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PRACTICE OF SOLVING BUSINESS PROBLEMS USING TRIZ TOOLS

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Abstract: *This work is devoted to the use of TRIZ for solving business problems. This is a very hot topic today. In TRIZ, a large number of tools are applied, so it is not always clear which tool to use to solve a particular problem. The authors and their students have been using a universal tool for identifying and resolving contradictions for many years, which was called the Logic of ARIZ. This method is easy enough to learn and use to solve problems from any field. The method is universal and allows you to quickly obtain effective solutions. This is very important for any area, and especially for a business, where saving time and resources is very important. Since 2015, authors and their students have been using this method to solve business problems and have received good results.*
The article is a case study of the use of this method for solving business problems.
Key words: *TRIZ, contradictions, IFR, Logic of ARIZ.*

1. INTRODUCTION

The business environment is changing dynamically even for large companies. The 2019 pandemic showed that many business approaches need to be changed, since they do not solve the critical business problems and issues: managing a company in self-isolation, switching to online work; the cyber-attacks growth; unpredictability of restrictive measures by governments and others. Top managers do not quite understand how to find solutions to those problems that no one has faced before and at the same time maintain or develop innovativeness, which is increasingly becoming one of the main criteria for the company's success. Company leaders or owners (who hire successful leaders) often decide on innovation based on their experience, which is often insufficient. The use of experience leads to the fact that a new product or invention is not obtained. In this case, an enumeration method is used, going through a large number of options and most often obtaining a low-level solution.

TRIZ has long gone beyond the solution of only technical problems. The use of TRIZ in business is a very relevant topic, and some authors show the use of TRIZ for solving various business problems. For example, Darrel Mann [1] shows how TRIZ is used to introduce systematic innovations that can improve business and solve business problems. A very practical approach is offered by Yeoh Teong San [2], when TRIZ tools are used to increase sales or to increase margins and can also be used to train top managers of a company. There are works that are aimed at generating business ideas and finding solutions that can also be applied by top managers of companies [3].

If it is necessary to build new business models, TRIZ finds its successful application here too. Thus, Valery Souchkov shows in practice how TRIZ tools and principles are used to search for new business models [4].

There are other examples of using TRIZ for solving business problems [2, 5, 6, 7].

On the other hand, a business requires simple and quick tools to solve its problems. V. Petrov suggested using an abbreviated version of ARIZ, which he called "Logic ARIZ", in business. Over the years, the technique has been repeatedly tested, and with its help many problems from different fields have been solved [8]. Since 2015, this method has been tested in solving business problems and has given very good results. Authors and their students use it all the time

2. Using TRIZ for solving business problems

Almost all TRIZ tools can be used to solve business problems. Sometimes some adaptation is required.
We will cover only a few of these tools:

- Contradictions;
- Ideal final result (IFR);
- Inventive Principle;
- Abridged version ARIZ – "Logic ARIZ" or the logic of solving non-standard tasks;

We work with non-technical systems, it is proposed to introduce new names for contradictions that differ from those proposed by Altshuller [10]. New contradictions were proposed by Mikhail Rubin [11].
Administrative contradiction – **superficial contradiction (SC)**;
Technical contradiction – **contradiction of requirements (RC)**;
Physical contradiction – **contradiction of properties (CP)**.

3. Logic of solving non-standard problems

Let us briefly outline the logic of solving non-standard tasks, which shows the relationship between the types of contradictions. Superficial Contradiction (SC) is formulated either in the form of a ***need*** for a *new requirement* **"A" (positive effect)** or in the form of an **undesirable effect (anti-B)** that must be eliminated. Let's schematically depict it like this:

SC (PE): A or SC (NE): anti-B
or vice versa: **SC (PE): B** or **SC (NE): anti-A**.

Superficial *contradiction* is only **one** requirement (either good or bad).
To determine the **Contradiction of Requirements** (**RC**), we identify two conflicting requirements for the system. Let us designate these requirements with the letters "**A**" and "**B**". Then the contradiction of the requirements can be represented as the need to improve the characteristics that satisfy the requirement "**A**", which leads to an unacceptable deterioration in the characteristics that fulfill the requirement "**B**" (the appearance of the **anti-B** requirement). The *undesirable effect* is the "**B"** requirement. Or vice versa — improvement of "**B**" due to deterioration of **A** (appearance of "**anti-A**").

RC: A – anti-B or **anti-A – B.**

Unlike a superficial contradiction, a contradiction of requirements has **two** requirements that contradict each other.
The **Ideal Final Result (IFR)** wording should be aimed at eliminating the ***undesirable effect*** (**anti-B**) while maintaining the ***positive requirement*** (***positive effect***) "**A**", which is

IFR: A, B.

