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INVENTIVE PROBLEMS AND MODERN THEORIES AND REAL-WORLD PRACTICE OF COMMERCIALIZATION. (Integration and psychological adaptation of the Theory and Algorithm for Inventive Problem Solving with modern theories and real-world commercialization practices, implemented and systematically adapted to the parameters and initial requirements of contemporary high-technology projects through the application of elements of artificial intelligence and artificial neural networks)

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Abstract

As discussed in the article, the integration and adaptation of the Theory and Algorithm for Inventive Problem Solving (TRIZ and ARIZ) with modern theories and real-world commercialization practices are examined. Particular attention is devoted to the influence of technical stereotypes and psychological barriers on the generation, evaluation, and implementation of innovative technical solutions within contemporary high-technology projects. The article analyzes the distinction between practical inventions that effectively solve real engineering and technological challenges and conceptual solutions that remain detached from actual market and industrial needs. The role of innovation analysis in identifying commercially viable technical concepts and overcoming technical and technological contradictions is also considered.

Special emphasis is placed on the changing requirements imposed on inventors by rapid technological progress, shortened product development cycles, increasing prototype costs, and the growing complexity of modern engineering systems. The article highlights the importance of multidisciplinary competencies, market awareness, and the ability to combine technical creativity with commercialization strategies.

The integration of forecasting techniques, innovation methodologies, artificial intelligence, and artificial neural network technologies is presented as an essential component of modern inventive activity. Such an approach enables inventors to develop technically sound, commercially relevant, and practically implementable solutions while reducing the influence of psychological

barriers and improving the effectiveness of innovation processes.

The article demonstrates that successful commercialization of innovative ideas increasingly depends on the inventor's ability to synthesize technical knowledge, market requirements, and advanced analytical methods into a unified framework for the development and implementation of high-value technological solutions.

Keywords: *Integration; Adaptation; Modern theories and real-world commercialization practices; Commercialization parameters and implementation practices; Innovation analysis; Artificial intelligence and artificial neural networks; Obvious technical solutions; Engineering and technology; Purposeful creative activity; Realization of ambitious integrated objectives; Technical stereotypes; Overcoming technical and technological contradictions; Forecasting techniques; Implementation of synthesized ideas*

Introduction

There are several fundamental directions that, under current conditions, have a decisive influence on the fate of new ideas. Taking these directions into account may ensure a real and high level of commercial success, whereas neglecting them may permanently close the path for an idea to be implemented in any commercial form.

The author proposes to consider some of these fundamental directions (naturally, the scope of this article allows this to be done only in the form of theses).

For modern technological innovations, which are largely formed through active and intensive brainstorming involving a sufficiently large team or group of specialists interested, to one degree or another, in achieving an effective result that may, in principle, be considered the equivalent of an ideal final result, there exist real problems in organizing the innovation process. These problems are caused by objective factors, including psychological, technological, and design stereotypes, as well as the apparent obviousness of emerging ideas and concepts.

The technical, compositional, and technological solutions that emerge and continue to emerge are evaluated and considered through the prism of conclusions derived from the practical application of the laws governing the development and construction of industrial technologies, machines, and mechanisms that originated at least in the previous century, at a time when none of the modern materials, components, assemblies, industrial electronics, and laser technologies known today existed.

In addition, the integration of elements of artificial intelligence and artificial neural networks into the infrastructure of new technical systems greatly complicates the processes of designing and forming the technical and technological characteristics of innovative products.

This situation is further aggravated by the fact that, as stated in the first part of this publication, recognition of a technical solution as an invention is based in the United States and in most other countries on different criteria: in the United States, on four criteria, and in most other countries, on three criteria.

The aforementioned fourth criterion is precisely the subjective factor in the evaluation of a technical solution that initiates the gradual development and entrenchment of a psychological stereotype based on the division of new technical solutions into obvious and non-obvious ones.

The presence of a clearly expressed subjective factor introduces into the process of evaluating a technical solution a comparison with known design or technological elements and their combinations that are familiar from previously known developments.

The familiarity of a particular solution and all the nuances of its implementation cannot be considered an objective factor, since the decision regarding the obviousness or non-obviousness of a technical solution fundamentally depends on the level of knowledge and professional competence of the experts conducting the evaluation.

Integration and Psychological Adaptation of the Theory and Algorithm for Inventive Problem Solving with Modern Theories and the Real Practice of Commercialization, Implemented and Systematically Adapted to the Parameters and Initial Requirements of Modern High-Technology Projects Using Elements of Artificial

Intelligence and Artificial Neural Networks

As is well known, the application of the Theory and Algorithm for Inventive Problem Solving within the overall innovation process, under the conditions of real globalization that have developed in world practice, requires, due to certain significant changes that have occurred in United States patent legislation, the introduction into the analytical evaluation process of the commercial potential of innovative products of a somewhat unusual method of additional subjective assessment. This assessment is connected with the obviousness or non-obviousness of the elements of global novelty embodied in the technical solutions underlying a new product.

The assessment of obviousness or non-obviousness under United States patent law constitutes the actual fourth criterion of an invention, and the recognition of the technical solution underlying a new product as an invention depends upon the conclusions of the patent office examination, which are inherently subjective.

In other words, if a new solution is non-obvious, it is considered an invention; if it is obvious, it is not considered an invention.

Such circumstances, combined with the structural complexity of innovative products incorporating integrated digital technologies and software products (which, as is known, are not technical solutions and therefore cannot be inventions), create the necessity of employing not only technological methods of analysis but also profound psychological techniques and approaches in all forms and types of evaluation.

The Theory of Inventive Problem Solving and all of its known derivative Algorithms for Inventive Problem Solving were created in a country and at a time when the commercialization of innovative solutions was not considered particularly important. It may even be said that, at a certain stage in the development of the Theory and Algorithm for Inventive Problem Solving, issues of commercialization were deliberately ignored in favor of purely technological variants of innovative solutions that were completely detached from the real economy and, in most cases, from real life itself.

As a result of such a short-sighted and one-sided organizational model for the development of the innovation process that existed during that period, inventors who were educated and trained on the basis of TRIZ and ARIZ found themselves completely unprepared for the peculiarities and methods of competitive struggle in a modern society characterized by a free and competitive innovation-driven economy.

They are ready and eager to invent, but they are not prepared and do not know how to earn income from their inventions in order to receive fair compensation for their talent and creative work.

It is particularly important to assess the necessity of initiating an innovation process and to understand – or, even better, to construct a psychological analytical model and calculate – all possible scenarios for the development of events during commercialization, naturally in conjunction with a realistic forecast of the achievable level or degree of protection of the new product as a non-obvious technical solution.

For this purpose, the author of this publication considers it advisable to apply a system of preliminary predictive evaluation tables in the form of an assessment sheet consisting, at the preliminary stage of evaluation, of 44 elements for assessing the criteria and parameters of the emerging innovative idea or initiative, including those associated with digital technologies and their potential impact on traditional technological solutions and processes, while also taking into account the psychological aspects of obviousness and non-obviousness.

Elements of the Evaluation Sheet

Each of the 44 elements of the Evaluation Sheet analyzes a specific aspect of an idea.

The Evaluation Sheet includes all possible elements of comparative assessment, the integration of which makes it possible, at all stages of project development, to maintain, among other things, a psychological model for the development and evaluation of parameters and characteristics from the perspective of actual non-obviousness and, on that basis, to assess the degree of reliability of the project's intellectual property protection.

The calculation of each element is measured in points.

1. Urgent Unmet Need
2. Explainable Uniqueness
3. Sustainable Differentiation
4. Readiness for Immediate Demonstration
5. Strong Competition
6. Weak Competition
7. Attractive Pricing Policy
8. Customers Who Have Committed to Purchase a Product That Does Not Yet Exist
9. Significance of Demand Validation
10. Market Leadership
11. Ambush Attack
12. "Hot" Market
13. Confidence and Fearlessness
14. Fulfillment of Commitments
15. Resilience
16. Passion
17. Managerial Competence
18. Honesty and Reliability
19. Ethics of Success
20. Attractiveness to Lobbyists
21. Cash on Hand
22. Revenue Exceeding Costs
23. Advantages of the Delivery Service
24. Availability of Resources
25. Leadership and Dominance
26. Market Penetration Strategy
27. Chasm-Crossing Strategy
28. Protection of Property
29. Partnership Potential
30. Correct Choice of Location
31. Quality of the Backup Plan
32. Undeserved Advantages
33. Capital Requirement Management
34. Limited Cash Before Business Launch
35. Visible Capital
36. High Potential Value
37. Predictable Results
38. Taboos
39. Show-Stoppers
40. Ostrich Syndrome
41. Connections with High-Flying Individuals
42. A Vivid and Convincing Story
43. Connections with Governing Circles
44. The Path of Least Resistance, or Easy Prey

In subsequent chapters of this publication, the author intends to disclose the essence of all elements of the Evaluation Sheet through specific examples from innovation practice.

Let us return to the Theory and Algorithm for Inventive Problem Solving.

The Theory of Inventive Problem Solving and the Algorithm for Inventive Problem Solving were conceived during the post-war period as a "precise science," despite the fact that even at that time an important question existed within the inventive community regarding the fundamental importance of having, at the core of a new technical solution, schematic, technological, and design elements formulated by an individual capable of generating useful and workable ideas (today, non-obvious ideas as well).

Since society at that time believed that any certified specialist and qualified worker, provided they possessed the Theory of Inventive Problem Solving, could generate new ideas and bring them to a real final result, the newly created Theory of Inventive Problem Solving, built upon this psychological foundation, was received with considerable interest by the community.

For a certain period of time, all of its laws and methods generally corresponded to the level of development and capabilities of technology and engineering.

What, then, do the Theory and Algorithm for Inventive Problem Solving actually represent today?

How have modern high technologies and processor technologies influenced their integrative capabilities?

How will the use of elements of artificial intelligence and artificial neural networks change the potential for optimizing the parameters and capabilities of monitoring and control systems?

These are far from the only questions that require clarification.

As an important fact, it should be noted that there is currently a widespread phenomenon of deep and detailed investigation of modern biological and biomedical objects, as well as other smart-technology objects across all fields of engineering and technology, in search of fundamental solutions – non-obvious analogues of future inventions – especially on the basis of biomechanical research and computer modeling.

How does this trend correspond with the laws, methods, and techniques of the Theory and Algorithm for Inventive Problem

Solving, as well as with patent and licensing strategy algorithms developed on the basis of their fundamental principles?

At present, the majority of interesting, effective, and non-obvious inventions arise from discoveries of certain elements of living nature that inspire inventors to create increasingly novel and non-obvious technical solutions, solving unusual problems through unconventional methods and approaches that generate new subjects of smart technologies within the framework of intelligent innovation infrastructure.

In the future, the application of quantum computers and their processor equivalents incorporating integrated elements of artificial intelligence and artificial neural networks should significantly expand the potential fields of application of smart technologies.

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