

TRIZ SUMMIT 2022



INNOVATION MANAGEMENT
AND TRIZ INSTITUTE



TRIZ SUMMIT 2022



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Life cycle and features of innovative TRIZ projects

Life cycle and features of innovative TRIZ projects



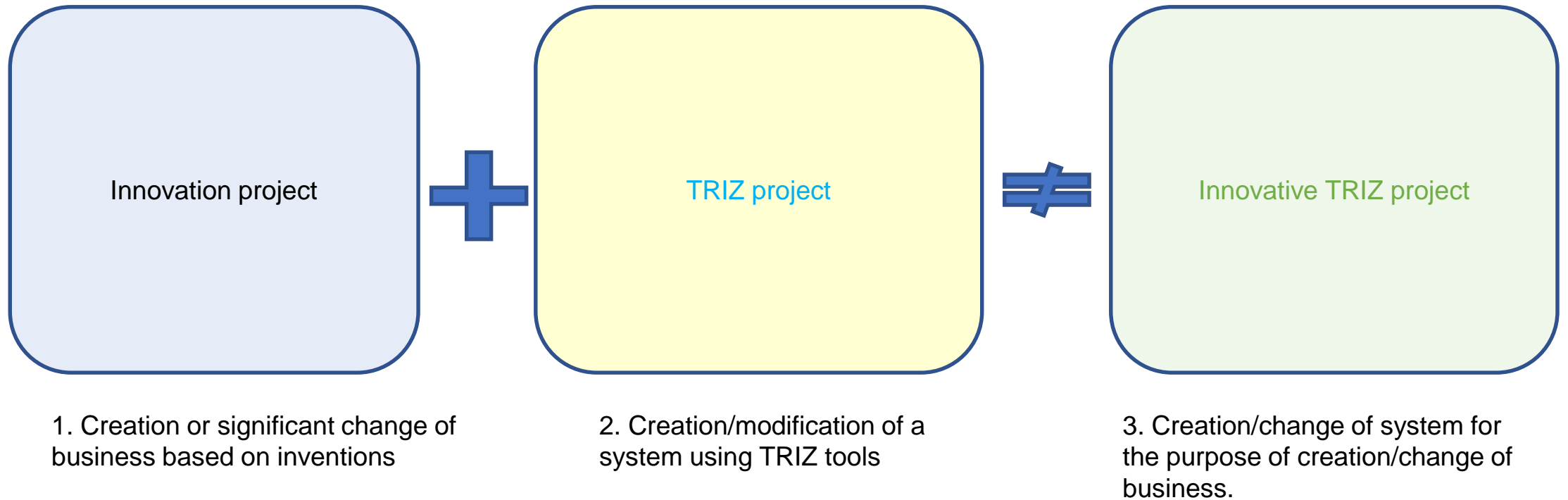
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Content