Contradiction of Properties (PC) is determined by identifying the ***conflicting properties*** of "**P**" and "**anti-P**" (for example, physical), which must be possessed by an element of the system that does not cope with the requirements of the IFR. For this, it is necessary to determine what property "**P**" the element must have in order to ensure the requirement "**B**", that is, to eliminate the *undesirable effect*. Simultaneously, the same element must have the opposite property (**anti-P**) to preserve the positive requirement "**A**". Thus, the element must have the property "**P**" to satisfy the requirement "**B**" (we denote it **P→B**), and the property "**anti-P**" to preserve the requirement **A** (we designate it as **anti-P→A**).

PC: P → B, anti-P → A.

The **solution (S)** of the problem consists of resolving the contradiction of properties, it is necessary to separate the contradictory properties "**P**"**.** (it is necessary to separate the conflicting properties of «P»)

S: P | anti P

The vertical bar symbolizes the division.
The main ways of separating conflicting properties were presented above (section 2.2). An entirely logical scheme for solving non-standard problems is shown in Fig. 1.

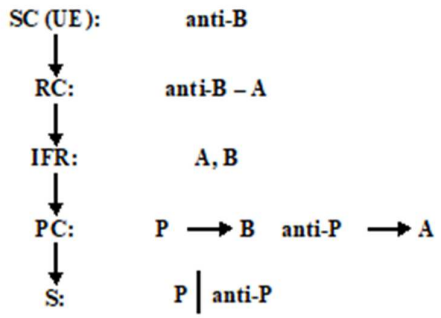

Figure. 1. Logical scheme for solving non-standard tasks

Legend:

SC – superficial contradiction
UE – undesirable effect
RC – contradiction of requirements
PE – positive effect
PC – contradiction of properties
A, B – qualities or parameters of the system
IFR – ideal final result
P – required properties of the system
S – solution
| – sign of separation of conflicting properties

4. Case studies

4.1 Tax system

The tax service is one of the main and significant in any state. The task of the tax service is to timely collect tax payments in favor of the state for solving important tasks (maintenance of the army, social protection of the population, etc.) and to monitor that the main taxpayers comply with all norms and laws prescribed by the state when preparing tax reports. But taxpayers are trying to optimize tax deductions, which is completely unprofitable for the state and the tax service has to increase the staff to control and manage tax payments, which significantly increases costs. How can the tax service perform their functions efficiently without increasing staff and costs?

Analysis of the problem

Surface contradiction (SC)

SC: anti-B

SC: **staff increase** of the Tax Service (**anti-B**).

Contradiction requirements (CR)

CR: A — anti-B:

CR: High**-quality performance of the functions of the tax service, i.e., an increase in tax collections (A)**, lead to an **increase in the number of employees (anti-B)**

Ideal Final Result (IFR)

IFR: A, B

IFR: **The Tax Service performs its functions with high quality collections (A), without increasing the number of employees (B)**

Property contradiction (PC)

PC: P → A, anti-P → B

PC: **For the high-quality performance of the functions of the Tax Service (A),** it requires **additional costs for the staff (C),** and in order not to **increase the staff (B) and do not need additional costs (anti-C).**

Resolution of conflicting properties:

– ***in time*** – to coordinate additional tax charges with taxpayers in advance. Used by Inventive Principles 10. Preliminary Action.

– ***by the condition*** – to make several models of the same type, according to which taxpayers will increase payments to the tax service. Used by Inventive Principles 6. Universality.

– ***in space*** – taxpayer employees themselves will be responsible for increasing payments. Used by Inventive Principles 25. Self-service.

– ***in the structure*** – additional charges are made automatically. Used by Inventive Principles 25. Self-service.

Solution

The Ministry of Finance of Kazakhstan launched a VAT invoice control system using blockchain technology. Thus, the Tax Service understands what deduction is made by the VAT taxpayer, what changes have been made and what additional tax must be paid.

4.2 New Bank

Kaspi Bank is one of the most advanced banks in Kazakhstan and an example of a business model is considered by the Harvard Business School as an excellent example of market capture. The Bank entered the market in a highly competitive retail environment (individuals). The bank's main income from individuals is the sale of loans (consumer loans, mortgages, etc.). In order to attract new customers to sell them a loan, the bank must lower the lending rate (knowingly reduce its income) and also invest in attracting new customers (without a guarantee that the new customer will buy a loan or any other bank's product). How to be?

Analysis of the problem

Surface contradiction (SC)

SC: (A)

SC: To enter a new market, a bank needs to attract **new customers (A)**.

