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Article

Theoretical and Methodological Foundations of Forming an Innovative Management Strategy at Construction Materials Manufacturing Enterprises

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Abstract: The article investigates the theoretical and methodological foundations of forming an innovative management strategy at construction materials manufacturing enterprises. Recent sectoral statistics are analyzed, revealing systemic problems in the innovation management system against the backdrop of existing growth trends. Based on an analysis of the innovation management theories of J. Schumpeter, P. Drucker, M. Porter, C. Freeman, and M. Imai, a five-stage conceptual model for construction materials enterprises — IMSF-CME (Innovation Management Strategy Formation model for Construction Materials Enterprises) — is developed. The model comprises the stages of diagnostics, strategic goal-setting, resource allocation, implementation mechanism, and monitoring-feedback. The findings serve as a basis for practical recommendations on institutionalizing innovation management at the enterprise level in the sector.

Keywords: innovation management, construction materials industry, strategic management, competitiveness, modernization, Kaizen, added value.

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Introduction

In the modern economy, the ability to manage innovative activity is a key factor in ensuring the sustainable competitiveness of industrial enterprises. The construction materials industry is one of the most dynamically developing sectors of Uzbekistan's economy: by the end of 2025, sector output reached 52.6 trillion UZS, and exports reached 1.2 billion USD, representing growth of over 40 percent compared to the previous year [1]. According to the sector association's leadership, export volumes have been growing rapidly in recent years [2]. In particular, cement production rose from 8

million tons in 2023 to 13.3 million tons in January–August 2025, an annual increase of 26 percent, with a total of 41 cement-producing enterprises currently operating in the country [3]. Ready-mix concrete production also reached 1.9 million tons in January–July 2025, up 27.7 percent from the corresponding period of the previous year [4].

At the same time, national leadership has specifically noted that the sector's quantitative growth is not being matched by qualitative indicators — innovative activity, energy efficiency, and the share of added value. At a meeting held on June 25, 2026, the President of Uzbekistan emphasized the need to direct sector enterprises not merely toward increasing output volumes, but toward technological modernization and the production of goods with higher added value [5]. Furthermore, the fact that 457 enterprises in the sector have accumulated overdue debt totaling 3.5 trillion UZS [6] serves as an indirect indicator of systemic problems in their strategic and innovation management systems.

This situation necessitates improving the scientific and methodological foundations for forming an innovative management strategy at construction materials manufacturing enterprises. The direct regulatory basis for the sector is Resolution No. PQ-365 of the President of the Republic of Uzbekistan, dated December 1, 2025, "On Measures for the Development of the Construction Materials Industry" [7], which sets targets to raise sector output to 62 trillion UZS and exports to 1.5 billion USD, to digitalize enterprise operations, to raise the share of environmentally clean, resource- and energy-saving materials to at least 25 percent from July 1, 2026, and to integrate production with scientific research. This Resolution builds on the earlier Resolution No. PQ-4335 of May 23, 2019, "On Additional Measures for the Accelerated Development of the Construction Materials Industry" [8]. To link these sectoral targets with overall innovation policy, the country's Innovative Development Strategy for 2022–2026, approved by Presidential Decree No. PF-165 of July 6, 2022 [9], is also in effect. However, concrete enterprise-level methodological mechanisms for implementing the tasks set out in these regulatory documents have not yet been sufficiently developed.

The purpose of this article is to investigate the theoretical and methodological foundations of forming an innovative management strategy at construction materials manufacturing enterprises and to develop a conceptual model applicable at the enterprise level.

LITERATURE REVIEW

The scientific foundation of innovation management theory was laid by J. Schumpeter, who described innovation as the principal driving force of economic development and introduced the concept of "creative destruction" into economic science [10]. P. Drucker treated innovation as a purposeful activity that can be systematically managed, identifying seven sources of innovative opportunity available to enterprises [11]. M. Porter emphasized the alignment of enterprise strategy with industry structure in shaping competitiveness and proposed the value chain concept [12]. C. Freeman developed the theory of national innovation systems, showing that the effectiveness of innovative activity depends on institutional interactions among the state, science, and industry [13]; this approach was later further developed through comparative analysis by R. Nelson [14].

In studying the diffusion of innovations, E. Rogers's theory of diffusion of innovations is of considerable importance, according to which the rate of adoption of

an innovation depends on factors such as its relative advantage, compatibility, and complexity [15]. H. Chesbrough advanced the concept of open innovation, substantiating the need for enterprises to actively draw on external sources of knowledge [16]. Among practical management methodologies, the Kaizen philosophy developed by M. Imai — an approach to improving quality and efficiency through continuous incremental improvements — is of particular practical significance for manufacturing enterprises [17]. I. Nonaka and H. Takeuchi, in their theory of knowledge creation, showed that organizational innovative capacity is formed through the mutual conversion of tacit and explicit knowledge (the SECI model) [18]. R. Kaplan and D. Norton's Balanced Scorecard is widely used to link strategic goals to operational indicators [19]. The OECD's Oslo Manual is recognized as the international methodological standard for the statistical measurement and analysis of innovative activity [20].

The above analysis shows that although innovation management theory rests on a broad scientific foundation, there is practically no systematized research in the form of a conceptual model specifically adapted to the sectoral characteristics of the construction materials industry (high energy intensity, dependence on raw materials, local market specifics, state regulation). This constitutes the scientific novelty of this article.