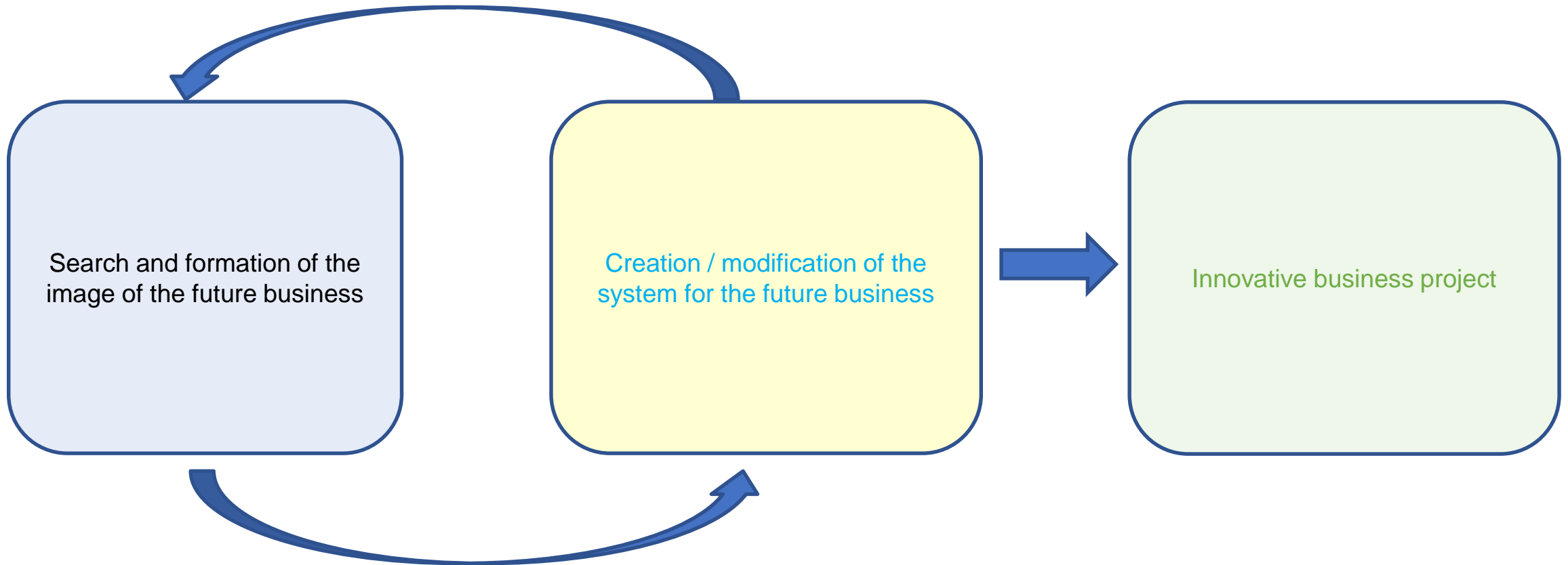
1. What is an "Innovative TRIZ-Project (ITP)"?
2. Goals and objectives of ITP
3. Life cycle of ITP
4. Stages of the life cycle of ITP
5. Features of ITP
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Innovative TRIZ-project (ITP)