Contradiction requirements (CR)

CR: A — anti-B:

CR: To attract **new customers (A),** the bank must spend a lot of money on marketing and reduce the interest rate of loans, which significantly **reduces the bank's profit (anti-B)**

Ideal Final Result (IFR)

IFR: A, B

IFR: The bank gets **new customers (A)** and does not spend a lot of money on marketing, reduces the interest rate of loans, **while receiving high profits (B)**

Property contradiction (PC)

PC: P → A, anti-P → B

PC: To get **new customers (A), it is necessary to *spend large funds on marketing and reduce the interest rate of loans (C)***, which increases the cost of the bank's products and makes the business unprofitable, and in order to get **high profits (B),** ***the bank does not need to spend large funds on marketing and reduce interest rate of loans (anti-C).***

Resolution of conflicting properties

– ***in time*** – the bank spends one-time funds on marketing to attract customers, and then customers come by themselves. Used by Inventive Principles16. Partial or Excessive Actions. In this case, a partial solution is used.

– ***in space*** – customers themselves come to the bank, because although they can only get a service in this bank. Used by Inventive Principles 25. Self-service.

– ***by the condition*** – the bank offers such conditions that customers cannot refuse. Used by Inventive Principles 3. Local quality.

– ***in the structure*** – the bank clearly understands what the client needs and offers it. Used by Inventive Principles 3. Local quality.

Solution

An example of a solution with union in time, space and condition.

The bank relied on e-commerce and invested in the purchase of the country's main online sites - sites for buying cars and real estate. Thus, the bank gained access to a large client base with an understanding of client needs and, with the help of analytics, began to make very profitable personal offers to clients.

4.3 Open business model

IT companies are trying to create more unique products to attract new customers and increase sales to old ones. But a new product costs a lot of money, how to be?

Surface contradiction (SC)

SC: (A)

SC: Creation of a **unique product (A)**.

Contradiction requirements (CR)

CR: A — anti-B:

CR: To create a **unique product (A)**, large investments are required, which **increases the cost of the product (anti-B)**

Ideal Final Result (IFR)

IFR: A, B

IFR: The company creates a **unique product (A)** and without **increasing the cost (B)**

Property contradiction (PC)

PC: P → A, anti-P → B

PC: To create a **unique product (A)**, ***investments are required in a new product (C)***, and in order **not to increase the cost price (B)**, it is ***not necessary to invest in a new product (anti-C)***

Resolution of conflicting properties

– ***in time*** – you can make products on time and follow the demand. That is, after a while, the product itself or its functions may change depending on demand. Used by Inventive Principles 15. Dynamics.

– ***in space*** – there are a lot of ready-made products, you need to correctly offer (find a market). Resource usage.

– ***by condition*** – we make a new product if we know the demand for sure. Used by Inventive Principles 10. Preliminary Action.

– ***in the structure*** – we take the finished product and refine it. Resource usage.

Solution

IBM, in the process of transforming from a supplier of goods to a service provider, decided to stop developing its own operating system. Instead, she is actively involved in promoting the open-source Linux system. With this move, IBM cut development costs by 80%, while server sales, which benefited from perfect compatibility with the fast-growing free Linux operating system, skyrocketed. IBM's deep knowledge of Linux helped its new service business flourish, and the company's change in direction in the late 1990s was largely driven by an open business model.

7. CONCLUSION

In this work, the authors have shown their experience of using some TRIZ tools. There is no doubt that TRIZ can be used to solve business problems and many authors show examples of using TRIZ to solve non-technical problems. However, the use of TRIZ tools requires knowledge of TRIZ tools, techniques, techniques, and practice, which take a lot of time

to learn. The authors proposed a simplified methodology for solving a business problem. The solutions to real business problems were shown using the "ARIZ Logic" methodology. This tool was developed by Vladimir Petrov and subsequently approved by Heinrich Altshuller. The convenience of ARIZ Logic is that it can be used to solve problems from almost any area, including a business problem, with minimal time spent on learning and using it, which is very important for both businesses and managers. The results obtained have significantly increased business performance: improving the business model, increasing profits, increasing sales, and others. It is important that people who have not previously encountered TRIZ quickly understand the ARIZ Logic and can use this tool to solve non-technical problems.

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PRACTICĂ DE REZOLVARE A PROBLEMELOR DE AFACERI FOLOSIND INSTRUMENTELE TRIZ

Rezumat: Această lucrare este dedicată utilizării TRIZ pentru rezolvarea problemelor de afaceri. Acesta este un subiect foarte fierbinte astăzi. În TRIZ, se aplică un număr mare de instrumente, deci nu este întotdeauna clar ce instrument să utilizați pentru a rezolva o anumită problemă. Autorii și studenții lor folosesc de mulți ani un instrument universal de identificare și rezolvare a contradicțiilor, numit Logica ARIZ. Această metodă este suficient de ușor de învățat și de utilizat pentru a rezolva probleme din orice domeniu. Metoda este universală și vă permite să obțineți rapid soluții eficiente. Acest lucru este foarte important pentru orice domeniu și mai ales pentru o afacere, unde economisirea de timp și resurse este foarte importantă. Din 2015, autorii și studenții lor folosesc această metodă pentru a rezolva problemele de afaceri și au primit rezultate bune.

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