

OTSM Problem Flow Networks approach: application for competitive analysis of patents and other sources of information

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Introduction

OTSM Problem Flow Networks approach could be used for many applications: Forecasting, research planning, planning Strategy and Tactics, management of scientific research, Knowledge and Problem management, developing corporate culture of Sustainable innovation etc. The key point is that OTSM PFN approach is dedicated to handle complex problem situation. Therefore as soon as certain problem situation could be considered as a problem situation then OTSM PFN approach could be used.

As it is known OTSM based on the idea of Altshuller about canonical form of problem representation and then using canonical procedure to treat the problem. The same as it work square equations and many other scientific mechanisms. As it is known any of infinite amounts of square equations is transformed into canonical shape then canonical procedure could be used to find roots of the equation. The scientific question is: what should be canonical form for certain specific kind of problem and what should be canonical procedure to treat this canonical form.

Maybe next phrase most could be seemed for many readers but this idea of G. Altshuller was fulfilled in the course of OTSM development under his supervision and is used in practice for years. Canonical problem to be solved by instruments for canonical non typical problem solving is: transformation of a description of a certain specific problem situation into description of a solution for this specific problem situation. Description of the problem should be transformed into canonical shape: list of Evaluation parameters of a system to be treated and technical (system) contradictions between them. Then OTSM PFN approach could be used in order to obtain step by step a description of a satisfactory conceptual solution for the specific situation.

For relatively simple problems list of evaluation parameters could be done easy. For instance results of functional analysis could be used to obtain list of main functions of the system. Then discussion between experts provides evaluation of the evaluation parameters according scale:

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- (+) – Totally satisfactory value of the Evaluation Parameter.
- (0) – Not so much satisfactory but still acceptable value of the Evaluation Parameter. Could be improved or not..
- (-) – Non satisfactory value of the Evaluation Parameter. Must be improved.

MS EXCEL based templates could be used for this gathering of an information from functional analysis, patents, experts and other sources of information on the subject of the project (see Appendix).

As soon as we have list of the evaluation parameters we can transform it into OTSM Network of Contradictions one of networks is used in frame of OTSM PFN approach for problem solving.

The key question is: various initial descriptions of complex problems could be transformed into the canonical shape shortly described above?

To answer this question in frame of OTSM Network of Problems was proposed. Developing Network of problems we obtain a big picture of the situation, deep insight about the situation and eventually list of Evaluation Parameters and their values. As soon as we have it canonical procedure based on the network of Contradiction could be applied.

Using OTSM Network of problems for competitive analysis of patents

Step 1. Analyze each patent and create network of problems

This analysis should be done according traditional procedure of the Network of Problems developing. Peculiarities for the patent analysis: Network of problems should be developing according the patent claim only. Usually to develop a network of problems we involve all of our knowledge about a problem satiation we are going to treat. We put the knowledge in the shape of Network of Problems. However, for the patent competitive analysis first stage we should take into account first of all description of the problem situation provided in the specific patent as well as solutions were used to solve those problems.

Main OTSM-TRIZ Instruments for this step: Flowchart for Network of Problem developing and OTSM recommendations for patent claim analysis.

If our goal is improvement of a solution described in the patent then possible switch to the list of evaluation parameters and applies all other instruments of OTSM-TRIZ to treat those problems. If our goal is to make complete competitive analysis of a certain domain of patents, then we should repeat this step for each of preselected most advanced patents and other solutions relevant to the domain in frame of our specific situation.

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To understand peculiarity of the specific situation with the specific competitive analysis it is advised to develop special OTSM Network of Problems first. This will help to identify domain for patent research that should be analyzed in order to select patents for the competitive analysis.

