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Existing Problems in Organizing Innovative Management at Enterprises Producing Building Materials

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Abstract: This study examines the theoretical and practical aspects of organizing innovative management at enterprises producing building materials and provides a comprehensive analysis of the existing organizational and economic problems in the field. During the research, the role of innovative management in ensuring the competitiveness of enterprises, production efficiency, and sustainable development was scientifically substantiated. As scientific novelty of the research, an integrated organizational and economic model of innovative management for enterprises producing building materials, a model for assessing innovative maturity, an Innovation Readiness Index, an Innovation Management Office, as well as a system of indicators designed to assess the effectiveness of innovative activities have been developed. In addition, practical proposals and recommendations aimed at integrating digital transformation, knowledge management, and external institutional cooperation into a unified management system have been formulated.

Keywords: Building materials industry, innovative management, innovative development, innovative strategy, competitiveness, digital transformation, human capital, innovative potential, innovative maturity, Innovation Readiness Index, corporate governance, resource efficiency, energy efficiency, digital technologies.

Introduction

Structural renewal of industrial sectors and the transition to the production of high value-added products is one of the important conditions for economic development. In this process, the building materials industry occupies a special place, since this sector not only provides the construction field with necessary products, but also operates in close interconnection with metallurgy, chemistry, energy, transport, mechanical engineering, and the service sector. For this reason, the effective organization of the innovative management system in this industry also has a multiplicative effect on the development of other sectors of the economy.

In recent years, requirements for quality, environmental safety, and functional characteristics of products in the building materials market have been changing significantly. Along with traditional cement, brick, and concrete products, the demand for high-strength composite materials, lightweight structures, heat-insulating materials, products made from recycled raw materials, and materials consistent with the principles of «green building» is growing. This requires manufacturers to reconsider technological processes, diversify product assortments, and effectively manage innovative projects.

The effectiveness of innovative management is largely determined by the enterprise's ability to adapt to changes in the external environment. Factors such as fluctuations in raw material prices, rising energy costs, increasing logistics expenses, intensifying competition in foreign markets, and rapidly changing consumer needs require prompt management decision-making. From this perspective, innovative management becomes an effective tool for strategic planning, risk assessment, and resource reallocation for enterprise management.

Furthermore, the level of development of innovative management in the industry is closely linked to corporate governance culture. In cases where enterprises lack sufficient development of practices to support employee initiatives, encourage new ideas, organize knowledge exchange, and implement collective decision-making, innovative activity declines. This leads to innovations being perceived merely as technical novelties.

However, modern innovative management views human capital, corporate culture, and organizational changes as the primary resources of innovative development.

The external institutional environment also plays an important role in shaping the innovative management system. Tax incentives, investment support programs, the level of development of innovative infrastructure, the activities of technology parks, engineering centers, and clusters expand the innovative capabilities of enterprises. At the same time, the effectiveness of cooperation mechanisms between the private sector, government organizations, and scientific institutions directly affects the speed and quality of implementing innovative projects.

Today, ensuring the principles of sustainable development in the building materials industry is also one of the important tasks of innovative management. Climate change, the limited availability of natural resources, and stricter environmental requirements necessitate the widespread introduction of innovative approaches aimed at reducing waste in production processes, using secondary resources, reducing carbon emissions, and increasing energy efficiency. The implementation of these tasks requires the application of modern models of strategic innovation management.

In general, the issue of organizing innovative management at enterprises producing building materials encompasses such interrelated areas as economic efficiency, competitiveness, environmental sustainability, resource conservation, human capital development, and digital transformation. A comprehensive analysis of these issues and the development of scientifically based organizational and economic mechanisms on their basis are of great theoretical and practical importance for ensuring the sustainable development of the industry and implementing the priority objectives of the country's industrial policy.

Literature review on the topic. The issue of innovative management at enterprises producing building materials in foreign literature is studied mainly from the perspective of introducing innovations in the construction industry, digital transformation, project-based management, and technological renewal.

