Part 1. Why do we need to know the foundations of applied theories?

One can frequently hear the following statement: “We are experts, we don’t need any theories…” This opinion is understandable in part. In relatively simple situations, it is quite possible to succeed by a simple selection of versions and accepting those of them which provide satisfactory operation and help to achieve some objectives.

On the other hand, not infrequently we are unaware of the fact that the tools we use in our everyday professional activities are often based on certain theoretical models and assumptions. Thomas Kuhn describes many of such facts in his famous book “Structure of Scientific Revolutions). T. Kuhn shows that often enough in the science history, theories and their tools were created on the basis of not quite realized and not quite distinctly defined premises. Kuhn calls these basic theoretical premises paradigms. Realizing and correcting these premises led to serious changes in scientific notions and creating new, more effective tools.

One can hardly imagine that Notre-Dame Cathedral in Paris or Riga Dome Cathedral could be built without a theory, on the basis of the trail-and-error method…
The same concerns cars. Imagine for a second that only “empirics” who renounce theory, mathematics, physics and accident-prevention rules, work at the design-engineering departments of Mercedes and create cars by the trail-and-error method… How many years or even centuries would it take them to create a new car model?

It took several centuries of research, experiments and theoretical generalizations for modern cars, airplanes, electronics, cinema, musical instruments to have been made possible. All that work resulted in the appearance of rules for empirics, which significantly increased the mental creative labor productivity. It is remarkable that people using those rules often renounce the possibility of creating similar rules for inventors who create the new in any sphere of activity – technology, business, art…

Even poetry, music and architecture have their rules – theoretical generalizations. Exactly these rules, typical solutions, are studied by future professionals. For example, today any schoolchild can solve quadratic equations and draw a linear perspective whereas not long ago these things were considered very creative and not formalizable by means of rules.

In 1991, at the World Fair EXPO-91 in Plovdiv, Bulgaria, I had the chance to meet the violinist named Johann. We were demonstrating the first versions of the “Invention Machine” software product designed for supporting engineering problem solving. It was the world-first TRIZ-based software created at our research lab. “Invention Machine” really helped engineers in their everyday practical work. It is just this software product that made TRIZ popular in the world.

An attractive guy approached our exhibition stand and asked why our company which created that software product was called “Invention Machine Laboratory”. During the talk, it became clear that

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Johann was a specialist not only in music but also in the computer science called Artificial Intelligence and that he had done in music the same work as that done by G.S. Altshuller in technology. Johann had identified and clearly defined the principles of creating music of one or another genre, integrated them into a system and developed a software program that allowed anyone to enter a sequence of several notes, indicate the parameters of a desired piece of music to a computer and the latter, after having performed the routine work, played the created music. You, as the computer's co-author, could listen to the obtained piece of music and improve something to your taste. Johann had invented a simple language which allowed even those, who could not play musical instruments and did not know notes, to use that system.

Johann's company was called "Computer Music Laboratory" and his software was named "Composer". He gave me a cassette with recorded pieces of music created by different people by using his software product. It included variations on popular musical themes in different genres as well as quite new melodies. I used to listen to this music with delight until I lost the cassette during one of my numberless trips… It is remarkable that many of my friends, including some professional musicians, also enjoyed that music…

Later I read about experiments where computer-composed and man-composed pieces of music were compared. An auditorium of musicologists was asked to listen to pieces of music and to guess whether they had been composed by a computer or by a man. Professional musicians failed to guess…

We can draw one important conclusion from these episodes and examples. Creative activity is not something unmodifiable, stagnant. What yesterday seemed creative work looks as routine today. And what yesterday seemed an unachievable dream requiring a huge creative effort is being done today by the new generation of creators employing new professional technologies.

The notion of creation is akin to the notion of Horizon.

Today, that tree on the horizon seems to be at the utmost point of the Earth. Tomorrow, after we have got to that tree and sat to repose it its shade, we will see that the horizon (the utmost point of the Earth) has moved away and a new, even more beautiful landscape has opened before us…

The same is happening to creative work. Today, many musicians and composers are already using software products like that created many years ago by the violinist Johann from Bulgaria. Just as many engineers are using some TRIZ tools in their practical work and are solving problems which remained unsolved for years in the machine building, nanotechnologies or microelectronics.

An interesting tendency showed itself on the example of a large number of people engaged in professional study of Classical TRIZ. Initially, they attended TRIZ courses for creating inventions necessary for protecting their dissertations or for solving complicated problems within projects in which they took part. With time, some of them were beginning to teach TRIZ at their organizations, which increased their TRIZ competence. Problems which had previously seemed creative were beginning to look routine. Very often, their objectives were becoming more and more complicated. Their creative energy found the way out though attaining those objectives…

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At present, traditional advertising specialists meet with competition on the part of colleagues armed with the knowledge of TRIZ application in advertising. And creating an advertising product which would help to significantly increase the sales of products and services of your clients is not at all a simple creative job. Competition is particularly strong in advertising and work results are easy to check: a growing sales volume means that the advertising campaign has been properly designed and conducted.

Igor Vikentiev, one of my advanced TRIZ colleagues engaged in the development of the Advertising Theory and creating effective methods for practical application, wrote a book titled "Advertising Principles". The book has been republished many times and today it is a desk book for many advertising specialists.

It is natural that the book is actively criticized by competitors – traditional ad-makers who insist that creating an advertising product by some methods is impossible, that an ad-maker must be always in the throes of composition to produce a new original advertising product… However, a desired result is not always achieved. That is why the new generation of ad-makers and advanced professionals buy the book and attend I.V. Vikentiev's workshops. The thing is that his approaches significantly increase the probability of obtaining a positive result, which means a higher probability of conducting a highly effective advertising campaign within a scheduled time frame. Using the TRIZ-based method of conducting advertising campaigns ensures sustainable production of good results and helps to win in a competition with those who do not admit that TRIZ is a very practical and effective theory.

Elena Novitskaya is a professional graphic designer. She has inventively revised the 40 TRIZ principles and is using them extensively in her work. She has a wide choice of customers. It is necessary to say that Altshuller's 40 principles are the most popular TRIZ tool in the world, but few people know that in 1986 G.S. Altshuller expressed regret concerning the years he spent to reveal and integrate those principles and removed them from the arsenal of TRIZ tools.

High competence in TRIZ means that a specialist knows the theoretical foundations and can use them as an applied tool; helps his company to obtain steady profit and high results in the field of innovations; increases chances of his company or organization for success under keen competition.

Why am I so interested in the examples concerning my colleagues from the advertising sphere dealing with the application of TRIZ elements in non-technical fields?
The thing is that Igor Vikentiev is not an advertising specialist by education. When the USSR economy collapsed and many engineers lost their jobs, those of them who knew TRIZ began to use its tools for solving problems related to the organization of advertising business and in those niches of products and services where a new labor market was emerging.

The thing is that in-depth knowledge of the fundamental principles if Classical TRIZ not only ensures effective application of its tools, but also allows new tools, adapted to specific needs, to be created as necessary.

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If experts, creating their tools by the trial-and-error method, without any theoretical generalization, face a situation when their tool does not work, they need to make a fresh start.
If, to the contrary, theoretical generalization has been made, it often, though not always, strongly facilitates creation of new tools for new applications and correction of existing theoretical principles. Classical TRIZ and its tools have been created in the same manner by studying the experience accumulated by many generations of inventors.

Thus, we can draw a conclusion that applied scientific theories significantly increase the probability of obtaining a desirable result at a lower cost and at a better quality of an obtained product or service. These theories may serve as a basis for the creation of new tools for everyday practical application. These tools are studied by future specialists in the course of their professional training.

The trouble is that all professionals, future competitors, learn much the same tools during their professional training. This considerably reduces the competitive advantages of specialists and companies. At present, to win a competitive struggle, one needs to develop and improve the skills of increasing the effectiveness of work while solving so-called creative problems. All professionals are taught to solve problems by standard methods. By far not all of them can work with nonstandard problems. It is, however, just an effective work aimed at defining and solving nonstandard problems that offers a tangible competitive advantage. And it is just where deep knowledge of Classical TRIZ comes to the rescue.

Using a good applied theory, we do not seek a solution to a problem by the trial-and-error method, but do it systematically, creating, step by step, a solution to a respective specific situation.

The knowledge of the theory for building various tools increases the level of professional training and provides for effective modification of existing tools or creation of new ones as and when necessary. That's why more and more universities all over the world are considering a possibility of introducing serious Classical TRIZ and OTSM courses into their academic curricula. A good applied theory turns the solving of complicated, nonstandard, so-called creative problems into routine, thereby opening up new vistas for a higher-order creative work and for work on more complicated problems. The creation horizons are being expanded, offering new opportunities for an efficient creative work.

The notion of creation is akin to that of horizon and applied theories are cars which allow us to reach new horizons much faster, than we could do that going on foot, and to move to new, still more interesting creation horizons.