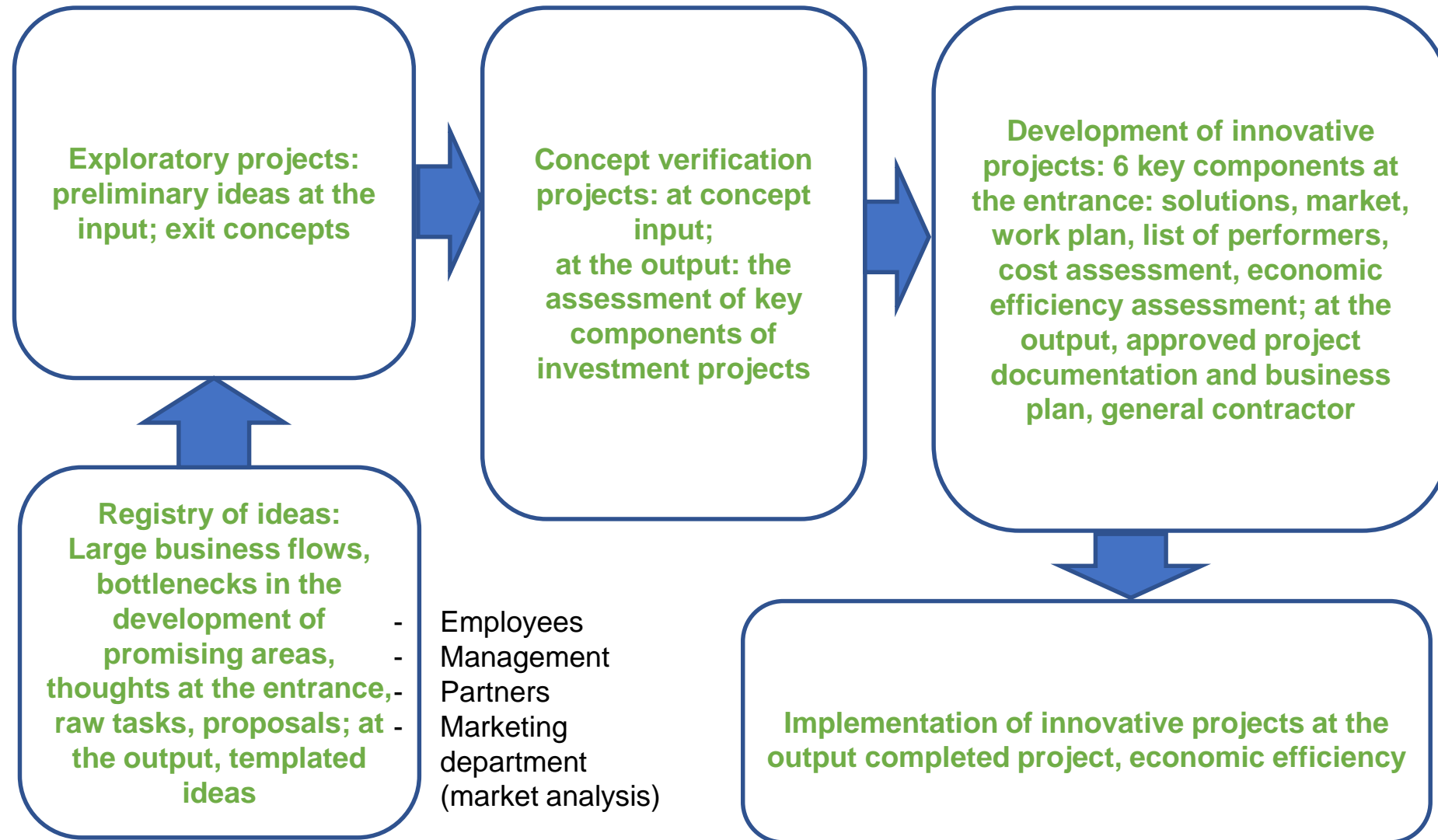
The report will focus on the third type of projects: the creation (or change) of a system in order to create (or change) a business.

Goals and objectives of ITP



The goal of the project is to create a more efficient business based on changes in the system. An innovative TRIZ project implies the widespread use of TRIZ tools both at the stage of creating the inventive basis of the project, and at the stage of creating (changing) the business part of the project, incl. its investment component

Life cycle of ITP



Within the framework of the life cycle of innovative TRIZ projects, four types of projects are considered:

1. Search engines
2. Verification
3. Development of ITP
4. Project execution (implementation)

Stages of the life cycle of an innovative TRIZ project

Stage	1. Search project	2. Verification project	3. Development of an innovative projec
1	Formation of the product image	Verification of developed technologies and products	Approval of technical and product solutions
2	Estimation of market volumes	Clarification and expert confirmation of the volume and structure of the market	Confirmation of the planned sales system and business model
3	Search for technologies (methods + objects)	Solving identified and predicted contradictions	Approval of the work schedule for the implementation of the project
4	Assessment of the availability/accessibility of personnel, their qualifications	Clarification of the required personnel and their availabilit	Approval of the business plan (FEM and economic indicators are part of it)
5	Estimation of financial flows	Determination of the structure and volume of financial flows	Making a decision on financing and project implementation
6	Efficiency assessment, draft business mode	Preparation of FEM for concepts	Preparation of project documentation for project implementation
7	Preliminary concepts benchmarking	Benchmarking of verified concepts. Clarification of the list of persons for decision-making.	Transfer of documents to the Customer and the Contractor and closing of the project

4. Support for the innovative project implementation

Project Consulting

Solving secondary problems that arise during implementation

Making changes to project documentation

Особенности ИТП

An increased level of uncertainty and, as a result, an increased risk of failure, especially in the initial stages of projects. In order to reduce risks, innovative projects are combined into a project portfolio in such a way as to balance the risks and ensure the planned economic effect within a given period of time.