E.S. Slaughter classifies innovations in the construction sector into five types: incremental, modular, architectural, systemic, and radical innovations. Her approach is important for enterprises in the building materials industry, because updates in the sector are not always radical. In many cases, partial modernization of equipment, changes in formulation, or improvement of product composition also yield economic benefits. [1] However, Slaughter's model does not sufficiently reveal factors such as the enterprise's

financial capabilities, personnel potential, and institutional environment. Therefore, when applying this approach in the conditions of Uzbekistan, it is necessary to take into account the industry's resource dependence and investment constraints.

D.M. Gann and A.J. Salter, analyzing the problem of managing innovations in project-based enterprises, note that in the construction sector, knowledge is formed in a dispersed manner among various participants. According to them, the effect of innovations arises not within a single enterprise, but through the exchange of knowledge among project participants. This approach is also relevant for the building materials industry, since in developing new materials, the connection between laboratory, production, design, and construction practice plays a decisive role. [2] From a critical standpoint, this approach does not fully cover the characteristics of the continuous technological cycle and serial production in manufacturing enterprises.

A.M. Blayse and K. Manley identify customers, manufacturers, production structure, inter-industry relationships, procurement systems, regulatory requirements, and organizational resources as the main factors influencing innovation in construction. Their research provides an important theoretical foundation for the topic, as it allows innovative management to be viewed not only as an internal problem of the enterprise, but also as a process linked to the market, standards, and the cooperation system. [3] However, this study does not thoroughly address issues of financial constraints in developing countries, dependence on imported equipment, and the use of the local raw material base.

A. Hartmann analyzes innovative management in construction enterprises based on a situational approach. He substantiates that the successful implementation of innovations depends on the enterprise's internal capabilities, market conditions, and project characteristics. This idea is important for enterprises producing building materials, because the mechanisms for introducing innovations in the production of cement, brick, ceramics, gypsum, basalt, or thermal insulation materials are not identical. [4] At the same time, although Hartmann's approach well reveals the general management context, it does not develop industry-specific factors such as energy consumption, raw material quality, and environmental requirements at the level of separate methodological indicators.

In domestic research, the building materials industry is studied more from the standpoint of industry development, utilization of local raw materials, import substitution, and enhancement of regional potential. S.O. Ibragimov substantiates the need to develop the building materials industry of Uzbekistan on the basis of innovative clusters. In his views, the cluster approach is assessed as a means of strengthening cooperation between enterprises in the industry, educational institutions, and service organizations. [5] However, the study does not sufficiently define the distribution of innovative management functions among cluster participants, project performance assessment, and mechanisms for digital information exchange.

Sh.Z. Igamova analyzes the innovative development of building materials enterprises under modernization conditions. The author notes the existence of the industry's resource potential, but emphasizes the need to strengthen innovative activity for its effective use. This idea is important for the research topic, because innovative management acts as a mechanism for transforming the raw material base and technological capabilities into economic results. [6] At the same time, this study does not fully disclose issues of the internal organizational structure of innovative management, employee competencies, and risk management.

S. Abduganieva analyzes the role of imports in the building materials market and strategies for its development. This approach helps to link innovative management in the building materials industry with foreign trade, imported technologies, and local production capabilities. [7] However, this study does not sufficiently analyze domestic research and development work, local technologies, and enterprise-level innovative management mechanisms to reduce import dependence.

In general, foreign literature provides broader coverage of issues related to types of innovations in the construction sector, project-based management, inter-industry cooperation, and digital transformation. Domestic research pays more attention to the resource potential of Uzbekistan's building materials industry, localization, market requirements, and problems of industry development. However, neither direction has adequately and comprehensively studied the issues of an integrated organizational and economic mechanism for organizing innovative management at enterprises producing building materials, criteria for assessing innovative potential, digital management tools, and management of innovative risks. Therefore, this research is significant because it is aimed at filling this scientific gap.

Research methodology. In the systematic analysis of existing problems in organizing innovative management at enterprises producing building materials, methods of systematic analysis, historicity and logicity, induction and deduction, analysis and synthesis, comparative and selective research, monographic analysis, and grouping were employed.

