

Influence of Quality Management Practice on Quality Performance in Construction Enterprises

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Abstract: The quality of engineering projects has always been related to the stability of people's livelihood. At the same time, the quality of construction enterprises is also an important part of the country's realization of a quality power. With the continuous progress and development of urban construction, enterprises have more and more requirements for the effectiveness of quality management practice. This study explores the connotation and division of quality management practice of construction enterprises, analyzes the measurement perspective of quality performance, and summarizes the influence of quality management practice of construction enterprises on enterprise quality performance, which provides theoretical reference for the effective implementation of quality management practice and the improvement of enterprise performance in the future.

1. Introduction

The overall trend of quality in China is stable and good under the long-term efforts, and high-quality development is bound to be the key to adhering to the principle. However, with the continuous innovation of technology, the structural imbalance of supply and demand in the real economy has become increasingly prominent. In the future, as an important member of the real economy, construction enterprises will continue to participate in high-quality urban construction and urban-rural transportation and other livelihood facilities renovation projects, and take the construction of a hundred-year project as the goal. Therefore, how to achieve substantive breakthroughs under the trend of supply-side reform is the core issue of construction enterprises.

To achieve and maintain high performance is the ultimate goal of continuous optimization and improvement of quality management. Therefore, the relationship between quality management practices and enterprise performance has been highly valued. Quality management practice refers to a series of management practices and measures taken by enterprises to improve business quality and reduce business risks and costs. Specifically, quality management practice is the implementation of effective quality management measures contained in TQM and ISO9000. It mainly includes enhancing the reliability of leadership commitment, formulating a sound quality strategy plan, enhancing customer attention, paying attention to project process management, paying attention to and analyzing quality information^[1]. Many research results show that there is a significant positive correlation between quality management practice and enterprise performance. Comprehensive

optimization of quality management practice helps to improve the quality performance and operation performance of enterprises and consolidate their competitiveness^[2].

Scholars believe that the quality management of construction enterprises has serious human impact, material irregularities and incorrect construction methods. For a long time, the quality management practice of most construction enterprises is composed of the management and control decisions of construction enterprises on project quality. Therefore, it is necessary for construction enterprises to strengthen the scientific nature of quality management practice by studying the influencing factors of quality management practice on quality performance, and promote the quality management of construction enterprises to be more effective. At present, there are many studies on the influence path between QMP and corporate performance, and different scholars have different definitions of the elements of quality management practice. Based on this, this study summarizes the effectiveness of quality management practice enterprise performance by combing the relevant literature.

2. Practice connotation and division of quality management

2.1. The connotation of quality management practice

In order to enhance competitiveness and expand product income, enterprises will optimize product quality and production costs, and a series of measures taken by enterprises are the quality management practice of the enterprise itself. Li et al.^[3] pointed out that quality management practice (QMP) is the implementation of all effective quality management measures to solve specific quality problems contained in TQM and ISO9000. The concept comes from scholars discussion of quality in their respective classic literature, and the theoretical framework comes from excellent performance models such as American and European Quality Awards. Based on relevant concepts, this study defines the quality management practice of construction enterprises as a collection of quality management optimization measures adopted to improve construction efficiency, customer satisfaction, engineering quality and enterprise competitiveness.

In the early studies, scholars paid attention to the relationship between QMP and corporate performance. With the continuous progress of quality management research, scholars integrated the model, subdivided the mediating effect of quality performance in the path between QMP and corporate performance, and studied the influence relationship between the three. Recent studies have pointed out that not all quality management measures can achieve remarkable performance improvement for enterprises. In the process of quality management, the implementation of ineffective quality management measures will also bear the risk of reducing employee enthusiasm and damaging the overall quality of the project. Therefore, with the continuous development of technological innovation, enterprises need to carefully implement quality management measures to ensure effective management to achieve target performance, so as to expand their market share and improve competitiveness.

2.2. Division of quality management practices

Barbara et al.^[4] investigated the impact of total quality management on performance and competitive advantage, tracked the evolution of ten years, and analyzed the positive role of total quality management practice in promoting enterprise performance and competitiveness. Through the practice of total quality management, the enterprise will achieve better results in customer satisfaction, employee status, product quality and production performance compared with other enterprises. At the same time, enterprises have greater competitive strength in market share, customer reputation and enterprise performance.

In recent years, with the continuous development of quality management research, quality management practice has also evolved new connotations. Jiang et al.^[2]Based on the environmental support and direct improvement measures of quality performance, the quality management practice is divided from the core and basic perspectives. Among them, the core part includes process design and control, statistical-based control and feedback. The basic part includes supplier relationship, human resources, leadership support, etc. Jiang et al.^[5]divided QMP into eight dimensions : manager leadership, quality improvement strategy, supplier management, customer attention, human resource management, project process management, information collection and analysis and project design. Xiong and Feng^[6]based on the framework of the Puerto Ricci National Quality Award, divides the implementation of quality management into soft elements and hard elements. Among them, leadership commitment, strategic management plan, human resources management, customer relationship management is classified as QMP soft elements , classify items process control, project data management and technology implementation as QMP hard elements. QMP soft elements can create a stable and reliable working environment for project employees to have a positive effect on employees psychology and promote employees to actively participate in the project. The core of QMP hard elements is to follow the structured problem solving mode, improve project production efficiency, reduce quality fluctuation and promote enterprise quality improvement through management analysis.

Based on the relevant literature^{[5],[6]}, the quality management practice can be divided into : QMP core elements and QMP basic elements. Among them, the core elements include project process management, information control and analysis,basic management elements include human resources, customer relationships and leadership behavior. The core elements of QMP are the production management in the project process to ensure the stability of production quality. The basic elements of QMP are environmental management in the project process, paying attention to the wishes of customers, employees and leaders, and contributing to the improvement of project quality.

3. Connotation and Measurement of Quality Performance of Construction Enterprises

3.1. Connotation and measurement of enterprise performance

Prajogo and Brown^[7]compared organizations with and without formal quality management practice plans through empirical analysis, and found that there was no significant difference in quality performance between the two. Through the survey, it is found that organizations adopting formal quality management practice plan will not widen the gap with other organizations without specific implementation of quality management practice. For enterprises, it is important to adopt quality practice rather than practice plan itself. Improving product quality and optimizing product service is the ultimate goal of quality management practice. Enterprises have been pursuing to reduce production costs and improve quality output. Therefore, the effective implementation of quality management practice will have a positive impact on improving enterprise performance.

For enterprise performance, Li et al.^[3]use enterprise financial situation, product sales, project market share and market share growth four indicators to evaluate enterprise performance , Song et al.^[8] selected asset returns, sales profits, sales growth rate, market share and market growth five indicators to evaluate , Zhang^[9] used the return on total assets and earnings per share to evaluate corporate performance. Xiong and Feng^[6] mainly from sales growth and income, total profit and growth four angles to evaluate enterprise performance. At present, the measurement of enterprise performance is not rich, and it can be considered from other angles in the future.

3.2. Connotation and measurement of quality performance

Jiang et al.^[2] elaborated the concept of quality performance, the quality performance is understood as the organization's quality performance, describes the quality performance including external quality performance, internal quality performance, project quality performance and process quality performance. In view of the improvement of the effectiveness of quality management practice, the quality performance of enterprises will also change accordingly. This study defines quality performance as : the achievements of effective quality management are also the results of the implementation stage of quality management.

For the measurement of quality performance, some scholars divide quality performance into internal performance and external performance. Song et al.^[8] divided external quality performance into product quality and customer satisfaction , quality internal performance is divided into product quality standard degree, design quality and consistency quality. In the empirical stage, three indicators of product acceptance qualification rate, product durability and product reliability are selected to evaluate internal quality performance. The three indicators of product use, customer satisfaction and product delivery quality are selected to evaluate the external quality performance. Yi et al.^[10] evaluated the internal quality performance through the standard, design and consistency of the project products , evaluate external quality performance through customer satisfaction.

At present, some scholars evaluate quality performance from the perspective of production process. Li et al.^[3] used the qualified rate of quality, guarantee cost, total cost and defect level as the evaluation index of quality performance and emphasized that managers must focus on the changes of these four indicators. Reducing the guaranteed cost of quality, improving the qualified rate, stabilizing the total cost and increasing the competitive advantage of enterprise quality through quality management practice will play a key role in improving enterprise performance. Xiong and Feng^[6] measured quality performance through four indicators : product stability, qualified rate, industry competition defective level and quality assurance cost. Lu and Zhou^[11] believed that six indicators of product, process, customer, employee, supplier and financial performance jointly evaluate quality performance. At the same time, the quality performance model includes five indicators : internal, external and other quality, profitability and productivity. Among all the similar performance evaluation models, ISO9004 and the three international quality award standards MBNQA, DAP and EQA are widely recognized quality performance evaluation models.

According to the literature research, the evaluation of quality performance is divided into : core quality performance and basic quality performance. Among them, core quality performance includes design quality and product standard consistency quality , basic quality performance includes customer satisfaction and product qualification rate. It influences core quality performance and basic quality performance through core quality management practice and basic quality management practice.

4. The effect of construction enterprise quality management practice on quality performance

Jiang^[2] and Liu et al.^[12] has proved that quality performance is the intermediary between quality management practice and enterprise performance, and the effect of quality management practice on enterprise performance is not obvious. Forker^[13] believes that quality performance is affected by internal operation practice and the relationship between enterprises and suppliers, among which internal operation practice is the practice of enterprise quality management. Specifically, the effective implementation of quality management practice can reduce project process losses, improve project qualification rate and improve the overall level of enterprise projects.

Liao et al.^[1] Combined with Chinese construction status, identify leadership, customer awareness, employee motivation, information analysis, process management, supplier management,

continuous improvement of a total of seven key practices to establish a conceptual model of the impact of construction enterprise quality management practices on project quality performance. The results of structural equation model analysis show that quality management practice has a direct and indirect impact on project quality performance. Among them, leadership and process management have an important impact on project quality performance. Some scholars through interviews with professionals in construction enterprises and retrieval of relevant literature found that the ability of project managers, the interaction between project participants and other factors significantly affect quality performance, lack of knowledge, the intensity of competition and other factors has a negative impact on quality performance^[14].

Through literature analysis and summary, construction enterprise quality management practice significantly affects quality performance. Among them, the influence of construction enterprise quality management practice can be divided into core influence and basic influence.

4.1. Core influence

Project process management. QMP realizes continuous improvement and correction of products through project process management, which can improve the design quality of products. Chen et al.^[15] proposed that there are two main ideas and methods for project process management. One is the use of network technology methods, including network planning, the other is the use of control theory, management and implementation for each stage of project production.

Statistical control and information analysis. With the development of science and technology, project management has also entered the era of big data. Compared with the traditional quality management relying on managers' knowledge and experience, the current project management environment has undergone tremendous changes. In the face of complex and changeable information age, statistical analysis and prediction of information can effectively enhance the stability of production process and promote the quality consistency of product standards. Yang et al.^[16] proposed that the core goal of big data analysis is to create value for customers. The main contents of big data methods such as statistics include identifying market demand, product R & D and manufacturing, and supply chain management. The R & D process is the key to achieving project value.

4.2. Basic influence

Customer relationship management. The improvement of competitiveness can bring profits to transactions. Therefore, the ultimate goal of improving quality performance is to improve the competitive strength of enterprises, but the improvement of competitiveness has always been difficult for major enterprises. From the perspective of social environment, transforming the improvement of competitiveness into the improvement of customer satisfaction can reduce the difficulty of enterprises in improving competitiveness to some extent. Rozitta^[17] points out that companies can earn and maintain customer loyalty by adopting customer relationship management (CRM) systems. Enterprises use the system to record various interactive behaviors between products and customers in the market, and convert them into relevant information data and analyze them. The analysis results can provide support and reference for enterprise decision-making. Therefore, scientific customer relationship management can protect the favorable position of enterprises in the market, improve the reputation of enterprise products, and then enhance the competitiveness of enterprises.

Human resources management. Zhang^[18] pointed out that performance is profit, compared to performance itself, employees pay more attention to the fairness of performance distribution. Therefore, enterprises in the way of human resources management should focus on performance

appraisal and management and to ensure the establishment of scientific performance appraisal indicators to ensure the reasonable implementation of the assessment. Among them, enterprises need to meet two key elements. First, clear the strategic objectives of business operations, second, enterprises should fully understand the position situation, effective human resource management is an important prerequisite for enterprises to provide performance.

Leadership behavior. In enterprises, entrepreneurs have leadership powers such as allocating resources, formulating strategic planning and production management, so their leadership behaviors have an important impact on the quality performance of enterprises. Therefore, the study of leadership behavior and the optimization of leadership practice efficiency is the focus of improving enterprise performance.

Wu and Zhang^[19] proposed that Chinese enterprises have a family structure in form, and in the changing environment, the internal enterprises are also moving towards more modernization and institutionalization with the society. Therefore, the traditional leadership model is also facing challenges. Facing the fluctuation of market environment, how to make the best decision in time, adjust the leadership mode reasonably and implement scientific management is an important subject for enterprises. Chen and Zhou^[20] divides leadership behavior according to relationship, reform and task and constructs a model, proposing that leadership behavior affects organizational performance through organizational learning ability. Through empirical analysis, the influence of reform orientation, relationship orientation and task orientation on leadership behavior decreases in turn.

5. Effect of Quality Management Practice on Quality Performance

Existing research shows that the quality management practice of construction enterprises has a direct and indirect impact on quality performance.

5.1. Main effect

Yi et al.^[10] proposed that supply chain relationship plays a moderating role between quality management practice and quality performance. Compared with cooperation with a large number of unfixed suppliers, the establishment of long-term stable cooperation between enterprises and fixed suppliers can produce more quality performance. At present, the proportion of purchasing cost to total cost is gradually increasing. Stable supply cooperation can effectively reduce the purchase cost of enterprises and improve the quality performance of enterprises.

5.2. Mediating effect

Jiang et al.^[2] put forward three basic modes of QMP's influence on quality performance, which are complete mediation effect, partial mediation effect and combined effect. Only when the core practice of quality management that is the process of project production is guaranteed, the basic practice of quality management can promote the core practice of quality, and then have a positive effect on the quality performance of enterprises.

6. Future research prospects

According to the literature review, the research on quality performance is booming. As an important factor affecting quality performance, the related research on quality management practice is also developing and evolving. Construction enterprises play an important role in the process of realizing quality power in China. Studying the influence of construction enterprise quality management practice on quality performance plays an important role in the development of enterprise quality in

China. At present, most of the literature focuses on the influence of enterprise quality management practice on quality performance, and there are few studies on the measurement of quality performance. This study argues that the future can be considered from multiple perspectives to evaluate enterprise quality performance^{[21]-[23]}. Secondly, in view of the remarkable influence of quality management practice on enterprise performance and quality performance, the future research on the effectiveness of quality management practice can be increased.

