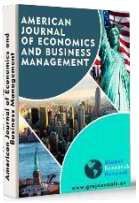

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Article

Methodological Basis of the Quality Management Concept System in Construction Industry Enterprises

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Abstract: This study addresses the need for enhancing international competitiveness in the construction sector through the implementation of ISO 9001-2015 quality management systems. Despite ongoing reforms, there remains a gap in the scientific and methodological understanding of how these systems can be effectively applied within the industry. The research aims to develop a methodological framework and practical mechanism for integrating quality management systems in construction enterprises, particularly in regional contexts. Using a qualitative approach, the study examines existing practices, identifies challenges, and proposes a structured model for quality control. The findings offer actionable insights for improving operational efficiency and aligning industry standards with global benchmarks.

Keywords: Quality management, Construction industry, Regional quality strategy, Quality management system.

1. Introduction

The wide spread of quality management systems is explained by their role in increasing the competitiveness of enterprises. Today, 1976 production enterprises of Uzbekistan have implemented quality management systems based on international standards, 1865 of themISO 9001 quality management standard, 42 - ISO 14001 environmental management standard, 43 - ISO 22000 food safety management standard [1]. Today, increasing the attractiveness of the construction market of Uzbekistan is the reason for the entry of many foreign project and construction companies. The main reason for this is the existence of a quality management system that meets international requirements in foreign companies.

The fact that the guarantee system of quality management in the field of construction did not allow to fully satisfy the demands of consumers is the basis for many errors and defects in construction objects. In the first half of 2024, only by the prosecutor's officeDuring the monitoring activities, it was found that in 338 cases, works worth 25.5 billion soums were performed with poor quality [2]. The attractiveness of investment offers from the international construction market is evaluated by the contractor's guarantee of quality, that is, the presence of an internationally certified quality management system.

In order to change the current situation, it is first necessary to increase the competitiveness of local construction companies in terms of quality. Based on these points of reference, we decided to focus on improving the theoretical mechanisms linking

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competitiveness in construction to quality. Analysis of the literature on the topic. Wide spread of quality management systems in real sectors of the economy is primarily the result of many years of scientific research and practical research devoted to quality management.

The theoretical foundations of modern quality management are the major representatives of this field of the 20th century, such as U. Shukhart, E. Deming, F. Crosby, Dj, Djuran, A. Feigenbaum, G. Taguchi, K. Ishikawa, Ya. Monden, A. Glichev and others. presented in works [3,4,5,6,7,8]. The results of their hard work are reflected in the ISO international quality standards of the International Organization for Standardization. Issues of quality assurance in the field of construction are addressed by Leonova T.I., Babarin M.S. Dikman L.G., Buzirev V.V., Volkova E.M. researches of scientists like [9,10,11,12]. Theoretical and practical aspects of competitiveness and quality management in construction industry enterprises are reflected in the works of the authors of this article.

2. Materials and Methods

The scientific assumptions of quality-based competitiveness improvement are based on:

a. Increasing the importance of the quality management system as part of global competitiveness factors in the construction industry. The main feature of the modern construction market is related to its departure from national borders. Implementation of large projects is determined directly on the basis of international tenders and open sales. It is becoming a national interest to become the world leader in the export of construction services. It is observed that construction services become a competitive system when combined with advanced project ideas, modern construction materials, qualified personnel and effective techniques and technologies;
b. Acceleration of investment flow and increase of its share in the world product. The growth of capital flows between countries is explained by the insufficient investment capacity of the country's economies and the low level of domestic income compared to exports. In addition, the growing importance of customs barriers in the international circulation of goods leads to the wide use of international investments. As a result, there are positive changes in the volume and composition of investments in fixed capital;
c. Increasing the practical importance of the achievements of the theory of competitiveness in terms of quality. Over-reliance on price, costs and market behavior in market concepts of competitiveness is causing the influence of external factors to increase in construction companies. At the same time, many scientific studies have been conducted to create a competitive advantage through high quality, and they are successfully applied abroad. International standards of the ISO-9000 series, known throughout the world, have been introduced in the industry since 1979 and are constantly being improved to this day.

