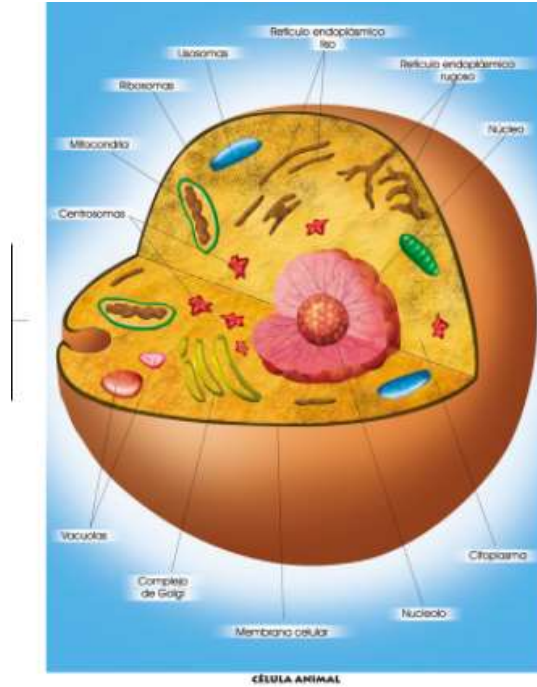
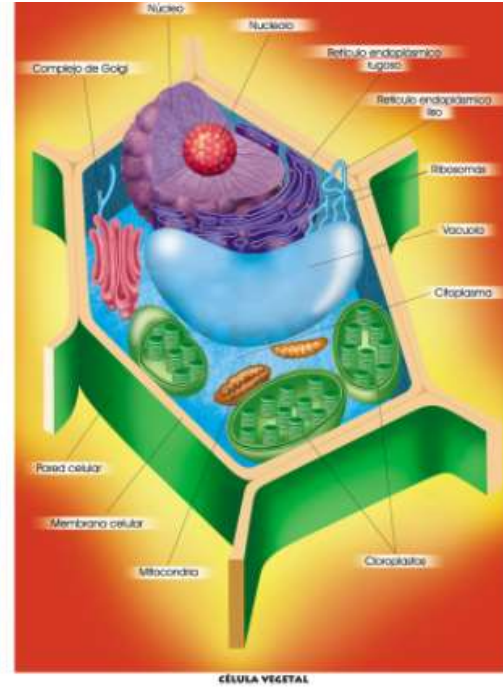


IMPROVE CELL BODY SURVIVAL AT THE ORIGIN OF LIFE

Animal Cell



Vegetal Cell



Introduction

Some people like to say we are star dust. Closer, we can say we are children of the original cell body. But, as that could evolve without innovation "gurus", without Steve Jobs, Alva Edison and many others. Is Evolution = Innovation ?.

TRIZ & TOC Tool offers a response that allows us to say that innovation in a language of our universe and that is there from the beginning, the bing-bang.

We postulate that:

The evaporation cloud of the Theory of Constraints (TOC) allows to formulate multi-variable innovation problem.

TRIZ has discovered the words that originate innovation, these are the engineering parameters or variables, the basic phrases of innovation, which are the inventive principles, and the fundamental messages that TRIZ delivers when solving the contradictions that are generated between pairs of words.

In a multi-variable problem of innovation, combining TRIZ and TOC, together with the AATRIZINVENTOR approximation algorithm, we can systematically find the solution to the formulated problem.