Analysis and results. In the building materials production industry, product quality management is also inextricably linked with innovative management. In the context of deepening market relations, consumers pay great attention not only to the price of products, but also to their service life, strength, safety, and environmental characteristics. Therefore, the integration of international quality management principles with the innovative management system is an important condition for ensuring product competitiveness.

At the same time, the relevance of innovative management is also important from the perspective of regional industrial development. The majority of enterprises producing building materials are located near sources of natural resources, and their effective activity serves to create new jobs in regions, increase population incomes, and diversify the local economy. The development of innovative management at enterprises further enhances these socio-economic effects.

Ensuring the effectiveness of innovative management at enterprises producing building materials depends not only on technological modernization, but also on the mutual consistency of strategic management, knowledge management, innovative environment, external cooperation, and digital transformation. In the conditions of the modern economy, the competitive advantage of enterprises is determined more by intellectual capital and innovative capabilities than by material assets. From this point of view, the analysis assessed internal and external factors influencing the innovative management system on the basis of a comprehensive approach.

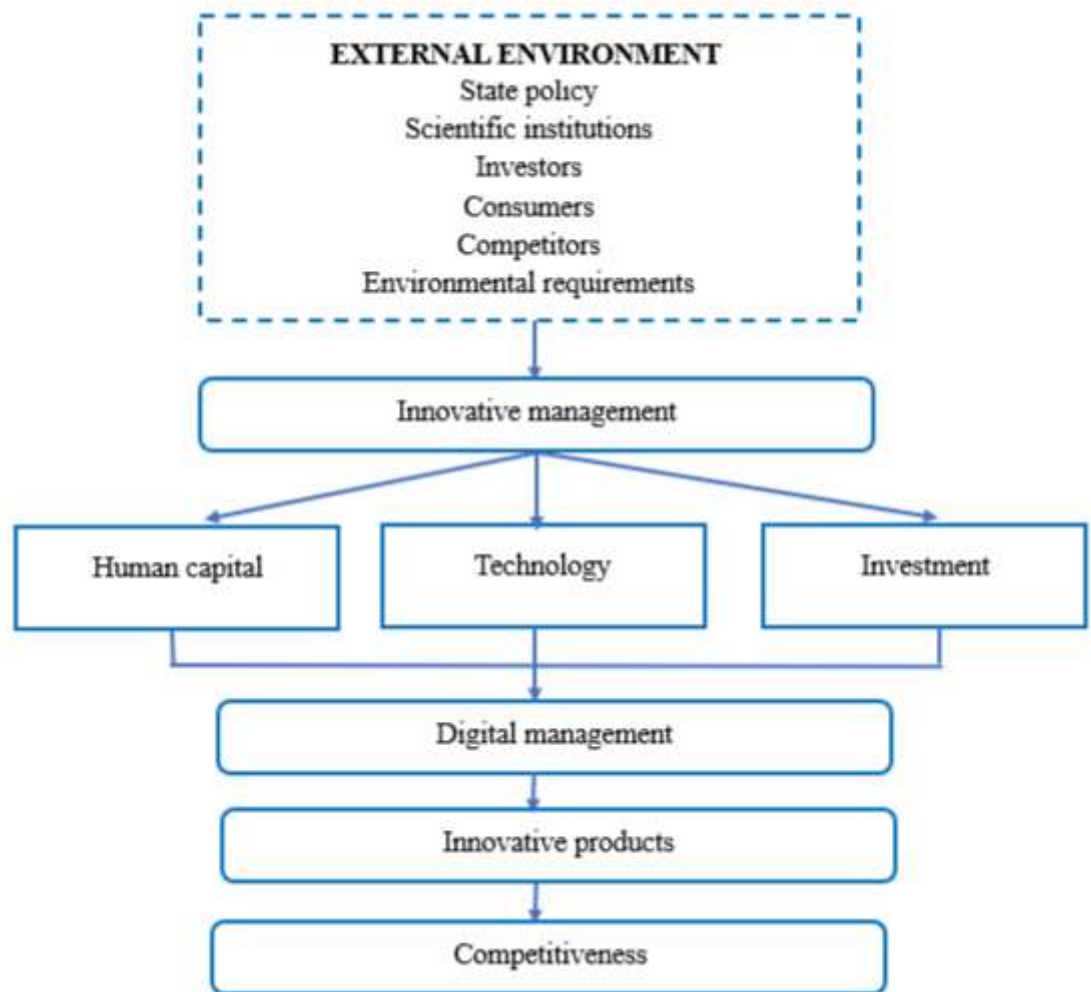


Figure 1. System model of innovative management of an enterprise producing building materials

