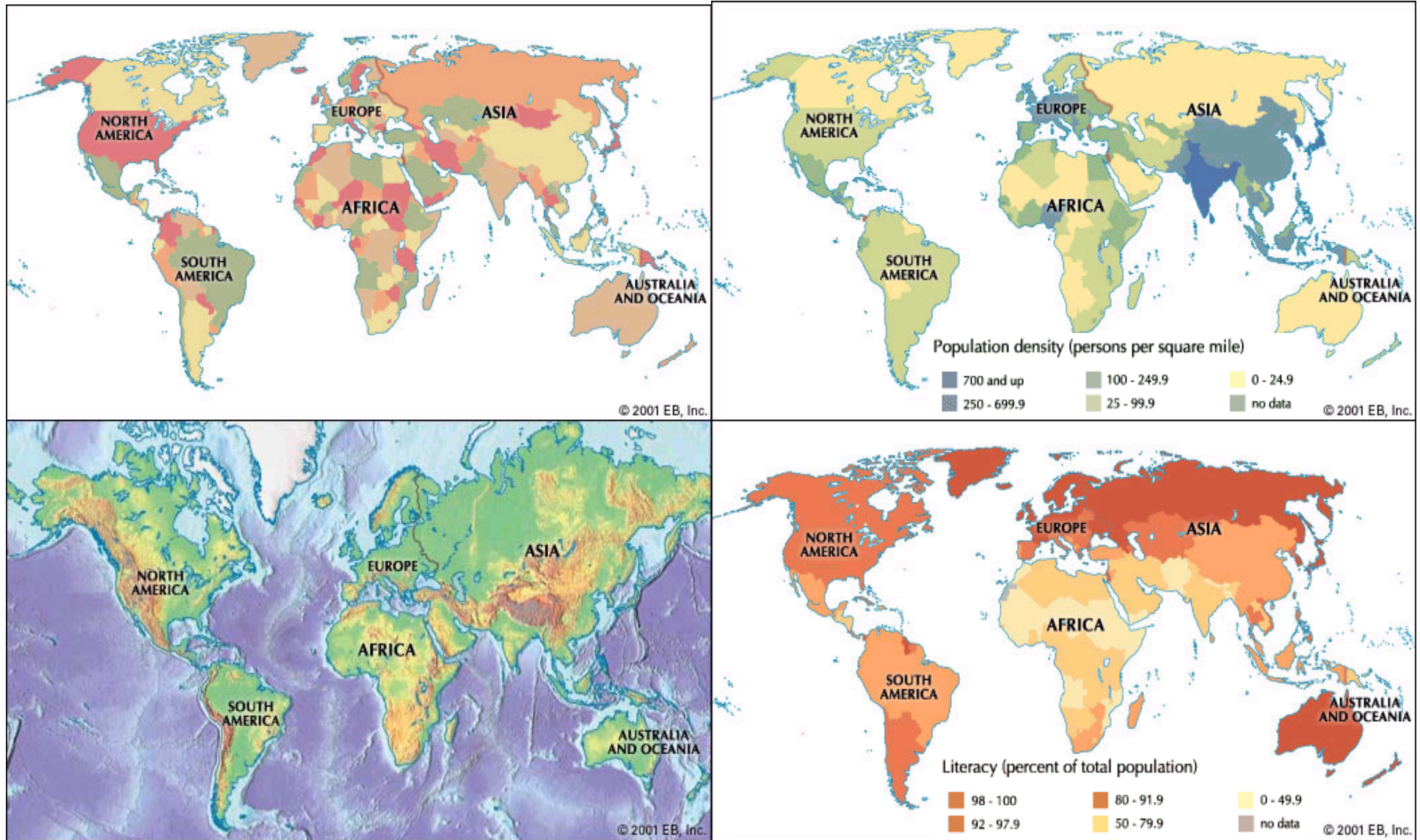# AXIOMS OF OTSM-TRIZ

(system of axioms)

1. **Main axiom** – axiom of description

2. **Axioms of Thinking** – about thinking process itself

3. **Axioms of World view** – about subject of thinking

axiom – *(1) an established rule, principle, or law; (2) a self-evident principle or one that is accepted as true without proof as the basis for argument; a postulate;*
[an extract from The American Heritage® Dictionary of the English Language, Fourth Edition]

What is it?

Population density (persons per square mile)

700 and up	100 - 249.9	0 - 24.9
250 - 699.9	25 - 99.9	no data

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Literacy (percent of total population)

98 - 100	80 - 91.9	0 - 49.9
92 - 97.9	50 - 79.9	no data

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© N.Khomenko. 1997-2001. Materials for seminars: OTSM-TRIZ: Main technologies of problem solving, "Jonathan Livingston" Project.