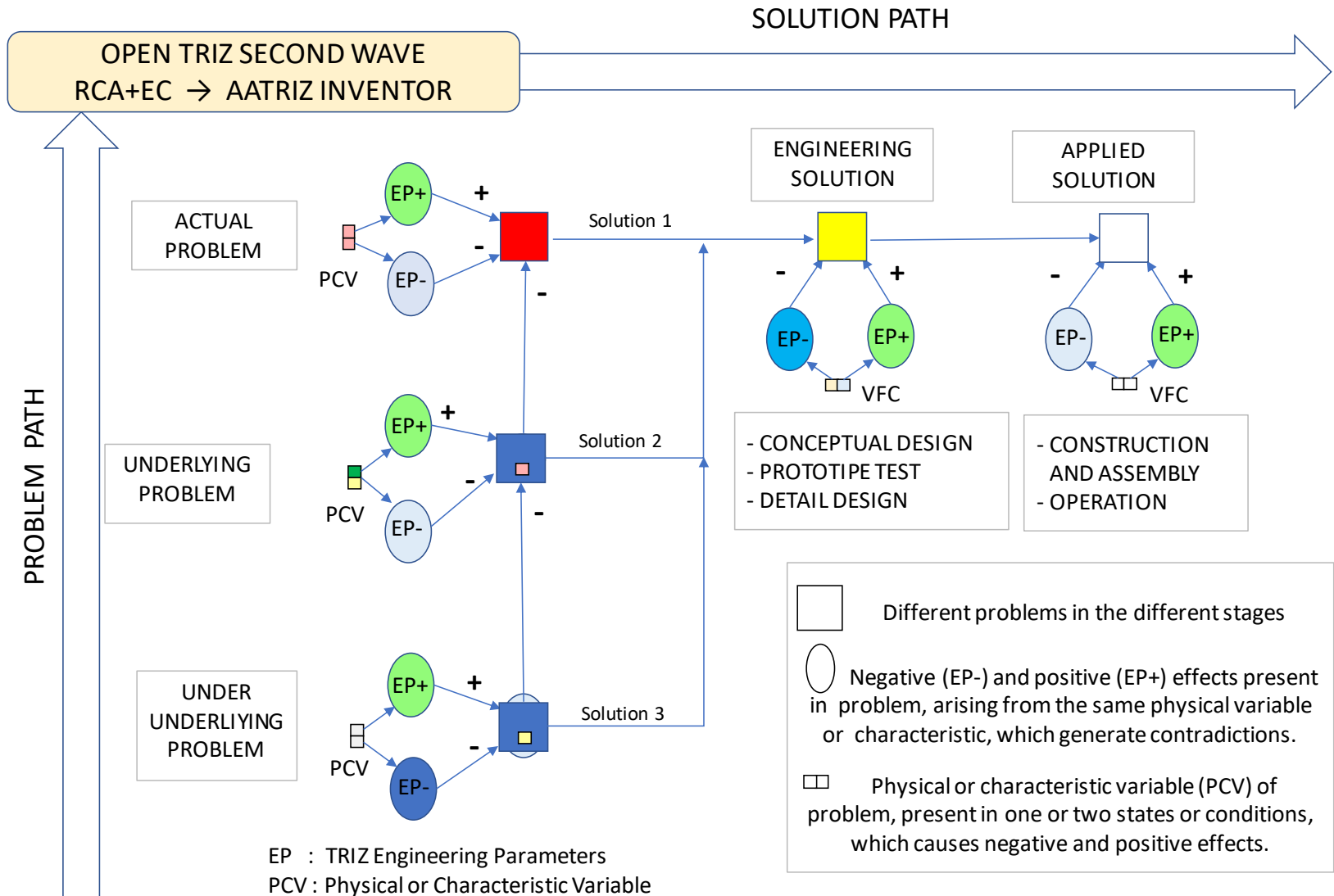
AATRIZINVENTOR is a mathematical algorithm that evaluates all possible contradictions in a multi-variable problem and proposes the essential contradiction that resolves the problem, together with a maximum of four supplementary contradictions.

Experience teaches us that a multi-variable problem of innovation in general can be fixed with 4 o more inventive principles.

Let's see the original problem of a cell body to survive in the beginning of life.

