growth

Sustainable development

Dynamic monitoring: about **quality and dynamics** of life-process such information delivers :
- is it **development or crisis** (regression)?
- what is **the rate** of development or regression?

Life-expectancy SD measure: period from now to limit to growth (LtG, point T) reaching.

Development: when the moment of LtG achieving (point T) go away.

System Dynamics (SD) - dynamic monitoring precondition

2. WSIS follow-up conclusions
systemic justification

The System of Life
conceptual model
basic axiom

i = B(n,q)1/s

i - the level of information (Wiener, 1971) – life-system development (and organization, as well as quality) level conceptual measure;
s – life-system (**ECOSOCIAL) entropy** (as well as **development-reserves**) level;
n - the number of life-system elements;
q - life-system elements quality, and
B(n,q) - some function connected with quantity and quality of life-system elements.

Ecosocial entropy

Isomorphic similarity to thermodynamic entropy

s = k ln w

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.

Life as information creation and entropy growth opposing process

Life-system as
Bertalanffy general and open system
(with homeostatic ability)

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

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

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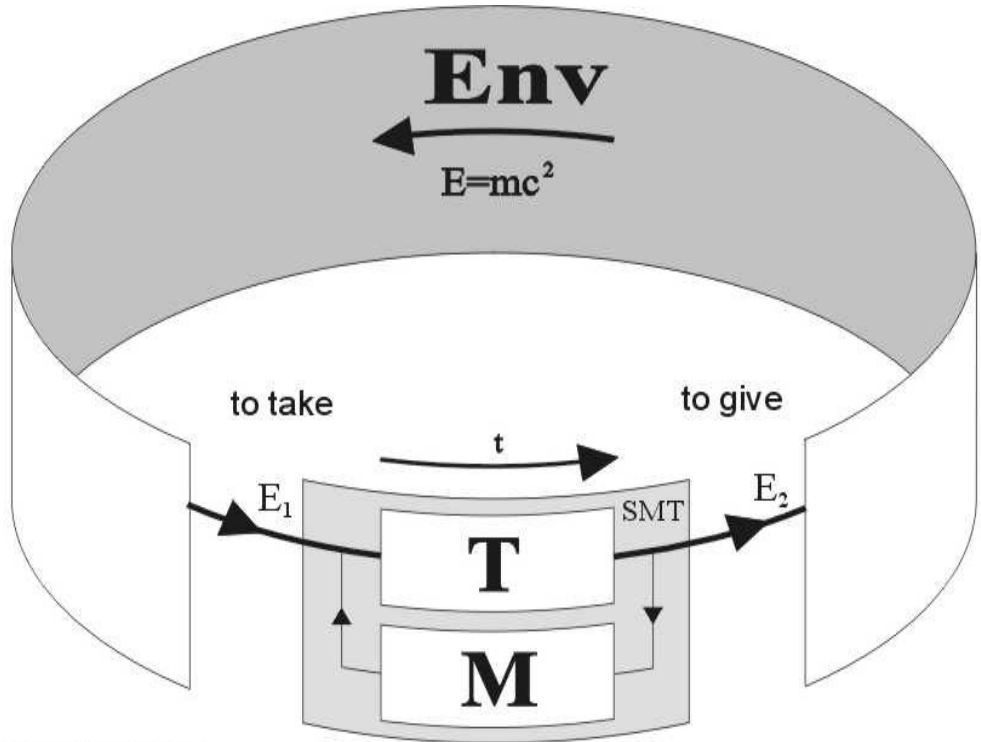
$$\frac{dQ_n}{dt} = f_n(Q_1, Q_2, ..., Q_n)$$

Life-process (past and future) reflection as moving point in multi dimensional grid-computer time-space

How many - in SCR - dates and knowledge (including new ones) we need for dynamic monitoring?

Egoaltruizm as necessary dates and knowledge access tool

Env

$E=mc^2$

Input-
- from space -
energy

Output
- to space –
energy

to take

to give

t

E_1

SMT

E_2

T

M

Denotations:
SMT   system: man-technology
Env   enviroment
T   technology
M   man, control subsystem of SMT
t   time
E1   SMT input energy (in larger sense),
E2   SMT output energy (constructive and destructive impacts).

**Global ecosystem as
system man-technology-environment (SMTEnv)
and open system**

Some properties of life-systems (1)   2.5.

Is = < E, Ri, **Re**, Ә, i, t >
E – life-system (Is) elements,
Ri – internal relations
Re – external relations,
Ә – Is life expectancy,
i – level of Is development
t – time.

Life of life-system depends on life, high quality and adequate form of environment (as source of proper – negentropy - form input energy).

Input energy for support life-system life transformed, can be degraded only relatively.

When this energy, as output energy, is formed adequate to environment life-needs, it is environment life support agent.

To support - **in SCR** - life-system life, **we need knowledge** about environment **future** life-needs and methods of life-system structure transforming in the way convenient for set: life-system – environment (SMTEnv)

Some properties of life-systems (2)

Constructiveness – „to give more than to take"
Synergy as main means of constructiveness

Developmental life states:
- internally constructive and externally destructive
(1th stage - **immature** life-systems;
- internally and externally constructive (2nd stage - **mature, wisdom creativity conditioned**)

Regressive life states:
- internally destructive, externally constructive (1th stage);
- internally and externally destructive (2nd stage).

