

**SUSTAINABLE DEVELOPMENT OF NATURAL AND ECONOMIC
SYSTEMS: THEORY, METHODOLOGY, AND PRACTICE**

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The monograph considers theoretical and practical issues of sustainability modelling of
natural and economic systems. Monograph will be useful to scholars, entrepreneurs, experts in the
field of economics, management and administration, educators, graduate students, students and all
those who wish to improve their command in English.

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3.5 PROCEDURES AND TOOLS OF PROJECT MARKETING IN THE CREATION OF INNOVATIONS AND SYSTEMS OF THEIR HIGH-TECH PRODUCTION

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The existing progress of the world's leading countries and companies shows that their success is based on the use of an innovative model of sustainable development and implementation of strategic plans and programs for continuous progress of products and systems of their high-tech production. At the same time, in addition to modern standards of strategic and project management of these processes, to ensure their competitiveness in the global market environment, leading companies use effective procedures and tools of project marketing.

Given the unsatisfactory state of Ukraine's economy and enterprises, their transition to world standards of management, development and competitive advantage is a real necessity today. Therefore, the topic of research and this article is relevant, has scientific novelty and practical value for the growth of domestic producers.

Modern problems and issues of marketing management of innovation processes were considered in the works of such scientists as S.S. Garkavenko [1], S.M. Ilyashenko [2,3], F. Kotler [4], R. Cooper [5], Y.S. Shipulin [2] and others. But for the complex economic conditions of Ukraine, a detailed study of the

mechanisms of market management practical application in unique innovative projects and enterprise development programs there is a few one and the need for additional research in this area of development management to ensure necessary success is an objective reality.

The purpose of the work is to develop scientific and methodological bases and practical recommendations for the formation and application of modern procedures and tools of project marketing in creating innovations and systems of their high-tech production to ensure continuous progress and competitiveness of domestic products and producers.

As we know, any innovation process is risky. This is especially true of unique (complex) innovations and systems of their production, which are developed in modern projects and programs. The risk of innovation is evidenced by the fact that according to world practice, in thousands of new products that appear on the market each year, only 10% are truly innovative (innovative products).

Therefore, innovators need to understand the difficulties and risks of creating a particular type of innovation. F. Kotler [4] identified the following types and features of innovative product-product:

a) world innovations: fundamentally new goods, products, technologies that lead to the formation of a new special market (or its new segment) and other radical changes at the world level;

b) innovative products that create new product lines: products that allow company to enter a new target market, or to expand into those market sectors where the company's products were previously absent;

c) radically improved goods that meet the needs that were previously met by other similar products, similar in method of application, but which had significantly worse qualitative and quantitative indicators;

d) expansion and distribution (diffusion) of existing product lines: new products, services, which are a supplement to the existing product groups of the company;

e) modified products-goods that are already on the market and come with some improvements that do not radically change their characteristics;

f) goods of market news and repositioning: reorientation of already existing goods (products) for new markets or market segments; reducing prices by simplifying some qualitative indicators of basic innovation. These pseudo-innovations have almost the same properties as their original predecessors, but they are much cheaper.

For the development, organization of production and implementation of a truly innovative product, it is necessary not only to select and develop an appropriate strategy, but also to implement a fairly risky investment. But it is not possible to guarantee absolute success to the innovator himself or to those who are involved in the implementation of innovative product-product on the market.

When planning and implementing innovation and investment projects and development programs of high-tech research and production systems (HTRPS) it is necessary to take into account the following typical causes of possible failures:

a) senior executives seek to «push» the idea they think is right, without paying attention to the negative results of marketing research;

b) the idea itself is good, but the market is overvalued;

c) finished product has design defects;

d) a new product (innovative product) was unsuccessfully placed, its advertising campaign was ineffective, or an excessively high price was set;

e) actual costs of developing an innovative product are higher than expected and they are not offset by revenues from the sale of the novelty;

e) response of competitors is stronger than expected.

According to leading scientists and marketing practitioners, it is possible to minimize the negative results of innovation and risks of creating and implementing an innovative product if the developers and implementers of the innovation program:

a) have a good understanding of consumer needs;

- b) characterized by a high ratio of results and costs in all types of research and production and commercial activities;
- c) significantly ahead of competitors in time to implement innovations;
- d) plan a high margin of expected gross income;
- e) allocate significant funds for advertising and product launch;
- f) have the leadership of HTRPS, which understands and supports innovation, and its structural elements (economic entities) actively cooperate with each other;
- g) continuously implement innovative projects and programs of their development.

Therefore, in the process of research, a set of procedures for marketing project management was developed, which must be performed throughout the life cycle of innovative projects and development programs to ensure the competitiveness of their results. Their essence is as follows.

Constant focus on consumer requirements and demands, trends and changes in the market, need to take into account the actions of competitors, require modern manufacturers to apply project marketing in their innovative projects and development programs. The use of project marketing should promote creation and production of new products at the level of world standards, as well as ensure its competitiveness. The practical implementation of this strategic task in innovative projects and development programs is achieved through the following proposals, procedures and tools:

1. To initiate the program of producers' innovative development, its concept and software and design solutions development as well, it is necessary to carry out the following stages of marketing research and planning of innovative transformations:
 - a) analysis of the external environment to predict its development;
 - b) analysis of the internal environment and condition of the producer;
 - c) analysis of existing market opportunities in relation to the external environment and internal environment to identify ways of innovative development;

- d) formation of the target market for the implementation of development programs and projects;
- e) research and quantification of uncertainty and risk at different stages of innovation development;
- g) choice of priorities for innovation and production development;
- g) formation of the organizational structure of innovation and development management;
- h) planning of production, marketing and financial activities;
- i) control over the implementation of program activities and development projects;
- j) preparation of decisions on the need to change development priorities [1-6].

2. To assess market and other positions of producers, as well as opportunities for their innovative development, it is advisable to use SWOT-analysis, which compares market opportunities and threats to the external environment with the strengths and weaknesses of the producer, forming its internal environment and potential. Regardless of the potential of the manufacturer, its strategic marketing analysis should be conducted in the following stages: first expert-indicative, and then more detailed, taking into account location of the study object in the main areas of the matrix SWOT-analysis.

3. In developing innovative software and project activities in the process of SWOT-analysis for effective assessment and use of the existing potential of the manufacturer we should consider 4 options for marketing strategies of its future market behavior, characteristics of which are given in table 1 and 2.

4. For practical and systematic implementation of the main functions of marketing management of innovative development, it is recommended to use procedures and tools of project marketing management, developed in this study and listed in table 3. They are standardized and mutually agreed on the main phases, subphases (periods), stages of implementation (life cycle) of the program (project) and other standards of project-program approach and management of innovative development, which determines their rational use in practice.

Table 1 – Variants of marketing strategies regarding the use of available market opportunities of the manufacturer in its programs and projects

Options for marketing strategies for future activities of the manufacturer	
available market opportunities	probable market threats
1	2
<p><i>Strategy 1.</i> Deep market penetration that is developing or has the potential to grow. This is done by: a) reducing prices; b) sales promotion; c) by improving the sales network and ways to promote innovative products; d) through the use of multilevel marketing and the complex «marketing mix»; e) by expanding the range of related services («branded service», «turnkey» system), application of flexible credit policies, transfer of complex innovative products for rent, leasing, etc.</p>	
<p><i>Market opportunities:</i> high prices for competitors' products allow to reduce prices; price elasticity of demand allows to increase sales and revenues while reducing prices; limited information about the products received by the target audience; existence of a good and well-established sales network and reserves for its growth; weak «brand» service from competitors; there are opportunities to provide related goods and services; there are needs in pre-sale preparation of the goods, its service after sale; there is a legal and regulatory framework and mechanisms for lending and leasing; increasing market capacity.</p>	<p><i>Market threats:</i> strong competitors; substitute goods; absence or weakness of the trade network; non-perception by the target audience of sales promotion methods; unstable economic and business conditions; lack of market mechanisms or their weak development; falling market capacity; sharp fluctuations in consumer needs and demands; unfavorable political, social and other conditions.</p>
<p><i>Strategy 2.</i> Expanding market boundaries, i.e. finding new consumers and customers, new markets for existing and modernized products. This is achieved by: a) entering new markets; b) coverage of new segments in those regions where the producer and its products operate; c) development of new forms and areas of use of existing goods and products.</p>	
<p><i>Market opportunities:</i> there is an unmet need for products that are similar to the analyzed products of the producer; economic recovery; there are market segments that are left out of the competitors attention or they act on them inactively; there are channels to enter other markets; there is a possibility of multipurpose use of production.</p>	<p><i>Market threats:</i> protectionism against local producers; lack of channels to promote products to other regions or market segments; there are specific features and traditions in new markets; availability of substitute products for powerful competitors; non-perception of goods in non-traditional areas of their application; unstable external conditions.</p>
<p><i>Strategy 3.</i> Development and implementation of new (innovative) products in existing markets through: a) improvement (modernization) of existing products; b) creation and implementation of a new innovation group of products that replace the outdated and inefficient product group, c) production of new (innovative) products that meet existing needs, but in a different way than existing (traditional) goods; d) creation, development, production and sale of fundamentally new (innovative-new) goods.</p>	

<p><i>Market opportunities:</i> economic recovery; acceleration of innovative development; stimulating to improve the quality and competitiveness of economic policy of the state and regions; presence of consumer needs differentiation; consumer dissatisfaction with available goods; possibility of using innovations in practice and life; existence of potential customer needs.</p>	<p><i>Market threats:</i> significant changes in the qualitative and quantitative needs of consumers; emergence of strong competitors; significant change in business conditions; falling market capacity due to adverse external conditions; conservatism of searches for innovative goods.</p>
<p><i>Strategy 4.</i> Diversification of production and sales of products in new (on various grounds) for this organization markets (their segments and sectors). This strategy is implemented by: a) offering in new markets new products that develop the traditional activities of the manufacturer, as well as products that are innovative (by type of activity) for this production; b) orientation of production and commercial activities of the producer on relatively small market shares with a radically defined specific needs of consumers (the so-called niche market).</p>	
<p><i>Market opportunities:</i> acceleration of innovation processes; raising living standards; economic growth; stimulating innovation policy; presence of significant differentiation of consumer preferences within one or more regions, market segments, etc.; emergence of new demand for new products; availability of clients with clearly defined needs and preferences.</p>	<p><i>Market threats:</i> jumping consumer needs due to the influence of various factors and changes; conservatism of buyers concerning innovative goods; weakness of trade networks; presence of artificial barriers and barriers.</p>

Table 2 – Characteristics of the internal environment of producers (strengths and weaknesses of their potential and activities)

Strengths (positive) sides	Weaknesses (negative) sides
<p>The positive (strengths) of the manufacturer we can include: high reputation; qualified and effective management that uses non-standard and creative management methods; constant contact with clients, partners and intermediaries; high qualification of the staff; a wide range of products; modern production facilities, technologies and equipment with high flexibility of use; availability of reserve capacities and production areas; competitiveness; high quality; significant innovative potential; experience in applying world quality standards (ISO 9000); reliability of resource provision; high financial independence and stability; experience in world markets.</p>	<p>The negative (weaknesses) of the producer include lack of strategy and development practice; deterioration (fall) of competitive positions; low financial independence and stability; ignorance in the market and in marketing; insufficient production capacity; rigid centralization of power; significant production size and management complexity; outdated technical and technological base and products; not rhythmic and unreliable provision; limited or no reserve production areas and capacity; limited or no reliable channels for product promotion and marketing; inefficient and cumbersome management system; lack of clear marketing and marketing programs; reluctance of management to change anything in activity, stereotypes of thinking.</p>

The following main processes of the program (project) life cycle are considered:

I. Pre-investment phase of the program:

- I.1. Clarification of the mission and innovative development strategy.
- I.2. Formation of the mission, goals and objectives of the future development program and its innovative projects.
- I.3. Strategic pre-project research on the program (project).
- I.4. Identify possible solutions to the key ideas of the program (project).
- I.5. Formation of general qualitative and quantitative parameters of the program (project).
- I.6. Structuring of works and measures of the program (project).
- I.7. Risk and uncertainty analysis.
- I.8. Strategic project research, feasibility study and business planning of the main parameters of the development program (project).
- I.9. Consideration and adoption of strategic decisions on the development and implementation of the program (project), its investment support.

II. Investment phase of program development and implementation.

- II. (1). Subphase of basic research, design and planning of the program (project).
- II. (2) Subphase of active (investment) implementation of of the commodity producer program development (innovative project)

III. Post-investment phase of the program:

- III.1. Commissioning and development of new production.

Table 3 – Marketing activities and management in innovative projects and development programs (*author's development*)

Innovation process and development program		Measures to assess producer potential in relation to its development program			Measures to bring the innovation process in line with the needs of the external environment		
stages of the program	marketing activities	market potential	innovation potential	production and commercial potential	goals of activities at this stage	procedures and tools for goal research	results
I. Pre-investment phase of the program: I.1. Clarification of the mission and innovative development strategy.	Diagnosis of the condition, analysis of conformity of the internal possibilities of development to external conditions.	Existing procedures and tools for assessing producer potential for its development program			Assessment of producers, identify promising areas of development in existing conditions.	Strategic analysis. Strategic marketing research.	Identification of problems, assessment of the state and opportunities for development, its directions.
I.2. Formation of the mission, goals and objectives of the future development program and its innovative projects.	Search for innovative ideas for new products and other changes (improvements) in each area of the development program.	Identify market opportunities and threats.	Identify the necessary innovations to meet the needs of consumers and producers.	Identify and evaluate the strengths and weaknesses of the manufacturer	Search for new ideas, defining the objectives of the development program to improve technology and production system.	Methods and tools of strategic, marketing and project analysis, including project management standards.	The list of ideas concerning innovative production, technologies, order of its production, necessary changes in business processes.
I.3. Strategic pre-project research on the program (project). I.4. Identify possible solutions to the key ideas of the program (project). I.5. Formation of general qualitative and quantitative parameters of the program (project).	Evaluation and selection of innovative product ideas, related changes in production and business processes. Development of a conceptual vision of program (project) implementation options.	Evaluation and selection of innovative product ideas, related changes in production and business processes. Development of a conceptual vision of program implementation options. Evaluate and select ideas that correspond to	Select ideas that develop the overall and innovative strategy of the manufacturer and contribute to the formation of the development program. Assess the possibility and effectiveness of their implementation.	Select ideas that develop production and marketing strategies, ensure development. Evaluate the production and marketing parameters of the program.	Drawing up a plan for detailed marketing research, their implementation for feasibility studies of the main parameters of innovative changes, as well as setting goals and objectives for the formation of marketing strategies and plans for the program.	Preliminary and detailed marketing research of existing markets, their characteristics to establish key parameters of innovative products, system of its production and marketing, taking into account innovative, technical and technological, organizational, economic opportunities for development and production of new	Selected ideas and their preliminary substantiation. Description of the innovative idea and its conceptual characteristics. Analysis of marketing and other indicative preliminary research, formation of preliminary data on the state and possibilities of development.

		the growth of the producer market potential. Check innovative idea from a commercial standpoint.				products.	
1.6. Structuring of works and measures of the program (project). 1.7. Risk and uncertainty analysis. 1.8. Strategic project research, feasibility study and business planning of the development program main parameters (project).	Comprehensive commercial (marketing) analysis of the market, external opportunities and threats to the state and potential of the manufacturer to develop a marketing strategy and plans for its implementation in the program (project).	Search or formation of the target market, its segments and sectors.	Detailed studies of the state and need to improve the innovation infrastructure and potential of the manufacturer to implement its development and projects.	Detailed studies of production and commercial potential of the manufacturer to establish qualitative and quantitative parameters of technical and technological, production, operational and commercial development.	Assessment of market prospects of innovative transformations, development of a marketing complex for program implementation. Defining goals and objectives of marketing management in the development program and formation of marketing strategy for its implementation.	Standard methods of marketing research of the external environment and the internal state of the manufacturer, analysis of results. Use of market segmentation methods and development of product, price, sales and communication policy for the implementation of program activities.	Marketing plan for implementation of the program, a list of standards for project management, strategic, tactical and current plans for marketing activities for the implementation of program activities.
1.9. Consideration and adoption of strategic decisions on the development and implementation of the program (project), its investment support.	Assessment of implementing a marketing program possibility and plans for innovation and software transformation.	Assessment of market opportunities and conditions for effective implementation of marketing plans.	Evaluation of marketing plans effectiveness to ensure development of scientific, technical and technological potential of the manufacturer.	Evaluation of marketing plans effectiveness to ensure growth of production and commercial potential of the producer and sales opportunities for new products.	Assessment of opportunities and prospects for the creation, production, promotion of innovative products. Assessment of commercial and economic effects from the application of marketing	Procedures and tools of functional-cost analysis (FCA); design, technical and economic analysis; evaluation of different types of effects and effectiveness of innovation and project-planning activities of the development program.	Feasibility study of the development program and other innovative projects. Approval of strategic program and design parameters of producer development.

