

## 2. ЕКОНОМІКО-МАТЕМАТИЧНЕ МОДЕЛЮВАННЯ ТА ІНФОРМАЦІЙНІ ТЕХНОЛОГІЇ В ЕКОНОМІЦІ

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### PECULIARITIES OF DEVELOPMENT FEASIBILITY STUDY INTERNET PROJECT BASED ON UNIDO METHODOLOGIES

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The article is devoted the problem of the features of the projects, which operate on the basis of the use of the Internet, the analysis of their content and context. The problem of the development of a feasibility study of the project on the Internet through the application of the methodology of UNIDO. The features of the Internet project in comparison with traditional business and influence the content of the relevant sections of the feasibility study on the methodology of UNIDO. Adapted contents of a feasibility study on the methodology of UNIDO with respect to the characteristics of Internet projects. Revealed that for the assessment of the economic efficiency of the Internet project in the feasibility study is necessary to assess the state of the Internet environment (characterized by analysis of the main characteristics of the Internet, as relatedness, dominance, etc.) and describe the project on the part of its uniqueness that can be done using data mining (especially the use of which in the analysis of Internet-projects are described in the article). Revealed that the Internet project important aspects that need to be described in the feasibility study (see financial analysis and investment appraisal) is the analysis of the source of income (monetization of the project) and methods to increase the conversion of the site (expressed as a percentage ratio of the number of site visitors, it is made on any action targeted to the total number of visitors). The study concluded that the project is implemented in the Internet environment with high risk and uncertainty that complicates the assessment of investments and returns of funds, cash flow forecast, the investment rationale for using conventional methods. The methods of economic-mathematical modeling, which can be used to describe and analyze the Internet project. Application of the proposed methods can reduce the risk of investment projects on the Internet. Highlighted further areas of research: the creation of the classification of the Internet project, the methodology of evaluation of investment attractiveness of the Internet project.

*Key words: investments, project, feasibility study, Internet project, UNIDO methodology.*

**Іванов С.М. ОСОБЛИВОСТІ РОЗРОБКИ ТЕХНІКО-ЕКОНОМІЧНОГО ОБҐРУНТУВАННЯ ІНТЕРНЕТ-ПРОЕКТУ НА БАЗІ МЕТОДОЛОГІЇ UNIDO / *Запорізький національний університет, Україна***

Досліджено особливості проектів, які функціонують на базі використання мережі Інтернет, проведено аналіз їх змісту та специфіки. Розглянуто проблему розробки техніко-економічного обґрунтування Інтернет-проекту на підґрунті застосування методології UNIDO. Виділено особливості Інтернет-проекту в порівнянні з традиційними видами бізнесу та які впливають на зміст відповідних розділів техніко-економічного обґрунтування за методологією UNIDO. Адаптовано зміст техніко-економічного обґрунтування за методологією UNIDO по відношенню до особливостей Інтернет-проектів. Виявлено, що для оцінки економічної ефективності Інтернет-проекту в техніко-економічному обґрунтуванні необхідно оцінити стан Інтернет-середовища (характеризується за допомогою аналізу таких основних характеристик мережі Інтернет, як зв'язаність, домінантність тощо) та описати проект з боку його унікальності, що можна зробити використовуючи інтелектуальний аналіз даних (особливості використання якого в аналізі Інтернет-проектів описані в статті). Виявлено, що для Інтернет-проекту важливими аспектами, які необхідно описати в техніко-економічному обґрунтуванні (в розділі фінансовий аналіз і оцінка інвестицій), є аналіз джерела отримання прибутку (монетизація проекту) і методів збільшення конверсії сайту (виражене у відсотках відношення числа відвідувачів сайту, що виконали на ньому будь-які цільові дії до загального числа відвідувачів сайту). У результаті дослідження зроблено висновок, що Інтернет-проект реалізується в середовищі з підвищеними ризиком і невизначеністю, що ускладнює оцінку вкладень і віддачі коштів, прогноз грошових потоків,

обґрунтування доцільності інвестицій за допомогою звичайних методів. Запропоновано методи економіко-математичного моделювання, які можуть бути застосовані для опису та аналізу Інтернет-проекту. Застосування запропонованих методів дозволяє зменшити ризик інвестиційної діяльності в Інтернет-проекти. Виокремлено подальші напрямки дослідження: створення класифікації Інтернет-проекту, методологія оцінювання інвестиційної привабливості Інтернет-проекту.