System: man–technology–environment (SMTEnv) as well as system: man–technology (SMT), and environment are life-systems

Life-system has homeostasis **ability to defend its life**, as well as **to cooperate** with other life-systems for their common good.

When **environment** is - at least internally - **destructive**,
system: man–technology (SMT) is in **crisis**.

Crisis of environment is (more probably) a result of
SMT limit to growth pathological crossing.
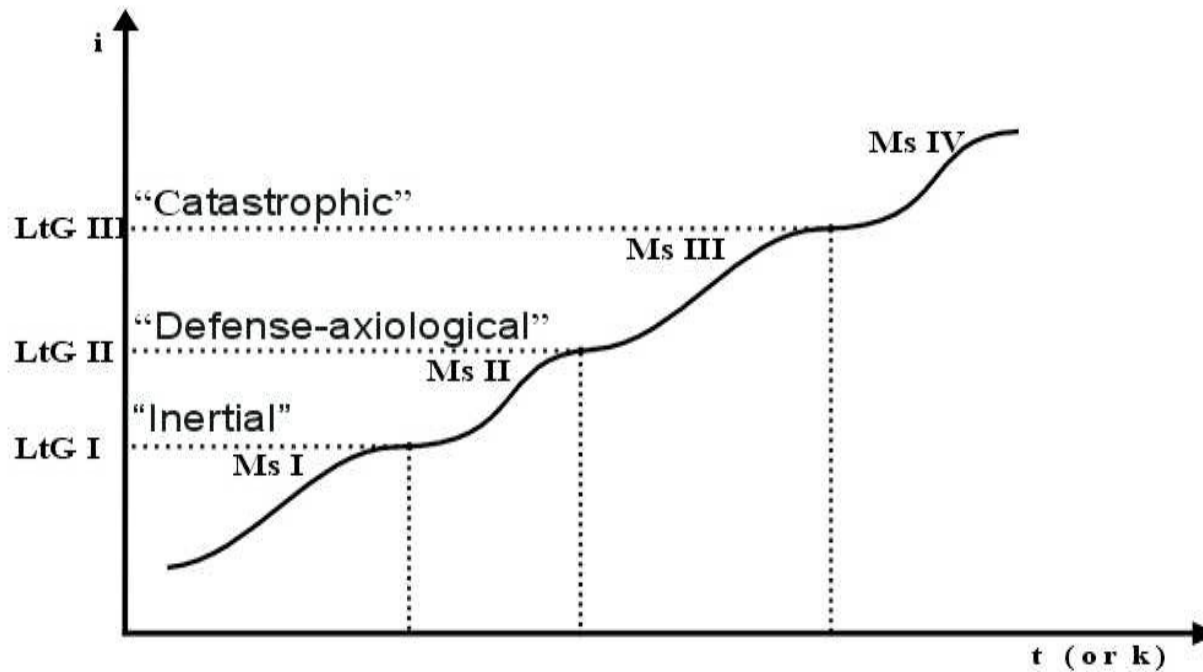
Denotations:
i - level of information, and quality of SMT;
t - time;
k - size of SMT
Ms - SMT macrostrucure
LtG - SMT limit to growth

Figure 3 Fundamental limits to growth of system: man - technology (SMT)

Limits to growth

developmental crossing/transcending conditions

General condition:
radical **information efficiency,** including:
- **far-sightedness**,
- **flexibility**, and
- **reserves creation** possibility,
increasing.
Limits to growth transcending is also conditioned on **environment**
taken under **egoaltruistic care enlargement** .

Fundamental limits to growth transcending conditions:

- **INERTIAL**: create **feedforward** control subsystem,

- **DEFENSE-AXIOLOGICAL**: strengthen **defense** potential
and shift egoism for **egoaltruizm**,

- **CATASTROPHIC**: create **symbiotica**l relations in SMTEnv.

3. End conclusions

The lack of ability to eliminate OBSOLETE (MORAL) DESTRUCTION (life-forms not adapted to new life-conditions) effects

is

THE MAIN CAUSE

of

the GLOBAL CRISIS.

In the State of Change and Risk
early warning
about
current negative consequences
of
socio-economic activity
is
essential**.**

UNEMPLOYMENT ELIMINATION
and
SUSTAINED ECONOMIC GROWTH
without access to knowledge about complex (and FUTURE) work effects
are
IMPOSSIBLE

**To build
sustainable development policy
and
sustainable development economy
information bases
we need**

**WORLDWIDE
GRID SYSTEM DYNAMICS**

Nijmegen (2006) SDS Conference paper:
Worldwide
Grid System Dynamics -
Why do we need it?
http://cgi.albany.edu/~sdsweb/sds2006.cgi?P184 , or
http://www.psl.org.pl/kte/Nijmegen-bn.pdf

Oxford (2004) SDS Conference paper:
HOW TO AVOID GLOBAL CATASTROPHE?
The Information Basis for Sustainable Development
Policy and Economy:
http://www.psl.org.pl/kte/howtoavoid.pdf

Palermo (2002) SDS Conference paper:
World Integrated Warning Forecasting System
Based on System Dynamics Principles
as a Basic Factor in Sustainable Development:
http://www.psl.org.pl/kte/740Michnowski.pdf

WSIS follow-up ITU Golden Book recomendations:
http://www.itu.int/wsis/goldenbook/Publication/GB-final.pdf (p.7.6).
http://www.itu.int/wsis/goldenbook/search/display.asp?Quest=4220012&lang=en&lang=en