

## Review Study on Factors Affecting Quality Management on Organisational Performance in Construction Industry

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### Abstract

Under the contemporary background of globalization and informationization, the construction industry, as a key pillar industry of the national economy, has been deeply interacting with the globalized resource allocation system and the information technology revolution. The effectiveness of the construction quality management system is not only directly related to the resilience of the whole life cycle development of the construction enterprise, but also the bottom line guarantee for the safe operation and maintenance of the project and the core constraints for the intensive utilization of resources. The new situation of accelerated technological progress and diversified market demand structure makes the innovation of quality management paradigm become the strategic pivot point for construction enterprises to build differentiated competitive advantages. By systematically sorting out the existing research results, accurately condensing the theoretical breakthroughs and practical contributions, and at the same time deeply analyzing the cognitive blind spots and methodological defects in the existing research paradigm, it has important theoretical value and practical significance for perfecting the governance framework of quality control, constructing the dynamic and optimized management model, and promoting the upgrading of the industrial value chain. The study will focus on the latest ideas such as digital transformation and green building concepts, and take into account regional and cultural differences, and incorporate research results from international perspectives, in order to promote the improvement of the theory and practice of quality management in the construction industry. In the study of quality management influencing factors on organizational performance in the construction industry, the main text contains the following aspects: first, the theory of quality management influencing factors on organizational performance in the construction industry in foreign countries. Second, the theory of quality management influencing factors on organizational performance in China's construction industry. Third, the latest theories on the influence of quality management on organizational performance in foreign construction industry. Fourth, the latest theories on the impact of quality management on organizational performance in the domestic construction industry. Research results show that construction quality control has broken through the traditional quality assurance category and become a core strategic element of enterprise competitiveness enhancement. International research confirms that a perfect quality mechanism can not only guarantee the achievement of project goals, but also build a sustainable competitive advantage through the optimization of resource allocation and risk prevention and control. Domestic research has found that there is a synergistic effect between quality innovation and technological innovation, and the integrated application of new technologies, intelligent means and green materials can form product differentiation while improving quality, such as BIM technology has been verified as an effective path to improve quality and efficiency. Cross-regional studies point to a key strategy: construction companies need

to build a multi-dimensional quality control system, integrating basic control and innovation drive. Facing the challenges of technology iteration and digital transformation, enterprises should establish a dynamic optimization mechanism to achieve system adaptive evolution through intelligent monitoring and data decision-making. This management upgrade not only meets the market demand for high-quality products, but also helps enterprises to occupy an advantageous position in the industrial change.

## Keywords

Quality Management; Organizational Performance; Influencing Factors; Theory; Innovation.

### 1. The Main Research Results at Home and Abroad on the Factors Affecting Quality Management on Organizational Performance in the Construction Industry

Construction industry since the early 20th century, with the rise of Taylor's scientific management theory, quality control has gradually become an important issue of enterprise management. With the current promotion of Total Quality Management (TQM) and ISO 9000 series standards, as well as the introduction of management methods such as Lean Construction and Six Sigma in recent years, the theory and practice of quality management in the construction industry have been continuously enriched and improved. At present, the increasing global demand for high-quality, high-efficiency and sustainable construction products has prompted the construction quality management research to develop in the direction of more refinement and intelligence.

The systematic research on construction quality management runs through the whole life cycle of the project, covering the stages of pre-planning, program design, material procurement, on-site construction and later operation and maintenance, with a focus on the path of improving management efficiency. The core is to build a dual mechanism of quality assurance and efficiency improvement through process reengineering, technological innovation and talent cultivation and other multi-dimensional initiatives. Research has confirmed that effective quality control not only ensures compliance with engineering standards, but also achieves cost savings through optimal allocation of resources, process innovation and other paths, and simultaneously strengthens the enterprise's market competitiveness. This kind of systematic management thinking integrates the quality objective and enterprise strategy in depth, providing key support for the sustainable development of the construction industry.

This paper adopts the method of literature analysis, which is a common and effective analytical approach in exploring the review studies on the factors affecting quality management on organizational performance in the construction industry. The core of this approach lies in systematically sorting out and refining the development of quality management theories and comparing the views and information in different literatures in order to construct a more complete and systematic research framework.

By sorting out the development of quality management theories, refining key ideas and information, and comparing and analyzing the similarities and differences between different literatures, a more complete and systematic theoretical framework for review research is constructed. This framework provides a strong guidance for practice, helps construction enterprises to better implement quality management strategies, and provides useful references and insights for future research.

Existing theoretical studies have broken through three major core issues: first, the effectiveness analysis theory clarifies the optimization path of quality strategy on key project indicators; second, the best practice theory refines the core elements and promotion value of successful cases; and third, the quality-performance correlation theory reveals the decisive role of management on economic efficiency and sustainable development. By systematically sorting out the research results at home and abroad, revealing the progress and limitations of the current research on the factors affecting the organizational performance of quality management in the construction industry, analyzing the key contradictions and proposing a path to break them down, we provide a theoretical framework and empirical evidence for the Research on the Impact of Quality Management on Organizational Performance in the Construction Industry of Chifeng City, Inner Mongolia.

Research on the association between quality management and organizational performance in the construction industry faces five core challenges: first, the data collection and integration process is complex and cumbersome, and the heterogeneous data from multiple sources is significant; second, there is insufficient research on the long-term impact, and the existing results are mostly focused on the short-term effect; third, the indicator system is heterogeneous, and the difficulty of cross-project comparison increases; fourth, the quality-performance role paths are multifarious and intertwined, and the inference of a single causality is difficult; fifth, the management paradigm differences between organizations affects the generalization of the conclusions. There are significant differences in management paradigms between organizations, affecting the universality of conclusions.

To sum up, the research on the factors affecting the quality management of the construction industry on organizational performance has a long way to go, and it is necessary for scholars at home and abroad to make more research on this issue, and give further improvement to this issue on the research results of the predecessors, so as to provide more and better theories and practices for the factors affecting the quality management of the construction industry on the performance of the organization, and to make contributions to the development of the construction industry.

### **1.1. Theories on the Factors Influencing Organizational Performance of Quality Management in the Construction Industry in Foreign Countries**

The international academic community has continued to focus on research on the impact of construction quality on organizational performance, and has made significant progress in the construction of theoretical frameworks and practical validation, but still faces key challenges: cross-sectional data dependence leads to limited explanatory power, insufficient cross-regional samples affects the universality of conclusions, the quality-performance mapping relationship is not yet clear, and there is insufficient research on the dynamics of long-term impacts.

1) Johnson & Rosenthal's (2005) study reveals that construction quality significantly contributes to customer satisfaction and brand loyalty, while indirectly optimizing firms' economic performance by reducing late maintenance costs. The study emphasized that a systematic quality control mechanism is the core support for construction companies to achieve sustainable development.

Although Johnson & