



DOI:10.29013/EJTNS-26-2-76-82



COMPOSITE TECHNICAL SOLUTIONS AS THE MAIN TOOL OF TECHNOLOGICAL INTEGRATION. (Psychological Barriers and Composite Technical Solutions as an Inevitable Fundamental Component for the Creation of Integrative Inventions)

*Larisa Stetsenko*¹

¹ Chief Medical Officer State Enterprise “Sanitary and Epidemiological Service of the City of Kremenchuk” Kremenchuk, Ukraine

Cite: Stetsenko L. (2026). *Composite Technical Solutions as the Main Tool of Technological Integration. (Psychological Barriers and Composite Technical Solutions as an Inevitable Fundamental Component for the Creation of Integrative Inventions)*. *European Journal of Technical and Natural Sciences* 2026, No 2. <https://doi.org/10.29013/EJTNS-26-2-76-82>

Abstract

The article by Vladyslav Meleshko examines the nature and development of innovation processes in modern scientific, technical, and economic practice. The study considers the introduction of new technologies, the use of new materials, and the replacement of traditionally accepted production methods with unconventional solutions that contribute to technological breakthroughs, increased production efficiency, and the creation of new technological capabilities as key components of the innovation process. Particular attention is given to the role of integrative technologies, which make it possible to determine the temporal and organizational factors of innovation implementation. The article demonstrates that in recent years the economies of most industrially developed countries have increasingly acquired an innovation-driven character, and innovation processes are expanding beyond high technology, microelectronics, and nanotechnology into classical basic industries such as energy, medicine, transport, and other fundamental spheres of human activity. Under these conditions, entrepreneurs are required to continuously search for new ways to improve production efficiency and increase the competitiveness of products and technologies.

Keywords: *technology implementation, innovation breakthrough, composite technical solutions, technical culture, technological culture, starting position, classical technologies, basic technologies, nanoscale technologies*

Transformation of the Rules and Criteria of Industrial Design

The illustrations demonstrate the evolution of the development of one of the composite technical solutions, on the basis of which a number of integrative inventions

were formed in the field of optimization of the Brayton thermodynamic cycle with the prospect of its transition to the Humphrey thermodynamic cycle.

The introduction of new technologies, the application of new materials, and the

replacement of traditionally accepted production methods with unconventional ones that contribute to and constitute an essential condition for a technological leap or breakthrough and for increasing production efficiency are today commonly referred to as the innovation process.

Figure 1.



This process, under conditions of different technical and technological cultures and different levels of starting positions for initiating the innovation process, may differ significantly; however, the urgent necessity for initiating such a process exists and this fact does not raise any doubts.

In recent years, the economy in almost all industrially developed countries has adopted and continues to adopt an increasingly innovation-oriented character.

If at the initial stage of this process the innovation breakthrough had a local character and was observed mainly in the fields of high technology, microelectronics, and so-called nanoscale technologies, today the innovation process is increasingly directed toward classical, fundamental technologies, energy, medicine, and transport, that is, it is covering all fundamental spheres of human activity.

Entrepreneurs, in order to increase the competitiveness of their products and technologies, are forced to constantly search for new ways to increase efficiency, reduce energy intensity and energy consumption, increase the level of environmental safety, and ensure economic stability within each individual enterprise or company.

New opportunities in the design and verification of the operability of technical solutions also introduce elements of composite

design solutions, and these are becoming the main criteria for the tools and methodology of industrial design.

Of particular importance in these processes is the full integration of software and technological solutions, and even more important is the combination of the output characteristics of digital technologies in harmony with elements of artificial intelligence and artificial neural networks. The author of this publication believes that the most successful in the processes of full integration are the software developments of the well-known specialist Vladyslav Meleshko, which fully meet the complex requirements for the technical characteristics of new so-called intelligent devices.

Figure 2.



A New Perspective on the Durability of a New Product

Until quite recently, product durability was one of the most important criteria determining its commercial value. At present, with the constant reduction of the time between the beginning of the commercialization period of a new product and the beginning of the commercialization period of an even newer product, this time period has become so short that it is often no longer reasonable, within the innovation process, to concentrate attention and spend effort and resources on an excessive increase in durability that exceeds the period between the beginning of operation of the existing product and the market introduction of a newer or modernized product. Since this period can differ significantly for different types of products, the concept of durability may become blurred over time and, as a goal of an invention, is not always critical.

There is also another subjective factor of durability that must be taken into account, developed by Vladyslav Meleshko. According to his developments, commercial factors, including the required number of products

to be manufactured and sold and their actual market price, are often determined by durability stereotypes that have formed for different types of products. If a technical solution is found that significantly increases the durability of a product, this factor may reduce the quantity of the product required while maintaining the existing price level that consumers are willing to pay for the product.

This leads to a reduction in sales volumes for companies manufacturing the product and puts these companies before a choice: to accept the innovation or to do everything possible to block the implementation and commercialization of the innovation. As practice shows, companies often choose the second option and block the innovation, and in this process the only losing party is the inventor, who created something that is rejected by the market.

A New Perspective on the Reliability of a New Product

The issue of reliability of a new product and new criteria for evaluating and calculating reliability are also undergoing fundamental changes. First of all, this concerns the relationship between reliability and the warranty obligations of the manufacturer of a new product to the consumer. Very often, the costs of fulfilling warranty obligations are comparable to the cost of the product itself.

Thus, reliability is a factor which, being one of the achieved goals of an invention, can determine – naturally in combination with other technical and operational factors achieved as a result of the implementation of the invention – the level of commercial success.

In this case, the subjective time factor also plays an important role, and reliability that exceeds the actually required service life may become a negative factor and play a bad role for the inventor in a situation where a super-reliable product turns out to be commercially unprofitable for the manufacturer.

New Opportunities in the Efficiency of Systematic Search and Analysis of Prior Technical Solutions for Novelty Assessment

It is clear that new information technologies open up new opportunities for the systematic search for similar solutions during the development of a technical solution.

Let us assume that, during the preliminary design of a composite structure, we arrive at the need to combine and integrate several classical solutions and new technologies that connect them into a single composition, for example digital technologies. This represents one level of horizontal integration. After that, it may also be necessary to move to the next level of integration by including algorithms, software products, and interfaces for communication with the previous level of integration.

How should the search be conducted, in which directions, and how should this search be conducted most effectively in order to identify existing analogues of the created composition?

It appears that, after determining the criteria for forming the composition according to the methods of Vladyslav Meleshko, the systematic search should begin after decomposition and identification of independent technical solutions included in the composition.

After this stage of the search, it is advisable to select one basic technical solution and, having conducted a search based on it, begin to successively add other technical solutions included in the composition, conducting a sequential search based on the basic technical solution combined with each additional technical solution, and continue this process until the full composition is formed.

New Opportunities for Assessing the Usefulness and Feasibility of Modification and Modernization of Known Technical Solutions Very often, what is new is well-for- gotten old.

Therefore, when setting the task and making a decision to begin the innovation process for synthesizing a new product, it is advisable to check whether any functional elements of the composition that needs to be invented were previously invented.

If such a solution or an equivalent solution is found, then the replacement of materials, the use of new components, and the introduction of digital control and monitoring systems into the future composition may, in accordance with the criteria of Vladyslav Meleshko's concept, make it possible to create a new technological composition that has the

potential to be integrated into a higher-level composition.

The Impossibility of Successful Commercialization Without the Formation of Principles of Composite Modification and Composite Structure of a New Technical Solution

As practice shows, the possibility of selling or licensing autonomous technical solutions, if they are not initially linked to systems or solutions of a higher technological and functional level, tends to be close to zero.