*Ключові слова:* інвестиції, проект, техніко-економічне обґрунтування, Інтернет-проект, методологія UNIDO.

Иванов С.Н. ОСОБЕННОСТИ РАЗРАБОТКИ ТЕХНИКО-ЭКОНОМИЧЕСКОГО ОБОСНОВАНИЯ ИНТЕРНЕТ-ПРОЕКТА НА БАЗЕ МЕТОДОЛОГИИ UNIDO / *Запорожский национальный университет, Украина*

Исследованы особенности проектов, которые функционируют на основе использования сети Интернет, проведен анализ их содержания и специфики. Рассмотрена проблема разработки технико-экономического обоснования Интернет-проекта на основе применения методологии UNIDO. Выделены особенности Интернет-проекта в сравнении с традиционными видами бизнеса и влияющие на содержание соответствующих разделов технико-экономического обоснования по методологии UNIDO. Адаптировано содержание технико-экономического обоснования по методологии UNIDO по отношению к особенностям Интернет-проектов. Выявлено, что для оценки экономической эффективности Интернет-проекта в технико-экономическом обосновании необходимо оценить состояние Интернет-среды (характеризуется посредством анализа таких основных характеристик сети Интернет, как связанность, доминантность и т.п.) и описать проект со стороны его уникальности, что можно сделать используя интеллектуальный анализ данных (особенности использования которого в анализе Интернет-проектов описаны в статье). Выявлено, что для Интернет-проекта важными аспектами, которые необходимо описать в технико-экономическом обосновании (в разделе финансовый анализ и оценка инвестиций), является анализ источника получения прибыли (монетизация проекта) и методов увеличения конверсии сайта (выраженное в процентах отношение числа посетителей сайта, выполнивших на нем какие-либо целевые действия к общему числу посетителей сайта). В результате исследования сделан вывод, что Интернет-проект реализуется в среде с повышенным риском и неопределенностью, что затрудняет оценку вложений и отдачи средств, прогноз денежных потоков, обоснование целесообразности инвестиций с помощью обычных методов. Предложены методы экономико-математического моделирования, которые могут быть применены для описания и анализа Интернет-проекта. Применение предложенных методов позволяет уменьшить риск инвестиционной деятельности в Интернет-проекты. Выделены дальнейшие направления исследования: создание классификации Интернет-проекта, методологія оцінки інвестиційної привабливості Інтернет-проекта.

*Ключевые слова:* инвестиции, проект, технико-экономическое обоснование, Интернет-проект, методологія UNIDO.

## STATEMENT OF THE PROBLEM

In terms of economic activity the information economy increasingly attracted to its functioning capabilities of the Internet. Internet business is experiencing a period of rapid growth that occurs on a background of a permanent increase in available financial resources required income allocation. As an economic activity, as well as an investment is increasingly seen online project.

An effective tool that provides potential investors, project developers and financiers the necessary information to make a decision on investing and financing ways are so technical and economic study.

According to experts, most of the investment in Internet businesses are unsuccessful. One reason is the lack of assessment methods of economic efficiency of Internet projects as targets.

## ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

Analysis of investment projects engaged in such scholars as Hridasov V. M. [1], who investigated the characteristics of investment projects and methodologies that evaluating investment projects. Duca A. P. [2] examined the management of innovation projects and analyzed the application features of the project approach when making investment decisions, management of financial flows of the project and assess the impact of the project on the farm. Kondraschenko V. [3] analyzed problem of the modeling and information technology management processes of financing investment projects involving third party capital.

The concept of the feasibility study, first published by UNIDO in 1978, and now has become the accepted worldwide standard [4]. This concept and built at its base, and methodology aimed at

providing standards and technology transfer, joint ventures and international funding. The proposed technique requires formalizing and focusing all necessary info for implementation Forecast Movement Cash funds and economic evaluation project using quantitative indicators.

Methods UNIDO is suitable not only for new investments, it is equally suitable for projects with rehabilitation, expansion, modernization and conversion companies. The use of standard and conventional techniques is beneficial to investors, joint venture partners, consulting firms and equipment suppliers as partners and facilitates interaction helps to improve the quality of investment proposals. Even more useful it is for investment banks and other financial institutions as well as the assessment of applications for funding for the project easier if prepared for bank study well structured, fully compiled and presented in the standard form [4].

Question assessment cost Internet-projects was relatively recently – the rapid development Internet and e-business. Artyshev M. S. emphasizes that with approaches and methods assessment efficiency Internet-projects do not differ of generally within assessment business investment projects, but have their own key features [5].

### **POINTED UNRESOLVED ASPECTS OF THE PROBLEM**

However, investing in Internet faces a number of features that cause problems and that influence the development of the feasibility of Internet projects. Therefore, the question arises adaptation methodology UNIDO the peculiarities Internet projects.

### **FORMULATION OF OBJECTIVES ARTICLES**

The purpose of this article to analyze the feasibility Internet projects based methodology UNIDO, which caused identified properties and characteristics of Internet projects.

### **THE MAIN MATERIAL RESEARCH**

To select features that affect the feasibility study for Internet projects focus on basic concepts. On the basis of the definition of [6] in Internet projects, we mean a temporary venture designed to create unique products, services, or results, the operation of which provide a means of the Internet. Typically, the term "Internet Project" is used for IT-companies associated with the Internet, it is often synonymous with the concept of "web-project", "startup", and defining characteristics – the following components: a new idea, limited resources, effective strategy to promote the idea in the market that provides rapid development of the company.

In Internet projects are usually defined only the main objective, the overall trend, but some tasks are specified as achieving ongoing results. Developers often do not have a clear idea of the final about the project at the beginning of its development, and only during the implementation of the idea at the exact time of the project. Moreover, the rapid change and Internet environment leads to the need to constantly introduce new technologies.

An important aspect to decide as to the existence of any Internet project is the question of monetization approaches that will apply to evaluate the project. On this question depends the future of the project and its prospects in the market. Most of the known Internet – business are several methods of monetization, which determine the understanding of management [7].

Feasibility study for the Sociology of UNIDO method contains the following sections [4]:

1. Summary and significance of the project.
2. Presentation of the main idea of the project.
3. Market analysis and marketing concept.
4. Analysis of the resource base of the project.
5. Formation of the accommodation project.
6. Definition of the stages of design and technology.

- 7. Organization and overhead costs.
- 8. Manpower.
- 9. Planning and budgeting of the project.
- 10. Financial analysis and valuation of investments.

Since the purpose of the article is to distinguish the features of Internet projects that affect the evaluation of its effectiveness, the following sections UNIDO methodology as concise content and significance of the project (1) Organization and overhead (7), human resources (8) will not be considered, since their content for Internet projects will be similar to a standard off-line projects (Table 1).

Table 1 – Sections methods UNIDO, on a statement s do not affect the features of the Internet environment

Number of Section	Section's title	The general section meaning
1	Summary and significance of the project	Summary of Data project (assessments, conclusions and recommendations, etc.)
7	Organization and expenses	Description of basic organizational structures, schemes and controls
8	Manpower	Description of existing jobs and resource requirements for their recruitment and training, causes of experts, a list of core staff (qualifications required) and the total number of workers (number and cost)

Isolate the main features of Internet projects affecting the calculation and assessment of the effectiveness and sections FS method for Sociology UNIDO, which should reflect this influence (Figure 1).

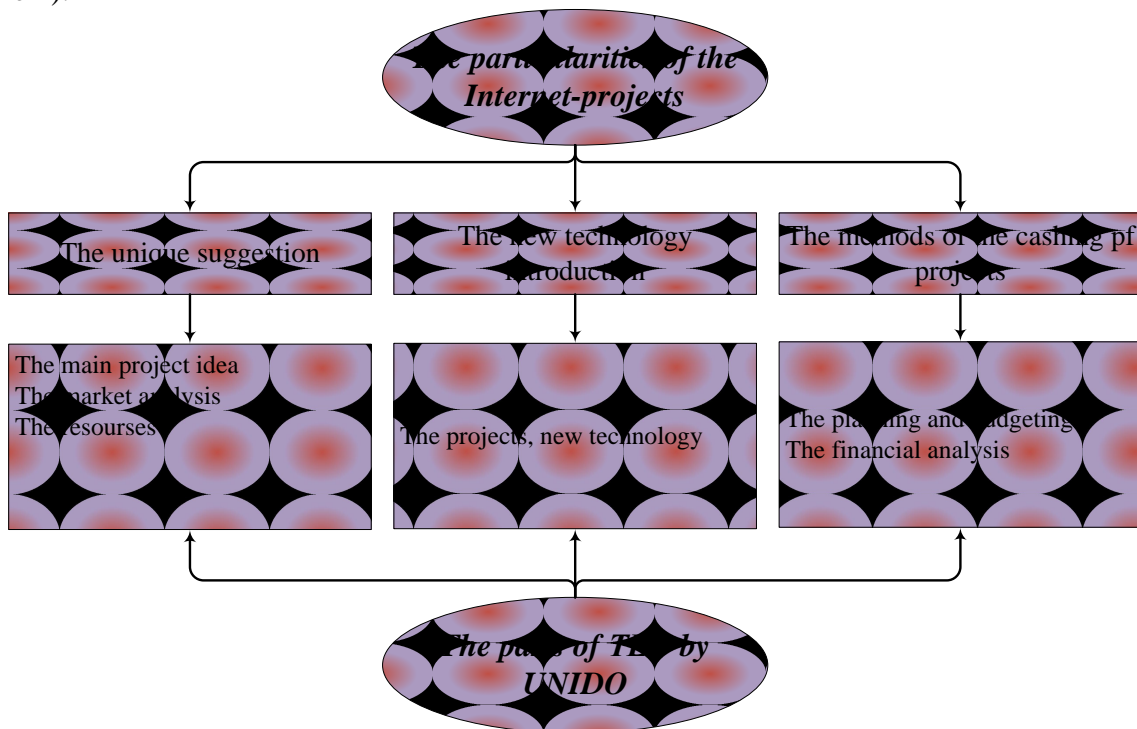


Figure 1. The features Internet-project of TEO section for UNIDO

Lets consider 2, 3, 4 UNIDO methodology sections.

In the Section **of conditions and a statement of the main idea of the project** appear objective of the project (corporate) and the general features of the main and second predictable strategy of the project. Includes geographical location and market share (internal and external), cost leadership, differentiation, niche market, location of the project orientation relative to the market or to resources (raw materials), economic and industrial policy that promotes project.

This section should describe the project from its uniqueness, namely at the principal characteristics we s direction s development characteristics. In particular, the Internet-project required classify under variety of signs:

I. In relation to the effect that you planned to obtain:

- 1) commercial;
- 2) social;
- 3) combined.

II. In relation to the innovative characteristics:

- 1) new product (service), which has not been produced (not provided) or product (service) to new consumer or operational (technology) properties;
- 2) the product (service) with better consumer characteristics or technical-economic indicators of its production;
- 3) the product (service), which is analogous to existing products (services).

III. With respect to off-line business;

- 1) operates independently of other enterprises;
- 2) is a complement of the existing off-line business;
- 3) acting parallel to the existing off-line businesses (both business and are equal).

The proposed classification of Internet projects classified by the method of conducting pilot testing, characterization of innovative product and the expected economic results in its market implementation.

In addition to determining the place of the classification in this section should evaluate the qualitative state of the Internet – the medium as "favorable", "normal" or "unfavorable". This can be done by using fuzzy sets to analyze the main characteristics of the Internet (bondage, dominance, etc.) [8].

Section 3 "**Market analysis and marketing concept**" provides an answer to the question of the scope of existing and production of the product of the leading manufacturers and their actions, and the prospects for growth in demand for the product. We estimate the level of development projects, quality products, the value of imports to meet domestic demand, show the results of the study of markets, assessing the degree of competition for this project from existing and potential producers, including foreign ones. Active forecast sales segment of the market and marketing costs. Formed approximate production program. The main result of Section – conclusion anticipated production program, including the release of byproducts and waste management.

For Internet-project in this section need to make a prediction of the number of qualitative and quantitative assessment of the medium-the Internet, which would be a temporary business. Rate investment in advertising, promotion methods and project management software system online project.

Section 4 "**Analysis of the resource base of the project**" is estimated requirements for raw materials, semi-finished products, components, energy. Determine the need for quantitative and manifests the possibility of interaction with potential suppliers. The main result of Section – calculation of annual costs of material factors of production, including imported. For the project, which operates in the information environment of the Internet, it is necessary to describe the management information system and information support site. Also, this section contains the calculation of the annual purchase cost of hosting and domain. Differences of Internet projects can be explored through such economic and mathematical tools as mining. This building intelligent systems contributes to more efficient use of human intellectual abilities using decision support systems. Human perception is more organic to understand than the engine, so it is necessary to investigate the properties of the Internet-project based on techniques such as fuzzy modeling, cellular automata, cognitive modeling and so on. In Table 2 identified problem (for estimation) characteristics of the Internet-projects and corresponding mathematical apparatus that allows display these properties.

Results of the analysis represented in Table 2.

Table 2 – Summary and withdrawal methods sections of UNIDO (2, 3.4) for internet-projects

Number of section	The name of section	The total content	The difference between Internet-projects and traditional business	Economic and mathematical methods
2	Analysis of the conditions and statement of the project main idea	Purpose of the project	Geographical value and Internet performance of the market analysis	Neural nets, cell automata
3	Analysis of the market and the marketing concept	Integrated market study bring on a list per annum indicators demand and supply; Description of the impact the project.	The need of the market base in terms Internet (characteristic environment Internet, Marketplace, Channels, Competition, Lifecycle).	Fuzzy logic, cell automata
4	Raw materials and supplies	Description of the situation with supply and material resources	Informational Provision of this site, is working in parallel with if off-line business information management system	Graph and game theory

Analyze sections 5 and 6 methods UNIDO, which should reflect the strategic advantages of the Internet project.

Section 5, "**Formalization the accommodation project**" is especially important if the project involves the creation of a new object – enterprise sales channel, laboratories and so on. A selection of the area and the specific grounds for placing the object. The main outcome of the unit – the cost of land, rents, etc. for accommodation options.

Internet project has a strong dependence on the location and results of operations do not affect the ecological environment. Therefore, for an internet-project in this chapter you should evaluate the cost of location and basic characteristics of the Internet medium.

Section 6, "**Defining the stages of design and technology**" includes data on production technology and equipment is necessities including information about the necessary research and development, licenses and import of equipment is. There is active selection of the best technological solutions. It's manufactured comparative evaluation of potential suppliers of necessary equipment and developed layout of construction and reconstruction. The main outcome of the unit – the cost of purchased licenses and equipment, construction and installation work, capital investment options for the project.

For Internet-project there is the existence in conditions of constant improvements of existing and new input technologies, business models, methods of monetization services. Therefore Internet-project main result of the section will be an analysis of existing technologies and existing supply in this market.

Results of the analysis represented in Table 3.

Table 3 – Summary and withdrawal methods sections UNIDO (5 and 6) for the Internet projects

Number of the Section	The name of the Section	The total content of the section	The difference Internet-projects from traditional business
5	Formation of the accommodation project	Cases Catalogue Descriptions and Selected Land for enterprise deployment	Cases Catalogue Virtually
6	Definition of the stages of design and technology	To define of the program, descriptions and technology	Cost Analysis equipment

We describe the adaptation of sections 9 and 10 of the methodology UNIDO (Table 4).

Chapter 9, "**Planning and budgeting of the project**" includes a sample schedule for the project. It determined the time of construction (reconstruction) of the company, equipment installation, commissioning Setting. The main result of Section – cost estimates for the project schedule.

Table 4 – Summary and withdrawal methods sections of UNIDO (9 and 10) for the Internet-projects

Section number	Section Title	The total content of the section	The difference Internet-projects from traditional business	Economic and mathematical methods
9	Planning and budgeting	To define actions (the job), that is need for deadline of the project	Description of the communication system	Neural nets, cell automate
10	Финансовый анализ и оценка инвестиций	Description of the investment project Investment and costs Sources of funding, Influence proposal, Evaluation of investment and of risks (Basic Data) Conclusions: Key dignity of the project, Major disadvantages of the project	Description of the project (Major Advantages and Disadvantages, zhyznennyi cycle) For the evaluation of investment with discounting need For building a forecast project is required by a model spacecraft	Fuzzy logic, cell automate

Section 10 "**Financial and economic evaluation of the project**" This is the final section of the feasibility study, which is a precondition for a final decision on the project or to abandon it. Here are forecasted cash flows in different periods of the project and using standard indicators evaluates appropriateness of investing in the project in question.

The important aspects of financial analysis are the main criteria for investment decisions, valuation of investments and the impact of the project, the planning horizon and the lifetime of the project as well as risks and uncertainties; will then be considered by the cost analysis, the basic principles of business analysis, investment valuation methods (discounted and traditional methods), finance, financial performance and financial performance, financial analysis and project evaluation under uncertainty.

For Internet project at result section is a ground source of income (monetization project) and methods to increase conversion site (this is the ratio of visitors, who performed it any targeted action (hidden or direct instructions advertisers, vendors, content creators – the purchase, registration, subscription, visit a specific page of the site, jump on sponsored links), the total number of visitors to the site, expressed as a percentage). You must also specify the cost for computer hardware jobs, mounting hardware and Internet project, the installation of the software.

Online project is implemented in an environment with high risk and uncertainty that complicates the assessment of investments and return funds forecast cash flows, justify investments by conventional methods.

## CONCLUSIONS

An analysis of the feasibility of projects using UNIDO methodology and disadvantages of using the methodology in assessing the online project makes it possible to identify the main features and Internet-projects that need to be taken into account when evaluating projects related to Internet environment, namely:

1. Unique offer.
2. The method of monetization project.
3. The introduction of new technologies.

Take into account these features of Internet projects possible by using tools of fuzzy sets and cellular automata for evaluating the attractiveness of the project. Variability and uncertainty of

Internet environment generate uncertainty, which increases the risk in making investment decisions related to Internet activity. To eliminate uncertainty completely impossible, but we can reduce its level. But perhaps partially resolve this problem by using complex methods of peer review, based on the principles of system analysis, fuzzy set theory and expert technology. The practice of real predictive calculations Internet-projects demonstrates the need for a comprehensive account of the various types of uncertainty in the assessment, planning and management of investment projects, so that the impact of uncertainty on Internet-projects resulting in unforeseen situations that lead to unexpected losses, damages, even those projects that are initially recognized as economically feasible.

Evaluation of investment attractiveness of Internet-projects using fuzzy sets has several advantages, among them, the ability to consolidate different types of uncertainty when evaluating Internet-project, because this issue requires further research.

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