Higher level of investment required (on average) than expected in production TRIZ projects.

Longer development and implementation times (on average).

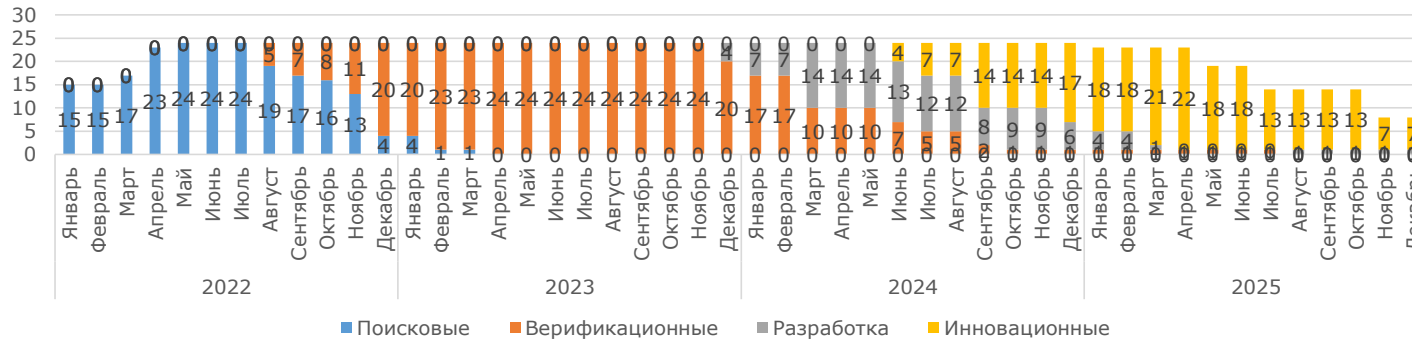
The complex nature of concepts and solutions being developed (successful innovations rarely concern any one aspect, more often it is necessary to make changes in several components of both the technical system and the business at once).

The dynamic nature of innovative projects (during the implementation of the project, the economy, logistics, the achieved technical level can change significantly, which will require a prompt review of design solutions).

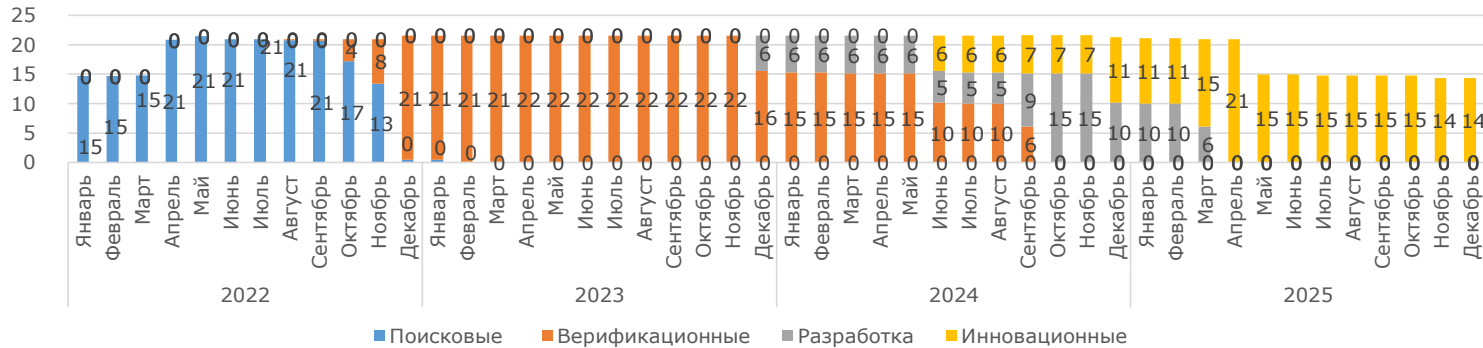
More opportunities to create a successful business due to greater coverage of the field of ideas.

ITP portfolio

Прогноз изменения количества концепций по портфелю проектов



Прогноз изменения э/эффекта по портфелю проектов, млрд. руб.



For the successful functioning of the company and its further development, there must be several directions, options, ideas for innovations in stock, i.e., the so-called "portfolio" of innovative projects, which is constantly updated and replenished.

The portfolio of innovative projects should be balanced and consist of both large innovations with high expected profitability and less radical innovations with lower risk and expected profitability. The figure shows an example of a forecast for the development of portfolio projects.

ITP Portfolio Metrics

The following are proposed as the main metrics for innovative projects and a portfolio of projects:

- **for individual projects**

Present Value NPV

IRR Internal Rate of Return

Profitability Index PI

Payback period PBP (DPP)

- **for the portfolio of projects as a whole**

Present Value NPV

IRR Internal Rate of Return

Profitability Index PI

ITP specific tools

Early business design

Already at the search stage, the developed concepts receive not only an EE assessment, but also a minimum business model, according to which the main investment indicators of the future Innovation Project are evaluated. For this, a simplified business toolkit is used, which is traditionally used to create and express analysis of business plans. At the same time, technical improvements obtained within the framework of the concepts are also formulated as “products”. For example, a product such as "millivolts" or "kilograms" is possible, since such "products" have a produced volume and "market value", costs, raw materials for their production, i.e. all the attributes of such familiar products as, for example, “shoes” or “cars”.

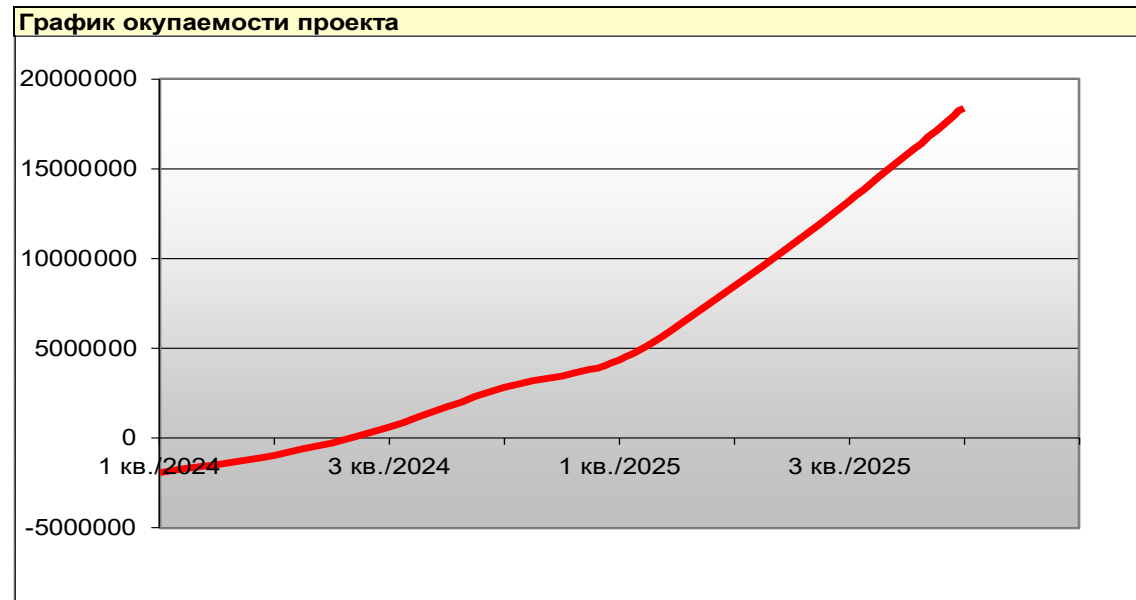
At the same time, in fact, a business plan is developed for the production and sale of products (or “products”), the necessary investments are clarified, and the main economic and investment indicators of the project are evaluated.

