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STAGES AND PHASES OF PROJECT ADVANCEMENT FROM CONCEPT TO COMMERCIAL IMPLEMENTATION. (Technology incubators as mechanisms for innovation commercialization and startup development)

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Abstract

This article examines the organizational, technological, legal, and commercial aspects of advancing innovative projects from the stage of conceptual development to successful market implementation. Particular attention is given to the sequence of stages and phases involved in project development, the formation of effective commercialization strategies, and the role of technology incubators as institutional mechanisms supporting innovation-driven enterprises.

The study analyzes the importance of patent and licensing strategies as fundamental components of the innovation process and highlights the significance of cooperation with patent attorneys in securing intellectual property rights and strengthening the competitive position of innovative products. The publication also considers the role of technology commercialization specialists in facilitating project financing, market positioning, and the successful transition of technological developments into commercial products.

Special emphasis is placed on the requirements imposed on projects developed within technology incubators. The article outlines the recommended structure of intellectual property assets, technical documentation, engineering models, research reports, prototype testing programs, manufacturing documentation, and supporting materials required for the effective evaluation and development of innovation projects.

The publication further examines organizational models for establishing and operating technology incubators, including mechanisms of interaction between inventors, investors, incubator management teams, engineering specialists, and commercialization experts. Particular attention is devoted to investment structures, project financing mechanisms, equity distribution models, and approaches to risk management during the implementation of innovative ventures.

The study demonstrates that technology incubators serve as effective instruments for accelerating innovation, facilitating the commercialization of scientific and engineering achievements, attracting investment capital, and creating favorable conditions for the development of sustainable high-technology enterprises. By integrating technological expertise, intellectual property

management, investment support, and commercialization strategies, technology incubators contribute significantly to economic modernization and the formation of innovation-driven industries.

Keywords: *Technology incubator; Innovation ecosystem; Effective implementation; Innovative development model of industrial and agricultural production; Ecosystem infrastructure framework; Quantum computing; Augmented reality visualization; Testing laboratories; Laws of technical system evolution; Standardization; Technology transfer*

Introduction

This is a highly specialized issue that varies significantly depending on the specific characteristics of the project and its position within the market.

It can be stated that, in innovative projects, this process does not differ substantially from conventionally accepted approaches and is optimized according to numerous influencing factors. In practical implementation, the determination of the nature and sequence of stages and phases is often carried out in accordance with specialized matrices and tables developed by the project initiators. More detailed information on these methodologies is available in dedicated publications presented on innovation-oriented websites.

Cooperation with the Patent Attorney Community

Since patent strategy and patent protection of innovative initiatives constitute an exceptionally important component of the innovation process, cooperation with patent attorneys and the selection of an appropriate attorney are among the key prerequisites for successful project advancement, particularly during the initial stages.

In order to make this process more predictable and to achieve a more reliably forecasted final result, patent and licensing strategies are generally developed before engaging patent attorneys, taking into account the numerous specific factors inherent to the innovation.

To obtain more favorable conditions for such work and to achieve stronger technological and legal outcomes, the principle of maintaining a high level of competition among patent attorneys is fully utilized, thereby ensuring the desired result.

Cooperation with Specialists in Project and Technology Commercialization

In practice, the innovation ecosystem is continuously populated by commercializa-

tion specialists representing various schools of thought and levels of expertise. The proper competitive selection of such specialists can significantly influence the availability of more favorable project financing conditions and provide a shorter and more successful path toward commercial implementation.

The selection of such a specialist is an important process, and the success of this selection is largely determined by the prior choice of a company capable of assisting in the evaluation of the innovation project and its correct technological classification.

Requirements for Projects Developed within Technology Incubators

When presenting a project to an intermediary company, the project materials should contain, or it is strongly recommended that they contain, the following documents and materials:

Composition and Structure of Intellectual Property Assets Owned by the Company or the Project Applicant Group

As a rule, all technological areas being developed by the project applicant company at various stages constitute complex intellectual property assets.