3. Results and Discussion

The nature of quality management in construction is that the achievement of a standard quality level does not guarantee the elimination of a defect [13]. In the process of fulfilling the requirements contained in the set of norms and rules in the construction industry, cases of non-compliance with them are more common than in other industries. There are several reasons for this:

1. Firstly, the location and nature of defects in construction products are different. The defect may arise from the normative document, be observed in the project, appear due to the construction material, be allowed during construction production, or even appear during the initial operation of the object;

2. Secondly, the concept of "defective product" is not clarified in the regulatory requirements for construction. In many cases, the corrected product is also recognized as being of good quality, or meeting the requirements;
3. Thirdly, the uncertainty of the scope of responsibility for the defect. In this case, the person responsible for the occurrence of the defect is difficult to be held responsible, and usually the person responsible for the stage at which the defect was detected is found guilty;
4. Fourth, lack of a systematic approach to the normative level of quality. This may be caused by the fact that the defects are not interconnected from a functional point of view, the cause-and-effect chain is broken, and the methodological aspects of defect monitoring;
5. Fifth, the lack of scientific basis of the concept of quality improvement. Quality management in today's construction industry is based on the concept of defect elimination, that is, it is subordinated to the goal of preventing the occurrence of defects in the final construction product, that is, the main goal of construction is to correct defects and deliver a product that is suitable for the consumer. Therefore, it will not be beneficial for the construction entities to fulfill the standard requirement in excess, both from the legal and economic point of view. This concept is contrary to continuous development, because the highest level of quality is a requirement set in the standard.

The world's leading construction companies are already operating on the basis of the concept of quality improvement. The basic idea here is that the result achieved today must necessarily be the impetus for development, that is, there is no high level of quality and it must be constantly improved.The concept of quality improvement is widespread in the industry, and a lot of experience has been accumulated in its application. In particular, integrated quality management systems based on international standards of the ISO 9000-2015 series are an important step in continuous quality improvement [14].

Among these standards, several models that have been formed over the years can be distinguished, including "Schuhart-Deming's RDSA cycle", "First delivery acceptance", "Zero defect", "Statistical control tools", "Quality costs", "Pareto diagram", " Six Sigma", "Quality Circles", "Total Quality Management", "Kaizen" models. Each of the models is dedicated to the foundation and development of a separate part of the quality management methodology, and its integrated application is the basis for continuous improvement of product quality.

An important condition for the practical application of the concept of quality improvement is the compliance of the industry with the quality strategy in the region. The essence of this condition is that the effectiveness of this concept will not be sufficient in a separate construction (design) organization, in which case it must be recognized as a component of the regional quality strategy (Fig. 1).

The development of methodological foundations of quality management in construction is based on the following scientific conclusions:

a. The activity of entities in the field of construction is connected to the investment-construction chain;
b. The quality strategy of an individual enterprise is derived from the quality strategy of the region and industry;
c. All construction entities have separate links of quality management or in this form;
d. The quality management system of any construction entity corresponds to a certain algorithm.

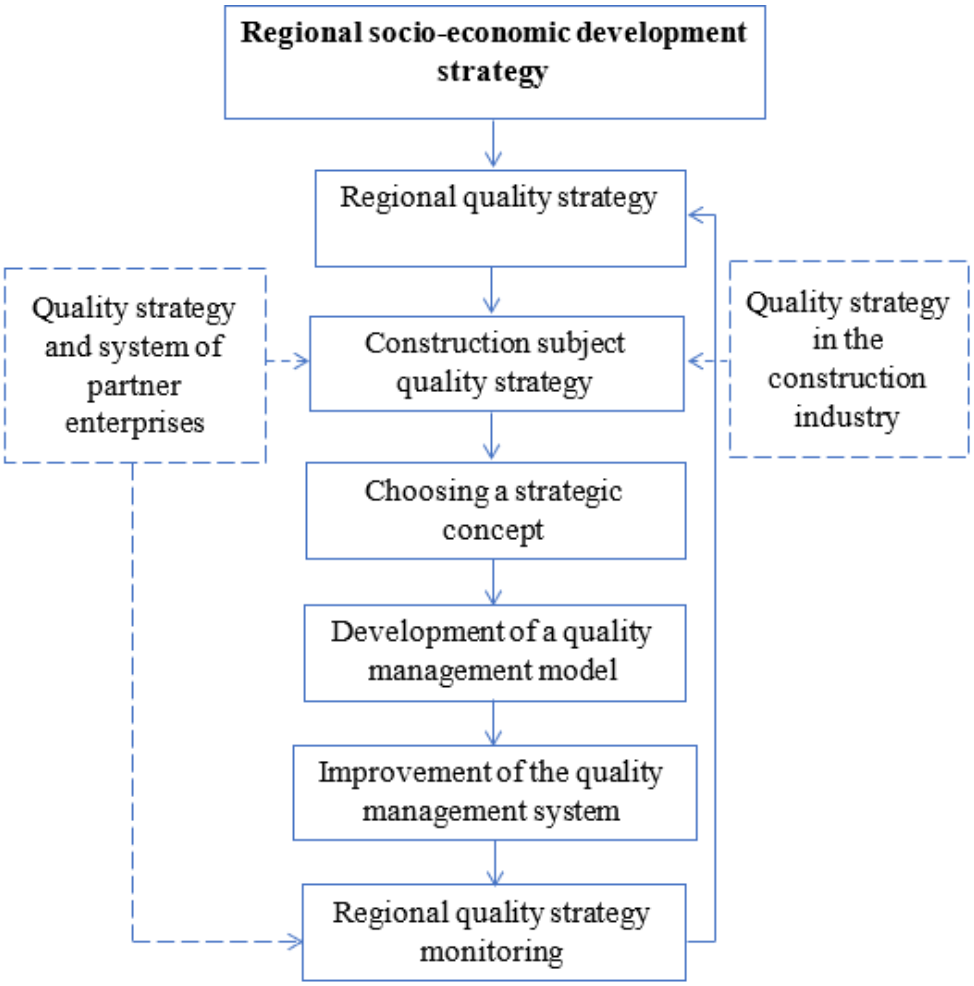

Figure 1. Methodological approach of quality management in enterprises and organizations of the territorial construction complex.

In the scheme presented in the figure above, the quality strategy of the region serves to fulfill its socio-economic development strategy, that is, it is focused on increasing regional competitiveness. The structure of the scheme aims to reveal what quality management is, what it depends on, and how it works. Its starting point and end point is the regional quality strategy.

Scientific-practical methods, tools and mechanisms should be completed for the formation of quality management in accordance with the concept in construction complex enterprises and organizations. The following scheme is dedicated to expressing the general mechanism of quality management improvement in project and construction organizations (Figure 2). Let's focus on the main joints of this mechanism.

Development of a quality policy consistent with the concept shows the perspective of improving the efficiency and quality of the organization's management. This section focuses on explaining the purpose of quality management to all interested parties, especially the work team. The ISO 9001-2015 international standard serves as a starting point for quality policy improvement. Even if the organization is not inclined to move to the ISO 9001 standard, it is necessary to develop a quality policy. The quality policy of the organization confirms the strictness of the chosen path, the responsibility and competence of the leader.