RESEARCH METHODOLOGY

The research employs a systemic-structural approach, comparative analysis, statistical analysis, and conceptual modeling. Official data from the Statistics Agency of the Republic of Uzbekistan and the sector association were analyzed to assess the current state of the industry. As a theoretical basis, the fundamental principles of strategic management, innovation management, and quality management (TQM/Kaizen) schools were synthesized.

As a result of the research, a five-stage conceptual model for construction materials manufacturing enterprises — IMSF-CME (Innovation Management Strategy Formation model for Construction Materials Enterprises) — was developed. The model comprises the following stages:

Stage 1. Diagnostics. The enterprise's internal innovative potential (level of technological equipment, share of R&D expenditure, staff qualifications) and external environmental factors (market, regulatory framework, competitive environment) are assessed using PESTEL and SWOT analysis tools.

Stage 2. Strategic goal-setting. Based on the diagnostic results, the enterprise's innovative development priorities (e.g., improving energy efficiency, mastering higher value-added product types) are identified and translated into operational goals following the logic of the Kaplan-Norton Balanced Scorecard [19], aligned with the sectoral targets set under Resolution No. PQ-365 [7] (raising output to 62 trillion UZS and exports to 1.5 billion USD).

Stage 3. Resource allocation. Financial, technological, and human resources are allocated among innovative projects according to priority level; in accordance with the open innovation concept [16], external technological partnership opportunities are also taken into account, including the science-production integration measures envisaged under Resolution No. PQ-365 [7].

Stage 4. Implementation mechanism. Based on the Kaizen philosophy [17], continuous improvement cycles (Plan–Do–Check–Act, PDCA) are applied to enterprise processes, with the SECI model [18] institutionalizing knowledge exchange among employees.

Stage 5. Monitoring and feedback. Implementation of the strategy is regularly monitored using innovation activity indicators developed in accordance with the recommendations of the Oslo Manual [20], as well as the environmental-energy indicators set under Resolution No. PQ-365 [7] (at least a 25 percent share of environmentally clean materials from July 1, 2026), with results feeding back into Stage 1 (closed-loop cycle).

RESULTS AND DISCUSSION

The sector's key statistical indicators for 2023–2025 are presented in Table 1.

Indicator	2023	2024	2025	Growth rate
Cement production, Jan–Aug (mln. tons)	8.0	10.5	13.3	+26.0%
Ready-mix concrete production, Jan–Jul (mln. tons)	n/a	≈1.48*	1.9	+27.7%
Annual sector output (trln. UZS)	n/a	n/a	52.6	—
Annual export volume (bln. USD)	n/a	n/a	1.2	>+40%
Overdue debt (457 enterprises, trln. UZS)	n/a	n/a	3.5	—

* The 2024 figure is an estimated value calculated from the 2025 volume (1.9 mln. tons) and growth rate (+27.7%, i.e., +423.3 thousand tons). n/a — not separately published by the source.

The data in the table show that production volumes (cement, concrete) in the sector have been growing steadily and at a high rate over the past two years, which is explained by the total of 12 billion USD in investment attracted to the sector over the past decade [6]. At the same time, national leadership's specific emphasis on the need to shift from volume-based growth to value-added-based growth [5] indicates that the existing management model is currently predominantly extensive (volume-oriented) in nature. This is also evident when comparing current output to the targets set under Resolution No. PQ-365 [7]: relative to the 2025 volume of 52.6 trillion UZS, the Resolution envisages raising output to 62 trillion UZS (approximately +18%) and exports from 1.2 to 1.5 billion USD (+25%), while simultaneously requiring that at least 25 percent of output consist of environmentally clean, energy-saving product types — a task that requires an innovation management approach capable of raising volume and quality simultaneously.

Furthermore, the fact that 457 enterprises have accumulated overdue debt totaling 3.5 trillion UZS [6] indicates that innovative-strategic management capacity is insufficient in a portion of the sector. This confirms that the first — diagnostic — stage of the proposed IMSF-CME model is of particular relevance for precisely such enterprises: financial rehabilitation programs [6] are only a short-term measure, while long-term stability can be ensured only through the introduction of an institutional innovation management system.

Thus, the research findings confirm, on the basis of real statistical data, the practical relevance of the theoretically substantiated IMSF-CME model: the sector's quantitative

growth potential is high, but a systemic management mechanism is required to convert this potential into qualitative (innovative) growth.

CONCLUSION

The research yields the following conclusions:

1. The current growth dynamics in the construction materials industry (26–28 percent annual growth in cement and concrete production) attest to the sector's high investment attractiveness, but this growth remains predominantly extensive in nature.

2. Based on an analysis of classical and contemporary strands of innovation management theory (Schumpeter, Drucker, Porter, Freeman, Rogers, Chesbrough, Imai, Nonaka-Takeuchi, Kaplan-Norton), a five-stage IMSF-CME model adapted to construction materials enterprises was developed.

3. The model was formed as a closed-loop system consisting of diagnostics, strategic goal-setting, resource allocation, implementation mechanism (Kaizen/PDCA), and monitoring-feedback stages.

4. Real indicators such as the high debt burden of 457 enterprises in the sector practically confirmed the priority of the model's diagnostic stage.

5. As a direction for future research, it is recommended to develop an integral index enabling quantitative assessment of the model (an innovation management index) and to pilot-test it using specific enterprises.

The practical significance of the scientific findings lies in their serving as a methodological basis for implementing, at the enterprise level, the tasks set out under Resolution No. PQ-365 [7] and the Innovative Development Strategy for 2022–2026 [9].

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