Each technological area should be represented by a structured system of component elements, including the following principal documents:

- Forecast of the technological development of the respective field for both short-term and long-term perspectives;
- Patent and licensing strategy covering all products within the technological field, including all project stages and all stages of production and marketing;
- Fundamental and core invention patents forming the basis of the technological field;

- Application patents generated through the development of the technological field;
 - Inventions created by employees and partners of the applicant company prior to the establishment of the applicant company, for which inventor's certificates, patent rights, or other legal documentation are held by the respective employee or partner;
 - Research and development reports generated by employees and partners of the applicant company relating to the technological field and performed outside the framework of the applicant company;
 - SolidWorks models for all product modifications within the technological field, including all assemblies, sub-assemblies, components, parts, and models intended for digital and virtual simulation of product operation;
 - Fundamental manufacturing principles for parts and assemblies associated with products of the technological field;
 - Complete sets of engineering design and manufacturing documentation required for the production of products within the technological field;
 - Optimized CNC machine programs intended for the production of prototypes and pilot samples of products within the technological field;
 - Testing programs and methodologies covering all required categories of prototype testing and product testing throughout all stages of production;
 - Operational models of innovative products within the technological field and field-test results relating to technological products in agricultural applications;
 - Operating and supporting documentation for products of the technological field, including technical instructions relating to installation, preservation, storage, maintenance, repair, and transportation;
 - Functional prototypes of products within the technological field;
 - Technical descriptions of the principles and design of specialized manufacturing equipment used for the production of key components and assembly of products within the technological field, together with materials intended for the preparation of patent applications relating to such specialized manufacturing equipment.
- Naturally, this represents only an illustrative structure of the required documentation. For each individual project, depending on its specific characteristics, implementation conditions, market-entry strategy, and the requirements of potential investors, this list may be substantially modified.
- Particular attention should be given to projects in the fields of biotechnology and genetic engineering. Such projects will most likely require specialized technological, scientific, commercial, and expert evaluation procedures tailored specifically to these areas.

Figure 1.



Figure 2.

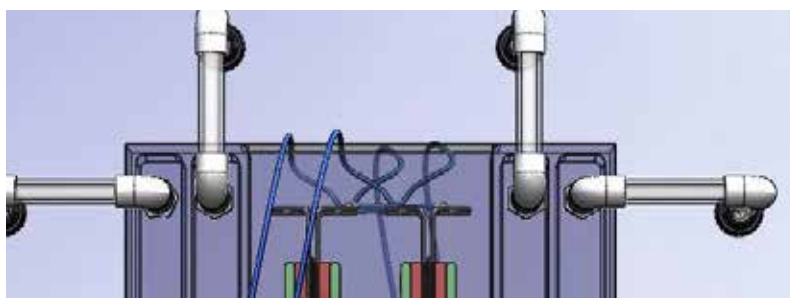
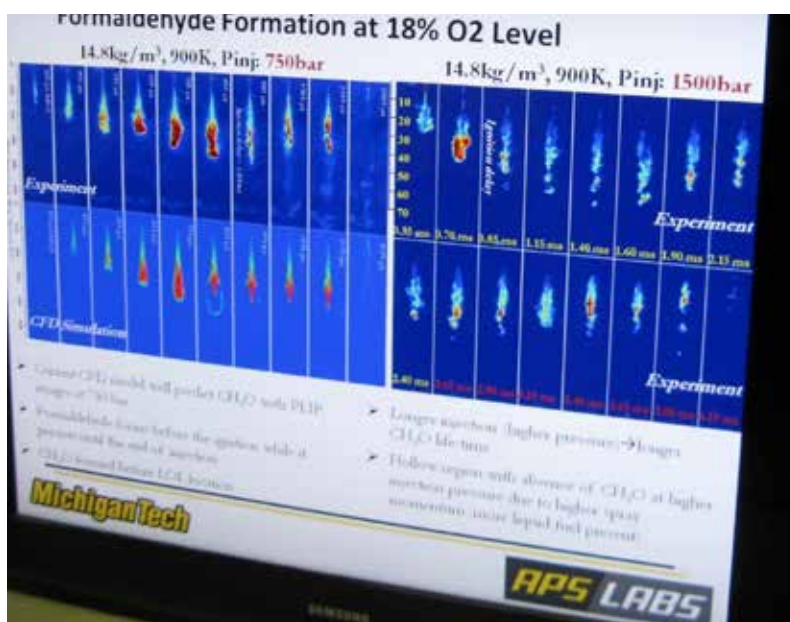