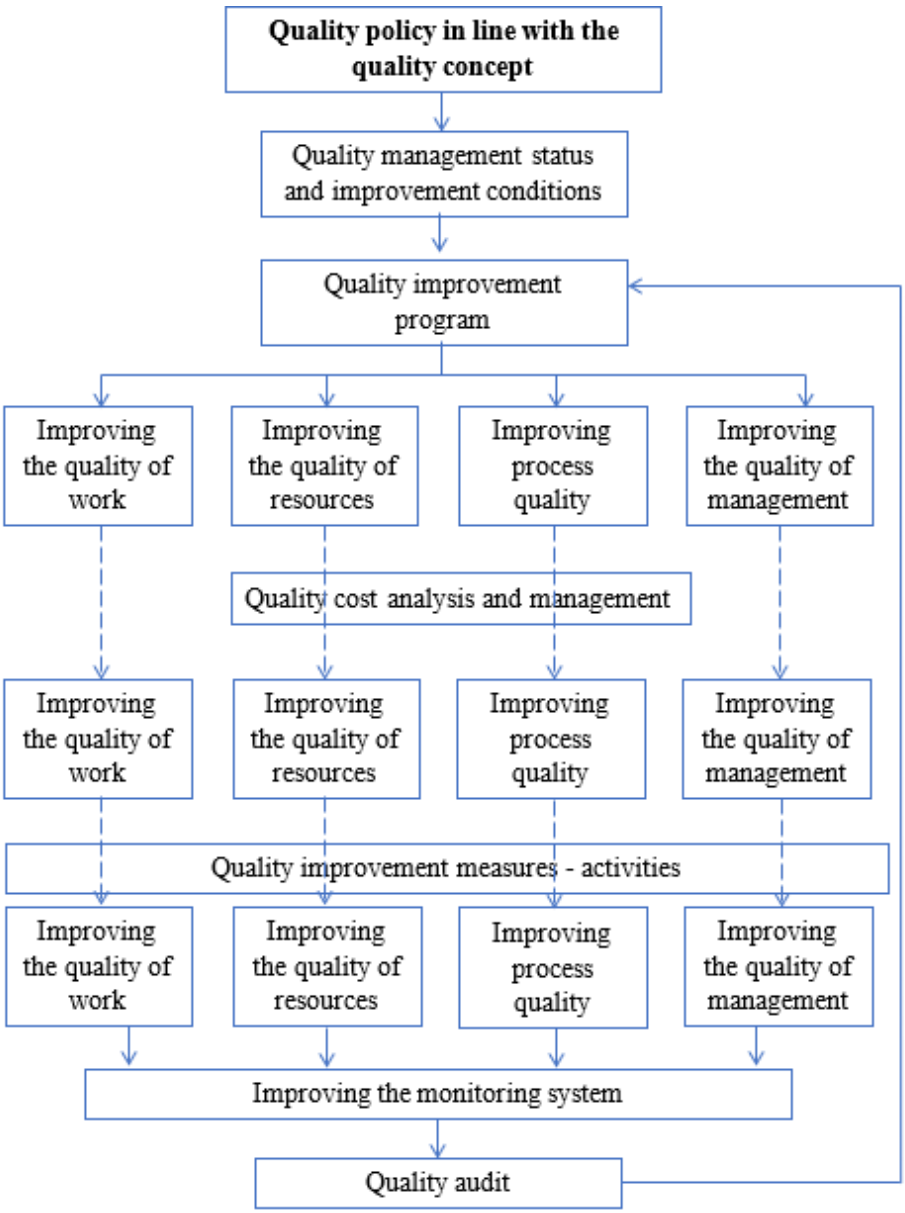

Figure 2. Quality management system improvement mechanism.

An integral part of quality management, the analytical link should show opportunities and limitations in improving the system. It depends on the objective assessment of the state of quality management when choosing the uniqueness of the organization's quality management system compared to others. This can be compared to the case where the finish point of the competition is the same, that is, an internal quality assurance system is created, but the starting points of the participants are different. In-depth analysis and objective assessment of available opportunities ensure the viability of a quality improvement program.

Another aspect of the mechanism to consider is the specific research and management of quality improvement facilities. Acknowledging the main principles of the process approach, we want to show the need for different approaches to different elements of organizational capacity in improving quality.

In the investment-construction chain, the quality of work or the fulfillment of requirements by workers serves as the most important factor. The reason for this is, firstly, the high labor capacity in the project-construction process, and secondly, the individuality of working conditions. Even small-scale work operations have to be performed in the same facility under different conditions. Therefore, the direction of improving the quality of

work differs significantly from others. Similarly, improving the quality of resources, processes and management also requires the development of specific principles.

A highly discussed part of this mechanism is the continuous improvement of the monitoring system. This section serves as the main tool for evaluating quality improvement and improvement of the quality management system.

Positive aspects of the proposed model for construction industry enterprises include:

a) in each of the three stages, the problem becomes more detailed, that is, it goes down from the general goal to a specific method;
b) basing on the "value of quality" at all stages of quality improvement, that is, linking quality to cost;
c) comprehensive evaluation of the quality characteristics of the construction product, that is, determining the collective effect of defects rather than individual defects;
d) application of the concept of quality improvement at all stages of the construction complex. The proposed model is universal and can be used in design and construction, construction industry, construction works, even at the stage of acceptance of buildings;
e) the relativity of the standard level of quality, that is, the increase after each action.

In the region, the quality strategy of construction, the concept of quality management, and the mechanism of improving quality management form an integral methodological unit of the quality management system in enterprises and organizations of the construction industry.

4. Conclusion

The findings of this research underscore the pivotal role of quality management systems (QMS) in enhancing the competitiveness of construction enterprises. The study reveals that while Uzbekistan's construction sector has made strides in adopting international standards like ISO 9001-2015, significant challenges remain in fully integrating quality improvements across all stages of the construction process. This includes the systematic identification and correction of defects, the regional alignment of quality strategies, and the consistent application of quality improvement models. The implications suggest that construction enterprises must move beyond compliance with basic standards towards continuous quality enhancement to remain competitive in the global market. Further research is recommended to explore more dynamic and integrated approaches for quality management in construction, particularly in how regional socio-economic strategies can better align with enterprise-level quality initiatives for sustained competitiveness.

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