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References

- [1]Liao Q Y, Zhu X and Lu K. (2018) *Research on the Effect of Quality Management Practices of Construction Enterprises on Project Quality Performance*. *Construction Economy*, 39(04), 59-65.
- [2]Jiang P, Su Q, Dang J X and Liu Q. (2009) *An Empirical Study on the Influence Mechanism of Different Types of Quality Management Practice and Enterprise Performance*. *China Soft Science*, 07,134-143.
- [3]Li Z, Su Q and Song Y T. (2008) *An Empirical Study on the Influence Mechanism of Quality Management Practice on Enterprise Performance*. *Science Research Management*, 01, 41-47.
- [4]Barbara, B, Flynn, Roger G, Schroeder, Sadao and Sakakibara. (1995) *The Impact of Quality Management Practices on Performance and Competitive Advantage*. *Decision Sciences*, 26(5), 659-691.
- [5]Jiang P, Su Q and Zhang P W. (2013) *A Research on The Relationship Model between Quality Management Practices and Firm Performance: Expanding Knowledge Route's Perspective*. *Studies in Science of Science*, 31(06), 904-912.
- [6]Xiong W and Feng X B. (2012) *An Empirical Investigation into the Relationship between QMP and Performance with Firm Characteristics as a Variant*. *Journal of Zhejiang University (Humanities and Social Sciences)*, 42(01), 188-200.
- [7]Prajogo D I and Brown A. (2004) *The Relationship Between TQM Practices and Quality Performance and the Role of Formal TQM Programs: An Australian Empirical Study*. *Applied Physics Letters*, 76(18), 2615-2617.
- [8]Song Y T and Su Q, J P. (2011) *The Effect of Relationship Quality on Quality Management Practice and Performance*. *Science Research Management*, 32(04), 69-75+85.
- [9]Zhang Z T. (2007) *Top Management Team Collaboration Needs, Pay Gap and Firm Performance: A Perspective of Competition Theory*. *Nankai Business Review*, 02, 4-11.
- [10]Yi L, Tao J P and Tan C F. (2017) *The Impact Mechanism of Quality Management Practice on Quality Performance under The Effect of Supply Chain Relationship Quality: Based on Survey Data from 448 Hubei Enterprises*. *Economic Management Journal*, 39(10), 110-127.
- [11]Lu S D and Zhou G H. (2014) *Study on Performance Measurement Model of Construction System Quality Based on BN Method*. *Science and Technology Management Research*, 34(23), 30-34.
- [12]Liu Q, Shi L P and Su Y. (2015) *Influencing Factors of Quality Defect Management and Its Mechanism on Quality Performance: Research Status and Trends*. *Technology Economics*, 34(07), 92-99+107.
- [13]Forker L B. (1997) *Factors affecting supplier quality performance*. *Journal of Operations Management*, 15(4), 243-269.
- [14] Jha K N and Iyer K C. (2006) *Critical Factors Affecting Quality Performance in Construction Projects*. *Total Quality Management & Business Excellence*, 17(9), 1155-1170.
- [15]Chen J H, Lin M and Ma S H. (2005) *Multi-objective Dynamic Control Mechanism Model of Engineering Project Based on Process Management*. *Chinese Journal of Management Science*, 05, 95-101.
- [16]Yang Q, Wu G N and Wang L Z. (2017) *Big data: A new perspective of the engineering project management driven by data*. *Systems Engineering-Theory & Practice*, 37(03), 710-719.
- [17]Rozitta Chittai. (2012) *Customer Relationship Management and Business Strategies*. *International Journal of Organizational Leadership*, 1(1), 13-22.
- [18]Zhang W Q. (2009) *Effective Setting and Implementation of Performance Appraisal Index*. *Scientific Management Research*, 27(05), 62-66.

- [19]Wu Y and Zhang B J. (2021) *Development and Prospect of Traditional Authoritative Leadership in the Process of Modernization. Gansu Social Sciences*, 05,185-190.
- [20]Chen G Q and Zhou W. (2009) *A Study on the Relationship Among CEOs' leadership Behavior, Organizational Learning Capability, and Organizational Performance. Science Research Management*, 30(05), 148-154+186.
- [21] Dow D, Samson D and Ford S. (1999) *Exploding the Myth: Do All Quality Management Practices Contribute to Superior Quality Performance?. Production & Operations Management*, 8(1), 1-27.
- [22]Wei G C and Xu J G. (2011) *The Influence of Service Management Institutional Factors on Logistics Companies Service Performance. Economic Management*, 33(08), 60-66.
- [23] Zehir C, Znur Gülen Ertosun, Zehir S and Büra Müceldilli. (2012)*Total Quality Management Practices' Effects on Quality Performance and Innovative Performance - ScienceDirect. Procedia - Social and Behavioral Sciences*, 41(41), 273-280.