Figure 3.



Proposal for Possible Models of Technology Incubator Development in Ukraine

Ukraine possesses all the necessary conditions and prerequisites for the establishment and successful operation of technology incubators.

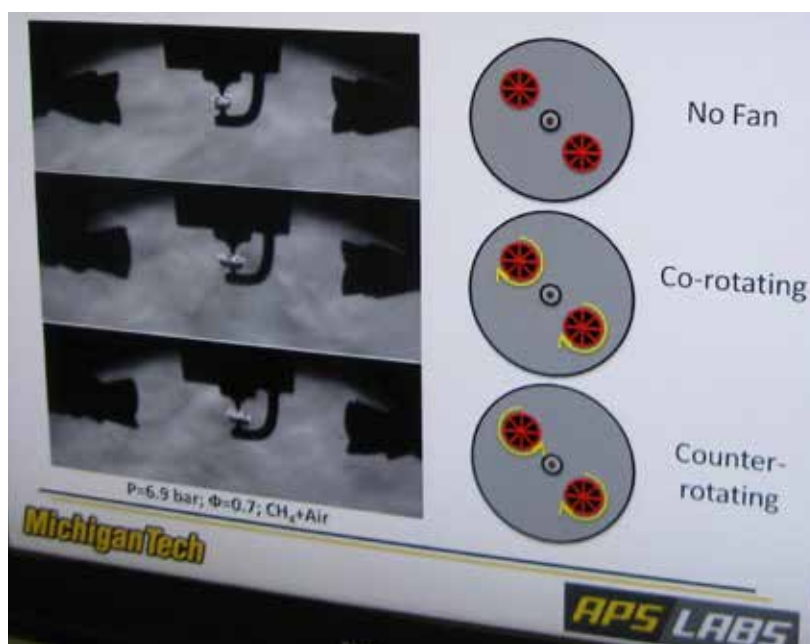
Thousands of highly qualified specialists are actively employed across the country. Over many years of stable operation within the defense-industrial sector, a vast body of manufacturing and engineering expertise has been accumulated. Engineering personnel have been educated and trained over several generations, and the level of professional expertise achieved by these specialists fully meets the highest requirements for the initiation and development of innovative technological solutions.

Ukraine has also accumulated unique experience in agricultural production. This experience, combined with exceptional natural conditions that have virtually no analogues

anywhere in the world – one prominent example being the famous Ukrainian black soil (chernozem)—creates highly favorable conditions for the establishment of agricultural enterprises capable of achieving exceptionally high levels of efficiency, productivity, and profitability.

These factors provide a solid foundation for the development of technology incubators focused on agricultural innovation, advanced manufacturing, environmental technologies, industrial automation, information technologies, and other high-technology sectors. By combining scientific knowledge, engineering expertise, industrial experience, and natural resources, technology incubators in Ukraine can become effective platforms for the creation, development, and commercialization of innovative products and technologies capable of competing successfully in international markets.

Figure 4. *Turbulence Effects*



Proposal for the Organization of Technology Incubators in Ukraine

Naturally, it is neither possible nor advisable to immediately cover the entire territory of Ukraine with a network of technology incubators, since, despite their technological and commercial transformative potential, the creation of highly effective technology incubators remains an evolutionary process.