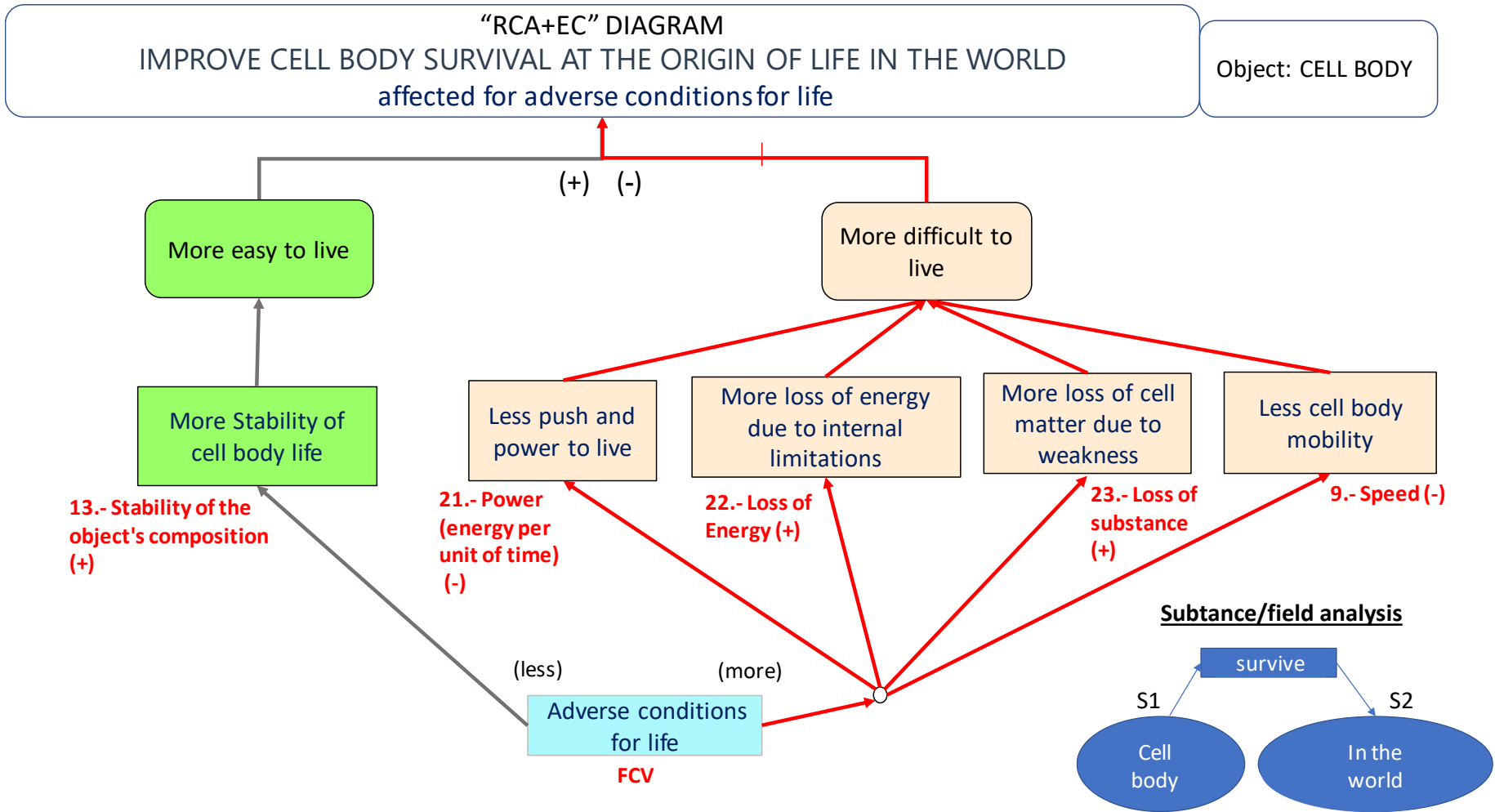


General solution of the innovation problem





Problem formulation for conceptual solution 1





Problem formulation for conceptual solution 1



Logical Analysis Summary

Objective Function	Improve cell body survival at the origin of life in the world
Evaluated Object	CELL BODY
Physical Variable or Characteristic	adverse conditions for life
With	More adverse conditions for life
We have	More difficulty to live
With	Less adverse conditions for life
We have	More easy to live



Problem formulation for conceptual solution 1 ■

TRIZ Engineering Parameters evaluated

TRIZ Engineering Parameters	Social and Human Context	To evaluate
21.- Power (energy per unit of time)	CELL BODY : there are More difficulty to live because there Less push and power to live Effect : negative	Si No
22.- Loss of Energy	CELL BODY : there are More difficulty to live because there More loss of energy due to internal limitations Effect : negative	Si No
23.- Loss of substance	CELL BODY : there are More difficulty to live because there More loss of cellular matter due to weakness Effect : negative	Si No
9.- Speed	CELL BODY : there are More difficulty to live because there Less cell body mobility Effect : negative	Si No
13.- Stability of the object's composition	CELL BODY : there are More easy to life because there More Stability of cell body life Effect : positive	Si No



PRIORITIZED SPECIFIC CONTRADICTION MATRIX
ALGORITHM AATRIZ INVENTOR



AATRIZINVENTOR RESULTS

II. SPECIFIC MATRIX OF WEIGHTED CONTRADICTIONS - CASE IN STUDY

Table with 8 columns: Par. Improve / Attenuate or preserve, Var., 21.- Power (energy per unit of time), 22.- Loss of Energy, 23.- Loss of substance, 09.- Speed, 13.- Stability of the object's composition, Sum% (Fij). Rows include parameter details and weighted contradiction values.