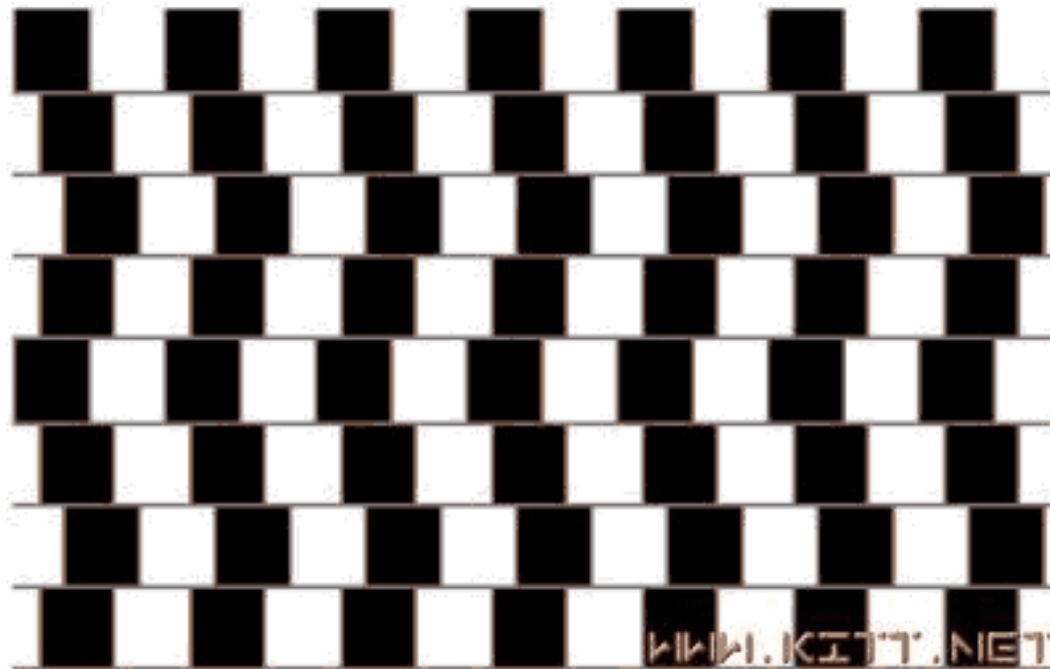Images source: http://www.britannica.com/atlas

main axiom:

AXIOM OF DESCRIPTIONS (MODELS)

The thinking about Elements (e.g. during problem solving) in fact, it is the thinking about models of Elements of the world but not about Elements themselves.

Practical conclusions for problem solving:

- Every description has limitations and it is not true (it is not complete).

- There are unlimited number of descriptions for every particular Element of the world.

- Every problem is just a description (model) of a problem situation. To simplify a problem solving process it is required to change (refine) the description.

- It is required to develop the set of general models in order to use them for finding the specific concept solutions for specific problems.

how it looks like?