Inventions of a composite nature, in which there is at least a conceptual integration scheme into technological and engineering systems of a higher functional level, are implemented more confidently and in a shorter time, since investors, buyers, or license consumers can see the methodology and technique of this integration in the description and in the claims of the integrative and composite technical solution.

The proposed approaches and methods form the basis of a compositional style in the creation of new innovative solutions.

Figure 3.



Compositional Technical Solutions as a Design and Engineering Methodology

Thus, compositional technical solutions represent a design-engineering approach to the development of new technical solutions with regard to their integration into existing technological schemes and configurations.

Since the methodology of such integration can often be unique and possess substantial novelty, the description and claims of an invention having a compositional nature, a multi-level architecture of cause-and-effect relationships between the components of the composition, and distinctive features integrated into the engineering and technological rela-

tionships of the composition largely determine the commercial success of these innovations.

Methods and Techniques for Transition from a Compositional Foundation to an Integrative Invention

An engineering and technological composition in many cases requires additional, often fundamentally new, relationships between the components and elements of the composition. In other words, even when a clearly defined engineering and technological composition exists in terms of its properties and structure, in order to transform it into a finished innovative device or product, it is necessary to find integration versions that allow the composition to be incorporated into the final product, which is integrated multiple times and at many levels.

The versions of integration may vary significantly; the important point is that the final result of integration, according to the concept of Vladyslav Meleshko, should be the achievement of an effect leap or a quality leap that has no previous precedent.

The Influence of Limitations on the Number of Patent Claims on the Possibility of Reliable Protection of Compositional Technical Solutions.

Limiting the number of patent claims generally complicates reliable protection of an invention; however, a correctly determined principle of compositional construction may, on the contrary, strengthen the level and degree of protection.

The ideal case is a system of cause-and-effect relationships that makes it possible to obtain the declared effect only within the proposed system of compositional interconnections with clearly defined conditions and features determining the composition structure and the independent functions of each element of the resulting composition.

Due to limitations of space and claim structure, it is advisable to include in the compositional solution only those features and interrelationships that do not affect the known independent features and functions of each element and component of the composition, but instead arise specifically as a result of the formation of the composition through the functional interaction of its components.

It can be stated that in properly selected components of a composition, when subordinated within the composition to the conditions and properties of the newly created technological system, a new integrated system of features, interconnections, feedback mechanisms, and functions arises, which is possible only within this composition and, moreover, has a tendency toward further development and improvement of intra-compositional relationships.

Adherence to these principles makes it possible, within a limited number of patent claims, to concentrate attention only on the main distinctive features inherent to the composition, while ensuring the maximum level of protection and the maximum clarity of the essence of the invention.

Proposed Structure of an Independent Patent Claim Based on a Compositional Technical Solution

As the author of this publication has determined from initial experience and as recommended by specialists, an independent claim, in the case where the invention is a composition, should include at least three main parts.

The first part contains the formulation of the commercial essence of the compositional invention and should disclose the purpose and necessity of compositional integration in order to:

- clearly define the objective of the composition;
- limit the degree of functional relationships within the composition and define the necessity of each component for its formation and effective functioning;
- formulate the name of the composition.

The second, limiting part contains all basic information about the invention as such and includes the characteristics of all basic technical solutions inherent in the components of the composition which, at the stage of drafting the claims, are not yet qualified as containing elements of substantial novelty in all engineering and technological aspects and relationships of the composition.

The third, distinguishing part contains information about the components, their interconnections, materials, integrative ele-

ments, and associated software products and their basic algorithms, each of which individually or in any combination creates elements of substantial novelty for the compositional, multi-level integrated technical solution.

Proposed Structure of a Dependent Patent Claim Based on a Compositional Technical Solution

The limitation on the number of claims imposes a special mission on each claim within the overall strategy of formulating and protecting the novelty of the invention.