(* Preferred Parameters : 9 (improve) y 21 (attenuate or preserve)



ESSENTIAL & SUPPLEMENTARY CONTRADICTIONS & PRIORITIZED TRIZ INVENTIVE PRINCIPLES



(*) Preferred Parameters : 9 (improve) y 21 (attenuate or preserve)

III. RECOMMENDED TABLE OF SOLUTION

Solution table	Essencial Contradiction	Supplementary Contradictions with Preferred Parameters (*)			
		09.- Speed	09.- Speed	13.- Stability of the object's composition	23.- Loss of substance
Eng. Par. to Improve	09.- Speed	09.- Speed	09.- Speed	13.- Stability of the object's composition	23.- Loss of substance
Eng. Par. to Attenuate or Preserve	21.- Power (energy per unit of time)	22.- Loss of Energy	23.- Loss of substance	21.- Power (energy per unit of time)	21.- Power (energy per unit of time)
Weight priority	WT.1	WT.2	WT.3	WT.11	WT.12
IPs. Priority 1	19	14	10	32	28
IPs. Priority 2	35	20	13	35	27
IPs. Priority 3	38	19	28	27	18
IPs. Priority 4	2	35	38	31	38



PROPOSAL CONCEPTUAL SOLUTION 1
INVENTIVE PRINCIPLES



1 IP.19.- Time-varying action / Periodic or pulsating action (Pos 10):
=> Instead of continuous action of CELL BODY, use periodic or pulsating actions.

2 IP.35.- Transformation / Parameter changes of an object (Pos 1):
=> Change the composition or condition by adding or removing components from CELL BODY.
=> Change the concentration or consistency; Change the degree of flexibility; Change the temperature or internal activity level of CELL BODY.

3 IP.38.- Strong and/or fast reactions / Strong oxidants (Pos 13):
=> Apply strong and/or fast reactions in CELL BODY.

4 IP.2: Taking out / Aggregation (Pos 5):
=> Separate an interfering part or property of a CELL BODY , or single out the only necessary part (or property) of CELL BODY,
=> or add new parts or properties to CELL BODY .



PROPOSAL CONCEPTUAL SOLUTION 1



5

IP.14.- Spheroidality - Curvature (Pos 2):

=> To interact with CELL BODY, instead of using rectilinear parts, surfaces, or forms, use curvilinear ones.

=> move from flat surfaces to spherical ones; from parts shaped as a cube (parallelepiped) to ball-shaped structures.

6

IP.28.- Mechanics substitution (Pos 3):

=> Replace in or for CELL BODY mechanical means with a sensory (optical, acoustic, taste or smell) means.

=> Change in or for CELL BODY from static to movable fields, from unstructured fields to those having structure, or vice-versa.

7

IP.10.- Preliminary action (Pos 4):

=> Perform, before it is needed, the required change of CELL BODY (either fully or partially).

=> Pre-arrange CELL BODY and others objects, if necessary, such that they can come into action from the most convenient place and without losing time for their delivery.



PROPOSAL CONCEPTUAL SOLUTION 1



8

IP.32.- Perception / Appearance / Color Changes (Pos 8):

=> Change the perception, appearance, or form of CELL BODY.

9

IP.27.- Cheap or short-lived objects (Pos 9):

=> Replace inexpensive CELL BODY or its action with a multiple of inexpensive objects or actions.

=> comprising certain qualities of CELL BODY (such as degree of participation, complexity or service life, for example).