This tool allows you to evaluate the economic feasibility of a project or a separate concept

Early business design

Название проекта:			
Инновационный анод			
Дата начала проекта	январь	▼	2023
Число периодов	8	▼	
Длительность периода	квартал	▼	
Число продуктов в проекте		3	▼
Наименования продуктов:		Ед. изм.	
Экономия анодной массы		кг.	
Экономия электроэнергии		мВ.	
Экономия материала анододержателя		кг.	
Ставка дисконтирования		15%	
Язык финансовых отчетов:		Русский	▼

Investment volume: 5 million \$



Чистая приведенная стоимость: NPV =	18367452	USD		
Внутренняя норма доходности: IRR =	993	%		
Период окупаемости: PBP =	6	мес.	Индекс прибыльности PI=	14,12880948

- The Project creates 3 products: savings due to weight reduction, savings due to reduced maintenance costs and savings due to reduced voltage losses.
- All products create EE (generate income) and require initial and operational costs for reproduction (create an expense)

Express Verification of Concepts

Due to the increased risks and the large number of concepts developed in the ITP, their full-scale verification takes a long time and requires significant costs, while the “survivability” of concepts in the early stages is reduced.

In order to reduce resource costs, verification is carried out in a two-stage process: at an early stage, even during the development of concepts, express verification is carried out with the maximum use of such techniques as replacing an object with its model, reducing the scale of the system, testing the most significant hypotheses without working out less important technical details etc.

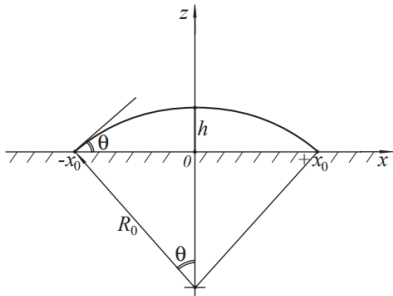
For pre-verified, i.e. of the "surviving" concepts on the Verification project, their full verification is already carried out.

Express verification: an example

Полярность наплавления

На обратной полярности:

- угол смачивания составил 65-85град
- глубина кратера 0.5-1мм



На прямой полярности:

- угол смачивания составил 35-85град
- глубина кратера 1-2мм



- The concept of increasing the wettability of the baked anode material with pour iron is proposed, which will lead to its deeper penetration into the pores of the carbon material and reduce the voltage drop in the contact zone.
- It is shown that the contact angle can be managed by changing the polarity and strength of the current flowing through the melt

Features of large ITP

Some projects (usually large, with high expected EE and high scientific and technical level), containing a large number of concepts, themselves constitute a mini-portfolio of subprojects.

As part of the concepts of such projects, one can single out the main concepts designed to give the greatest effect (and these concepts can be either competing or complementing each other), auxiliary concepts (as a rule, they are subordinate to the main concepts and serve to solve emerging secondary problems) and additional concepts, which can be implemented as independent solutions, or in combination with the previous two types of concepts. In fact, each of the concepts in such a set is an innovative project (subproject).

Accordingly, the management of such a portfolio of concepts is carried out according to the same basic principles as the management of a portfolio of projects.

conclusions

- The life cycle (LC) of an innovative TRIZ project differs from the LC of a production TRIZ project
- In an innovative project, it is required to consider a large number of concepts in order to compensate for their reduced “survivability”
- Business analysis of concepts should be carried out already on the Exploration Project in order to exclude concepts that initially have low business indicators and are of little use for investment design
- For business modeling, it is necessary to reformulate technical effects (watts, kilograms, minutes, etc.) as produced “products”, then it becomes possible to analyze them with standard business tools.
- Verification of concepts must be carried out in two stages: the first (simplified) is already carried out on the Exploration Project in order to make sure that the proposed concepts, effects and technical solutions are fundamentally viable. On the Verification Project, a full-fledged verification is already carried out, but only those concepts that have already been previously verified and passed the benchmarking procedure.

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Q&A

SESSION



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THANK YOU!