The organization of the first stages in the development of technology incubators in Ukraine appears feasible and advisable in the following sequence:

- First and foremost, based on the opinions of Ukrainian experts, it is necessary to identify the technological sector in which Ukraine possesses the highest aggregate scientific, commercial, and historically established competitive potential;
- It is not advisable to make premature forecasts or assumptions. In our view, the most appropriate approach would be to announce competitions for the best technological projects across all sectors of production, particularly in agriculture, throughout all regions of Ukraine.

To evaluate the technical and commercial merits of the proposed projects, it would be advisable to establish competition criteria

and an expert review panel. During the first stage of evaluation, it would be beneficial to invite specialists in the commercialization of innovative technologies from the United States (individuals already expressing interest in participating have been identified). During the second evaluation stage, when the most promising projects have been selected, representatives of various investment funds should be invited to participate in the assessment process, particularly those possessing experience in investment activities within the Russian market. Some of these organizations have already been preliminarily introduced to the concept of establishing technology incubators in Ukraine, have expressed initial interest, and understand the requirements necessary for successful implementation.

In this proposal, the operational scope of a technology greenhouse (or incubator) established in one of Ukraine's regions is divided into domestic activities within Ukraine and international cooperation activities.

Within the framework of operations in the Ukrainian technology market, the following sequence of organizational and technical stages is proposed for project initiators and inventors, assuming that a technology incubator has already been established:

1. Initial Project Preparation

The project initiator or inventor prepares the required informational and technical

documentation and secures an initial private or other investor willing to invest no less than USD50,000.

If the inventors or project initiators encounter difficulties in identifying such an investor, it may be advisable to engage a consulting company for assistance.

2. Establishment of the Project within the Technology Incubator

After securing the first private investor, the innovators, possibly together with the investor or an authorized representative of the investor, present the project to the technology incubator.

Under predefined standard conditions established by the technology incubator, the project is formally organized, and a new innovative company is created on its basis.

It is appropriate at this point to briefly describe these standard conditions.

Drawing upon existing experience, investments in the new company should include private investment of approximately USD50,000. This amount represents a minimum threshold; private investments may be significantly larger if the investor has sufficient confidence in the project.

The remaining funds required for project implementation are provided by the technology incubator. According to practical experience, this amount is approximately USD400,000.

Neither the private investor nor the incubator contributes the full amount immediately. Initially, the company receives an advance equal to approximately 10% of the total investment amount. As the project progresses and successfully completes each planned stage, additional funding is released in amounts corresponding to the value of each completed phase.

This approach allows investors to protect themselves against technological failures or project-related errors. In the event of difficulties or technical problems, subsequent funding tranches are released only after corrective measures have been implemented and the project stage has been successfully completed.

Distribution of Company Shares

Upon formation of the company, the project authors receive 50% of the company's shares.

The private investor contributing USD50,000 receives 15% of the shares.

The remaining 35% of shares are allocated as follows:

- Technology incubator – 25%
- Employees who make the most significant contribution to project implementation – 10%

Return on Investment

Repayment of invested funds begins only after the project generates its first commercial profits and is limited to no more than 5% of annual profits.

In the event that the project is unsuccessful and unable to generate commercial returns, the invested funds are not reimbursed.

To attract investors, governmental and public authorities should establish appropriate incentives. One of the most significant incentives would be the exemption of newly established companies from corporate profit taxes for a period of at least ten years following the generation of their first profit.

All of the above represents a conceptual proposal. In practice, alternative organizational and implementation models may emerge depending on specific circumstances.

Expansion into International Markets

Let us assume that the project proves successful and economically efficient.

In such a case, additional opportunities arise for commercial implementation, including expansion into international markets and, under favorable conditions, the eventual listing of the company on stock exchanges in the United States or European countries.

The mechanisms by which this may be accomplished within the framework of existing laws and market conditions will be discussed in our next article.

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