SUMMARY CONCEPTUAL PROPOSAL SOLUTION 1

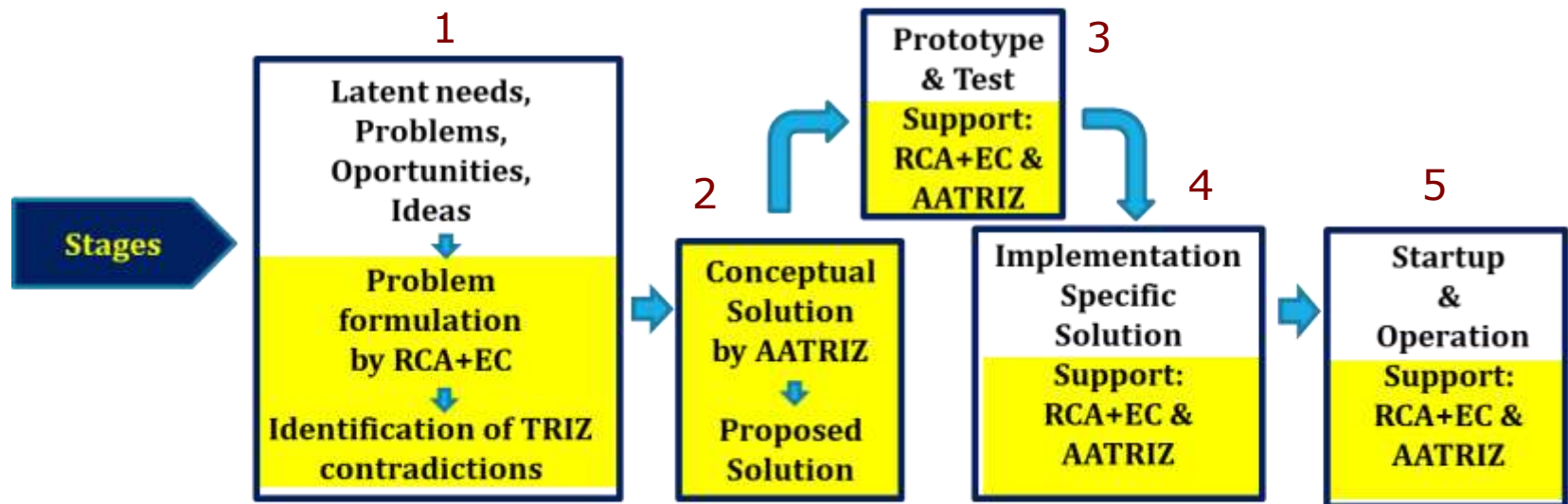
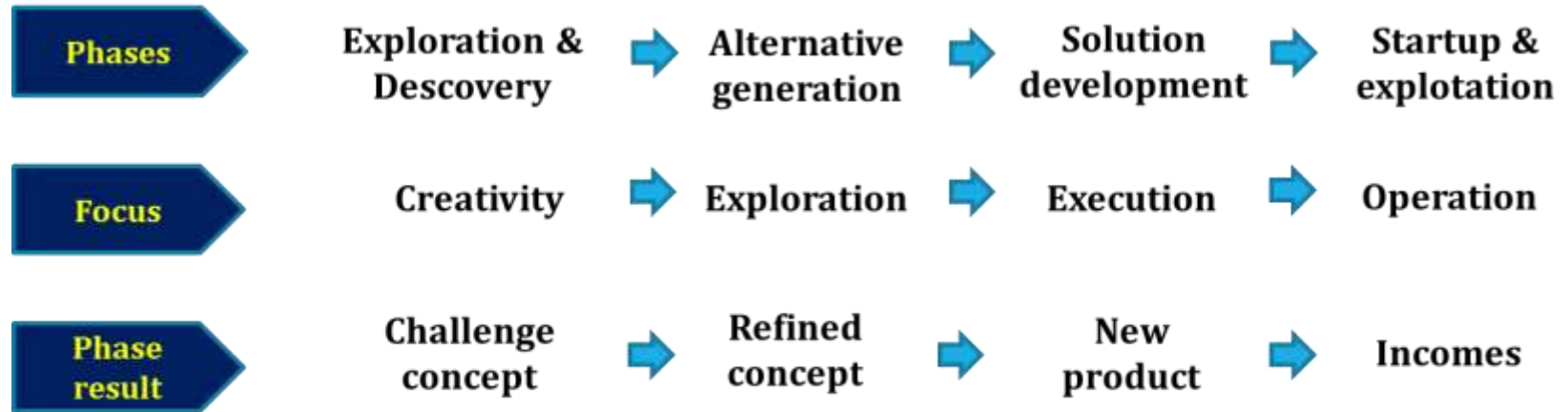


Cell body must:

- Use a pulsating action to distribute energy: it must beat, it is the beginning of life.
- Transform, be more flexible and raise your internal level of activity.
- Capture more energy, more oxygen, even more than necessary, excess will be eliminated.
- Separate the unnecessary parts and add others that serve more.
- Propender to curvilinear and spherical shape.
- Replace mechanical means by sensory means: optical, acoustic, taste or smell.
- Make changes to their living conditions in advance, ie evolve step by step.
- Change the perception and appearance that give security and ease to live.
- Compose of many parts, many cells, each one that performs simple actions, of short life and that are replaceable.

The next stage of innovation is to develop the solution, where it is necessary to solve new contradictions.

If we see the following diagram, here we have worked stage 2 of the innovation process.



RCA+EC : Root Conflict Analysis plus (TRIZ tool) & Evaporating Cloud (TOC tool)
 AATRIZ : Solution Approach Algorithm TRIZ

END