axioms of thinking

ROOTS OF PROBLEM AXIOM

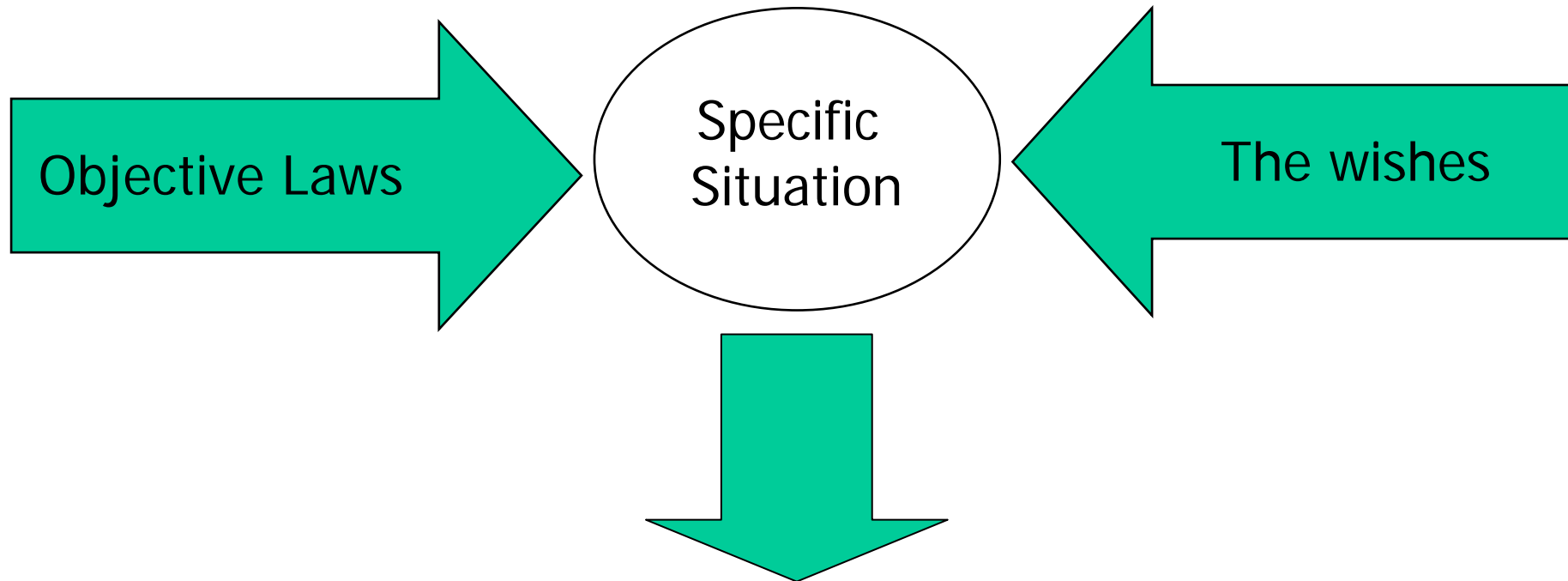**AXIOM OF IMPOSSIBILITY**

AXIOM OF REFLECTION

axioms of thinking: ROOTS OF PROBLEM AXIOM

Problem appears as contradiction between Objective laws that produced particular situation and our wishes (needs, demands) in this particular situation.

Practical conclusions for problem solving:

▪ It is necessary to look for those general Objective laws that are causes of the particular problem.

▪ First of all the solution must be based on these Objective laws.

▪ For analysis of problem it is necessary to clarify what kind of needs produce the problem.

axioms of thinking: ROOTS OF PROBLEM AXIOM

Objective Laws → Specific Situation ← The wishes

↓

CONTRADICTION

between **the wishes** in specific situation and
Objective laws that produce this specific situation

axioms of thinking: AXIOM OF IMPOSSIBILITY

During problem solving it is required to use the descriptions (models) that look impossible (incredible) at first sight.

Practical conclusions for problem solving:

- On certain stages of the problem solving process it is strongly recommended to forget about the real world and let go of our imagination.

- On other certain stages it is necessary to use the Golden Fish method for eliminating everything that seems incredible.

Examples:

Question (1900): *Is it possible to fly using the systems that heavier than air?*

Question (I B.C.): *Is it possible to float using ships from iron?*

axioms of thinking: AXIOM OF REFLECTION

During problem solving it is required to change point of view in order to disclose roots of problem situation.
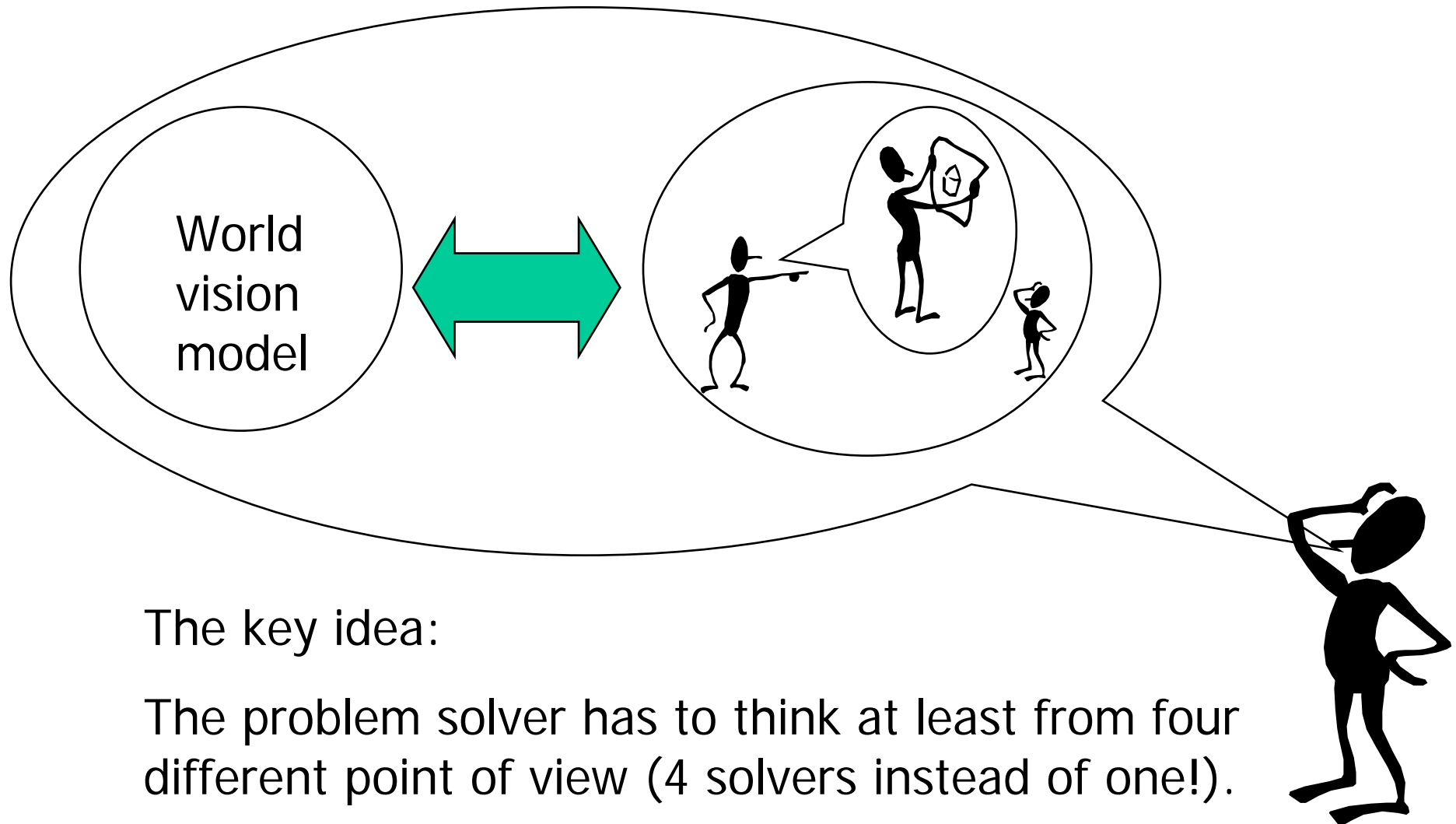
Practical conclusions for problem solving:

In order to take into account the system of contradictions it is required to change point of view consciously.

The system of contradictions during problem solving:

- Contradiction of the **problem solver** (solver wishes and solver knowledge contradict each other).

- Contradictions of the **Evolution** (General Contradiction of the particular family of systems).

- Contradiction of the **Element** (different Name of Features contradict each other)

- Contradiction of the **Feature** (different Value of the same Feature contradict each other)

axioms of thinking: AXIOM OF REFLECTION

World
vision
model

The key idea:

The problem solver has to think at least from four
different point of view (4 solvers instead of one!).

axioms of world view

AXIOM OF UNIVERSAL

AXIOM OF DISTINCTION

AXIOM OF CONNECTEDNESS

AXIOM OF PROCESS

axioms of world view: AXIOM OF UNIVERSAL

The world is unified system that exists according to General Objective laws.

Practical conclusions for problem solving:

- It is necessary to take into account (to look for them if they are unknown) those General Objective laws and use them for the problem solving.

- Those Objective laws are the variety of general knowledge and can be used for any kind of system.

- It doesn't matter what kind of system we deal with - substantial system or non-substantial system (substantial and non-substantial systems form universal system).

- The problem about substantial systems can be solved using non-substantial resources (e.g. information).

axioms of world view: AXIOM OF DISTINCTION

Every system is a separate part and exists according to particular Objective laws (specific for the class of systems).

Practical conclusions for problem solving:

- It is necessary to take into account (to look for them if they are unknown) those particular Objective laws and use them for the problem solving.

- Particular Objective laws are the variety of specific knowledge that is used for a particular kind of system.

- The powerful solution concept has to satisfy restrictions of Particular (Specific) Objective laws as well as the restrictions of General Objective laws.

axioms of world view: AXIOM OF CONNECTEDNESS

General Objective laws are connected with Particular Objective laws by resources that specific system is built of.

Practical conclusions for problem solving:

- For the effective problem solving it is required to investigate the resources, their features, and value of the features.

- Purposeful investigation how features of resources influence on the Objective laws' interaction (General and Particular) has to be performed for problem analysis.

axioms of world view: AXIOM OF PROCESS

Every Element has to be considered as a process.

Practical conclusions for problem solving:

- For the effective problem solving it is necessary to investigate resources of time: before, during and after conflict.

- Every Element must be considered as a part of process (historical, evolutional, etc.).

- It is strongly required to investigate how features (properties) of the Element or its parts (sub-system) can be changed during certain period of time.

axioms: summary

- Axioms assist for solver to build the general rules of problem solving for case there are not any detail rules.

- There is a lot of connectedness between multi-screen scheme of strong thinking and axioms of OTSM-TRIZ.

- The system of axioms of OTSM-TRIZ is applied permanently in order to improve efficiency of problem solving process.