According to the data presented in Figure 1, the functioning of innovative management as an open system is reflected. It shows that external environment factors have a constant impact on the enterprise's innovative potential. According to the Dynamic Capabilities theory, an enterprise's ability to quickly adapt to changes in the external environment determines its innovative competitive advantage. Therefore, innovative management should ensure continuous information exchange with the external environment.

According to the system model developed by the author, innovative management functions as an open system. External environment factors — state policy, scientific institutions, investors, consumers, competitors, and environmental requirements — constantly influence the enterprise's innovative potential. According to the Dynamic Capabilities theory, an enterprise's ability to quickly adapt to changes in the external environment determines its innovative competitive advantage. Therefore, innovative management should ensure continuous information exchange with the external environment. The model includes investments, technologies, human capital, and digital management as components of innovative management, with innovative products and competitiveness as the resulting outcomes.

In the building materials industry, the continuity of the production process depends on the reliability of technological equipment, technological discipline, and the effectiveness of the control system. Through innovative management tools, it becomes possible to plan

preventive maintenance, carry out digital monitoring of technological processes, and predict potential risks. This serves to reduce production interruptions and prevent financial losses.

In the production of building materials, the supply of raw materials, storage of finished products, transport logistics, and cooperation processes with distributors require management as a unified system. The application of innovative management methods allows coordinating these processes, reducing excess inventories, lowering logistics costs, and shortening the time for products to reach the market. va mahsulotlarning bozorga chiqish vaqtini qisqartirish imkonini beradi.

According to the Innovation Value Chain concept, innovations represent a continuous cyclical process: ideas emerge, are selected, designed, tested through experiments, directed to production, and commercialized, after which market demand generates new ideas. In the building materials industry, many innovations stop at the laboratory stage, which indicates the insufficiency of the commercialization mechanism. Therefore, in the innovative management system, it is necessary to strengthen integration between marketing and production departments.

The Balanced Scorecard theory allows evaluating innovative management not only from a financial perspective, but also from the standpoint of customers, internal processes, and human capital. The proposed KPI system includes the following areas: in the financial area, revenue from innovations is measured as a percentage; in the customer area, demand for new products is assessed as a percentage; in the internal processes area, the share of new technologies is measured as a percentage; in the personnel area, participation in innovation trainings is measured in persons; in the R&D area, research and development expenditures are measured as a percentage; in the ecology area, reduction of SO₂ emissions is measured as a percentage. This approach serves to determine the real economic effect of innovations in the building materials industry industry.

Table 3

Innovation Maturity model

Level	Description	Key characteristic
Level I	Traditional management	Innovations are episodic
Level II	Initial innovation	Individual projects exist
Level III	Integrated management	Cooperation between departments
Level IV	Digital innovation	ERP, MES, AI are implemented
Level V	Innovation leader	Continuous improvement and global competition

According to the data presented in the table, this model allows for a step-by-step assessment of the level of innovative development of enterprises producing building materials. Based on the model, each enterprise can determine its current state and establish the necessary organizational and technological measures for transitioning to the next stage of development.

In Uzbekistan, the building materials industry has been developing rapidly in recent years: new enterprises have been established, production capacities have been expanded, and a number of investment projects aimed at effectively utilizing local raw materials have been implemented. However, the growth of production volumes in the industry is not always accompanied by the development of the innovative management system. Analyses show that at most enterprises, innovations are mainly limited to the purchase of new technologies or equipment. Meanwhile, innovative management represents a comprehensive system encompassing human capital, digital technologies, scientific research, corporate culture, and strategic management.

The following are the main problems in the industry and scientifically based proposals for their elimination.