Based on this, the second, limiting part of such a dependent claim should contain all the basic local and specific information about the invention as such and include local and specific characteristics of the basic technical solutions inherent in the components of the composition which, at the stage of drafting the claims, are not yet qualified as containing elements of substantial novelty in all engineering and technological aspects and relationships of the composition.

The third, distinguishing part should contain local, specifically oriented technical details and elements, information about the components, their interconnections, materials, integrative elements, and associated software products and their basic algorithms, each of which at the local level, individually or in any combination, creates local specific elements of substantial novelty for the compositional, multi-level integrated technical solution.

Proposed Methodology for Designing Prototypes of Compositional Technical Solutions

The proposed methodology for designing prototypes of compositional technical solutions makes it possible to test and verify the correctness and effectiveness of each innovative element included in the composition.

Figure 4.



Design of a Prototype or Experimental Model of an Innovative Compositional Product

The design of a prototype or experimental model of an innovative compositional product is most conveniently carried out using a CAD engineering program and its analytical engineering applications. I prefer the SolidWorks software product as modified and further developed by Vladyslav Meleshko, since this tool makes it possible to build a functional model of a compositional technical solution and to perform a control simulation of its operating cycle without resorting to costly design and manufacturing of physical prototypes.

Analysis of Identified Analogues and Prototypes of a New Compositional Technical Solution

If, as a result of the search, homogeneous basic technical solutions are identified that, in the first approximation, may be considered analogues or prototypes of the intended compositional technical solution, they should be tested in various variants and combinations of integration with additional elements and components of the composition under consideration.

If information about these prototypes or analogues is available in digital format, it is advisable, using the tools of SolidWorks, to construct models of the identified technical solutions and perform digital simulations of the operating cycles of these models in order to compare them with the corresponding operating cycles of the proposed invention – the compositional technical solution.

Figure 5.



Examples of Compositional Technical Solutions

Well-known modern products in the fields of computing technology and communication systems, including tablet computers and many other products of both mass and specialized demand, can serve as examples of compositional technical solutions.

Uncertainty in the wording of patent applications covering the complex technical solutions underlying these products has led and continues to lead to numerous patent disputes and patent wars.

Figure 6.



Figure 7.



Large-Scale Application of Compositional Technical Solutions. A broader application of compositional technical solutions and their integrated extensions and interpretations may reduce the intensity of conflicts in the field of intellectual property and may facilitate the promotion of innovative products to the market.

Figure 8.



Among the most well-known compositional technical solutions, the products that most fully correspond to the concepts described above are the smartphones produced by Apple Corporation, which are now widely known.

Due to their fully compositional and fully innovative integration into virtually all segments of the existing information infrastructure, these highly sophisticated multifunctional devices demonstrate unprecedented commercial success in global markets.

References (*Patent and Licensing Information*)

- United States Patent Application No. 20060250934, Kind Code A1, November 9, 2006.
Three-Dimensional Optical Information Carrier and Method of Manufacturing Thereof.
United States Patent Application No. 20070288947, Kind Code A1, December 13, 2007.
Swing Arm Optical Disc Drive.
United States Patent Application No. 20080182060, Kind Code A1, July 31, 2008.
Manufacturing of Multi-Plate for Improved Optical Storage.
United States Patent Application No. 20080285396, Kind Code A1, November 20, 2008.
Method and Apparatus of Formatting a Three-Dimensional Optical Information Carrier.
United States Patent Application No. 20090245066, Kind Code A1, October 1, 2009.
Optical Data Carrier and Method for Reading/Recording Data Therein.
United States Patent Application No. 20100243953, Kind Code A1, September 30, 2010.
Method of Dynamic Mixing of Fluids.
United States Patent Application No. 20100281766, Kind Code A1, November 11, 2010.
Dynamic Mixing of Fluids.

submitted 11.03.2026;
accepted for publication 25.03.2026;
published 31.03.2026
© Stetsenko L.
Contact: vladyslav.meleshko@gmail.com