					management and measures to implement the program.		
II. Investment phase of program development and implementation. II. (1). Subphase of basic research, design and planning of the program (project).	Creation of innovative products, technologies and systems of its modern production: design and research and development works; experimental production and experimental testing of prototypes; preparation and development of production, including trial marketing.	Operational assessment of market threats and real commercial benefits of program activities implementation.	Evaluating effectiveness of innovative ideas implementation in design and software solutions. Diagnosis of quality and efficiency of the investment part development of the development program.	Evaluation of marketing activities implementation in project decisions and implementation plans in development programs. Operational management of marketing activities to implement the program and ensure its effectiveness.	Implementation of marketing activities related to: effective development of working and other project documentation; production of prototypes and their testing; conducting trial marketing to clarify the parameters of innovative products and development programs; implementation of marketing management in the program.	Application of marketing research results in design and research works, including ISO, DSTU, PMBoK, TQM, etc. standards to ensure the quality and competitiveness of innovative products and other results of the development program.	Technical and working documentation; prototypes; test reports and trial marketing; design and estimate and other documentation of the program; ensuring the effectiveness of software solutions and program implementation.
II (2). Subphase of active (investment) implementation of the commodity producer program development (innovative project).	Market tests of new products, new technologies and production systems, other results of the program. Bringing an innovative product to market and increasing its output.	Analysis of the market tests results of new products and changes in the development of the manufacturer and its innovative products.	Adjustment of innovation processes and activities of innovation infrastructure; making changes to operational plans to increase the efficiency and quality of the innovative	Operational management of the program implementation; making changes in the development program, current plans and business processes of new production and	Evaluation of the reaction and attitude of buyers and other consumers to the release of new products, effectiveness of the marketing complex in relation to its promotion. Evaluation of the program	Implementation of the marketing complex measures of the program in relation to the production and promotion of innovative products; monitoring, collection of necessary information and implementation of marketing controlling in program activities; implementation of	Adjustment of the marketing complex and policy for sales management and promotion of innovative products; operational decisions on marketing management and making changes to operational plans for the program;

			potential of the manufacturer.	commercial activities.	effectiveness.	marketing management functions of innovative development of a commodity producer.	evaluation of the effectiveness of marketing management program.
<p>III. Post-investment phase of the program:</p> <p>III.1. Commissioning and development of new production.</p> <p>III.2. Organization of new production precise activities.</p> <p>III.3. Further modernization and development of the producer and its products.</p> <p>III.4. Diffusion of innovative products into new markets.</p> <p>III.5. Evaluation of the obtained results.</p> <p>III.6. Implementation of the following innovative projects.</p>	<p>Sales growth and marketing adjustment of innovative products parameters depending on the available demand.</p> <p>Product achievement of maturity: stabilization of sales and production as a result of market saturation.</p> <p>Gradual decline in sales, reduction and withdrawal from the production of obsolete products, transition to the production of new higher quality innovative products.</p>	<p><i>Marketing management to ensure efficiency of sales and competitiveness of innovative products:</i></p> <ul style="list-style-type: none"> ● Extensive and constant informing of potential consumers (buyers) about a new, still unknown innovative product. ● Encouraging consumers to test a new product, ensuring its implementation through the wholesale and retail network. ● Creation and development of branded service. ● Accelerate the return on positive profits by intensifying the use of previous marketing measures (marketing mix), increasing sales and production of innovative products and reducing its cost. ● Improving quality of an innovative product, giving it new properties, consolidating its position in the market. ● To protect the basic model of the product - organization of its modifications release, expansion of the range and properties. ● Entering new market segments, expanding existing (effective) marketing channels and finding new ones. ● Reorient advertising from efforts to increase product information to efforts to promote benefits. ● Reduction of prices for consumers, for whom the price is the dominant factor in purchasing goods. ● Conducting additional market research and consumer opinions on further product improvement and development. ● Modification of markets, as well as market expansion by attracting new customers. ● Modification of the product, as well as the marketing complex to stimulate sales of new products. <p><i>F. Kotler [4] at this stage of the product life cycle recommends to carry out:</i></p> <ul style="list-style-type: none"> ● Increased investment in the development of high-tech production and new (more innovative) products in order to reach a leading position or strengthen its position in the market. ● Maintaining a certain level of investment in innovative re-equipment and development of modern production while studying the situation in the industry (until it becomes clear). ● Selective reduction of investments by «refusal» to serve some consumers of obsolete products with a simultaneous increase in investment (their reinvestment) in profitable products and niche markets. ● Refusal to invest («harvesting» in order to quickly increase cash flow). ● Diversification (or sale) of production and placement of released assets with greater benefits for the producer. 					

III.2. Organization of current activities of new production.

III.3. Further modernization and development of the producer and its products.

III.4. Diffusion of innovative products into new markets.

III.5. Evaluation of the obtained results.

III.6. Implementation of the following innovative projects.

The combined implementation of all these standards should strengthen the overall effect of the implementation of programs for innovative development of high-tech research and production systems and ensure their creation of competitive world-class innovative products.

The authors of the article are convinced that proposed procedures and tools of project management due to their integration with world standards of management, strategic and project management should jointly create a synergistic effect and accelerate innovation and economic progress of products and enterprises of Ukraine. This will ensure not only growth of their competitive position in the world, but also increase the welfare of the entire population.

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3.6 BUSINESS ENTITIES MANAGEMENT INFORMATION AND ANALYTICAL SUPPORT IMPROVEMENT AREAS

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The transformation of Ukraine's economy into the European space, domestic economy instability functioning, the growth of international competition requires new