1. Lack of a formed innovation management strategy. At many enterprises producing building materials, innovation activity is carried out not on the basis of a long-term strategy, but based on current needs. As a result, innovations are not systematic but fragmented in nature, and their economic efficiency does not fully manifest. To solve this problem, the following is proposed:

- develop a 5–10 year innovation development strategy at each enterprise;
- adopt a separate "Road Map" for innovative development;
- form a portfolio of innovative projects and manage them by priority level;
- introduce a KPI-based strategy execution assessment system.

2. Low integration between scientific research and production. In practice, cooperation between enterprises and higher educational institutions is not systematic. Most scientific developments remain unimplemented in production. To solve this problem, the following is proposed:

- create corporate R&D centers at large enterprises;
- open joint scientific laboratories with higher educational institutions;
- link the research of doctoral students and master's students with the needs of enterprises;
- organize "university – scientific center – production" cooperation based on the Triple Helix model.

3. Insufficient implementation of digital innovative management systems. At some enterprises, production processes are still managed using traditional methods. The level of use of digital technologies such as ERP, MES, IoT, Big Data, and AI is low. To solve this problem, the following is proposed:

- gradually introduce ERP, CRM, and MES systems;
- monitor technological processes through IoT sensors;
- form production forecasts using artificial intelligence;
- **organize a digital data center.**

4. Limited sources of financing for innovative projects. Innovative projects are mainly implemented using the enterprise's own funds. The opportunities of venture capital, grants, and innovation funds are insufficiently utilized. To solve this problem, the following is proposed:

- create a special Innovation Development Fund for the industry;
- improve mechanisms for attracting venture investments;
- expand tax incentives for private investors;
- allocate preferential loans under state guarantees for innovative projects.

5. Insufficient personnel potential. The number of highly qualified specialists in the field of innovation management is limited. Enterprises have little systematic work on developing employees' innovative thinking. To solve this problem, the following is proposed:

- introduce the position of "Innovation Manager";
- train employees under international certification programs;
- create corporate professional development centers;
- organize a bank of innovative ideas and internal startup competitions.

6. Low level of innovation culture. An environment of initiative regarding innovations has not been fully formed at enterprises. New ideas of employees are not sufficiently supported. To solve this problem, the following is proposed:

- develop a concept of corporate innovative culture;
- organize "Best Innovative Idea" competitions;
- provide material and moral incentives to authors of innovations;
- introduce the Open Innovation model.

7. Low energy efficiency. At some enterprises, the use of high-energy-consuming technologies continues. To solve this problem, the following is proposed:

- conduct regular energy audits;
- introduce the ISO 50001 energy management system;
- apply technologies for reusing waste heat;
- increase the share of renewable energy sources utilization.

8. Underdeveloped system of innovative risk management. Mechanisms for assessing and monitoring risks for innovative projects are practically unformed. To solve this problem, the following is proposed:

- introduce an Enterprise Risk Management (ERM) system;
- form a register of innovative risks;
- develop a risk map for each innovative project;
- use scenario analysis and sensitivity analysis.

Based on the research results, the following new scientific proposals have been developed for improving innovative management at enterprises producing building materials:

1. Inclusion of the "Innovation Management Office (IMO)" in the organizational structure of each large enterprise. This department will be responsible for developing innovation strategy, managing the portfolio of innovative projects, and monitoring results.

2. Introduction of the Innovation Readiness Index (IRI). The index is assessed in the following areas: strategic readiness; digital infrastructure; human capital; innovation culture; financial capabilities; external cooperation.

3. Development of an "Innovation Dashboard". The dashboard allows real-time monitoring of innovative projects, KPIs, investments, risks, and economic efficiency indicators.

4. Creation of a "Corporate Open Innovation Platform". Through this platform, the exchange of innovative ideas between universities, startups, engineering centers, and enterprises will be established.

5. Assessment of enterprises by five levels based on the Innovation Maturity Model and development of a specific development program for each level.

The proposed approaches serve the systematic improvement of innovative management at enterprises producing building materials, acceleration of digital transformation, and ensuring long-term sustainable development of the industry. These proposals have scientific novelty, and their gradual implementation into the practice of industry enterprises can yield high economic and organizational effects.

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