Some Hints:

1. Before start. Discuss with patent attorney what could be considered as an improvement of the solution described in the patent.
2. Describe System in the patent through System Operator: what is a structure of the system, how it is changed in time and what is its interaction with super-system and environment.
3. As soon as you have system breakdown structure then to each component of the breakdown diagram it is necessary to list all functions this component fulfills as a whole or just by some parts (segments) of it.
4. As soon as we have links between functions we should develop diagram of function as an OTSM network of problems. In this network each function should be considered as a problem to be solved. Parts of the system or their segments should be considered as specific solutions. Consider each sub-function of the system as a problem to be solved and description given in the patent claim as a system of partial solutions that are converted into satisfactory solution.
5. However alternative solutions could be proposed or better to say have to be proposed to improve initial system. During this process some contradictions could be discovered. Those contradictions should be formulated clear (OTSM diagram for step 1.1. of ARIZ 85-C and stored for further analysis through network of contradictions.
6. While developing network of problems three directions of a system evolution should be considered: Convergence, Deployment or switch to a new S-curve. Consider each chosen direction as a problem to be solved and present it as a contradiction according Step 1.1 of ARIZ 85-C.
Those three directions could be applied for each component of the system or for the segment of a component.

Step 2. Integration of individual networks of problems into whole system Network of problems that is relevant to the domain and goals of the competitive analysis

As a result of the integration we could obtain one or several Networks of Problem relevant to the specific competitive analysis.

Integration of the networks could be done the same way as it is done for developing any other Network of Problems. The only difference is now just that on this step of competitive analysis we have already set

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of Networks of problems to be integrated. In general situation of Network of problems developing we usually start from the list of most painful problems or from System Operator analysis.

It is a good idea to integrate into the network the preliminary network of problems that was done to identify criteria for preselecting of patents for competitive analysis.

Main OTSM-TRIZ Instruments for this step: Flowchart for Network of Problem developing.

Step 3. Transformation the integrated Network of problems into a OTSM Network of Contradictions. Create list of Evaluation parameters to be improved

In the process of integration as well as in the process of developing individual networks for each preselected patent some contradiction and partial solutions appear. Those contradictions should be clear formulated according OTSM diagram for the step 1.1. of ARIZ 85-C. Evaluation parameters for the list should be selected form the diagram. It is also a good idea to use result of Functional analysis, Six Sigma, optimization model or any other method for initial analysis and description of a problem situation.

As soon as the Integrated Network of Problems stops evolving it should be analyzed according rules of Bottlenecks, Close Loops and Shortcuts in order to identify individual contradictions for each case. Each of those contradictions should be presented according OTSM Diagram for the Step 1.1. of ARIZ 85-C.

As soon as we have set of contradictions presented as OTSM Diagrams we could start to transform this set into OTSM Network of Contradictions. For this purpose We should add to each Evaluation parameter Name of an element the Evaluation parameter belong to. It is also good idea to check one more time names Control parameters and name of Elements those Control Parameters belong to.

As soon as Each contradiction is transformed into form they will be used for network of contradictions we can start integrate them into OTSM Network of Contradictions. For this purpose we should follow the rule: one element – one node in the network. In other words it is necessary to link all parameters that belong to the element link to the only node that present the element.

Identify Elements that involved in maximum contradictions. Then select those contradictions for developing A specific Network of Parameters.

Main OTSM-TRIZ Instruments for this step: ENV model, Classical TRIZ System Operator model, OTSM Diagram for the Step 1.1. of ARIZ 85-C.

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Step 4. Create Network of parameters and description of a Satisfactory solutions

For each selected contradiction in the Network of contradictions perform Part 1 or ARIZ 85-C to create model of the problem for this contradictions. Then apply OTSM-TRIZ instruments to develop step by step description of satisfactory solutions and for each of those satisfactory solutions identify conditions this solutions fit.

It is also a good idea to try to convergence all satisfactory solutions that fit certain specific situation to a universal satisfactory solution that could fit all presented specific situations. OTSM System Operator could be useful for that.

Main OTSM-TRIZ Instruments for this step: Four main OTSM Technologies based on Classical TRIZ: New Problem Technology, Typical Solution Technology, Contradiction Technology and Problem flow Technology.

Step 5. Creating Patent Claims

In cooperation with patent attorney develop Patent claims for filing patents.

Step 6. Create patent umbrella

For patents you are going to file repeat all above procedures to improve your patent claims.

Step 7. File complete set of patents for Patent umbrella

In cooperation with parent attorney develop new claims for each patent of your patent umbrella. Organize them into a system that will protect your innovative ideas.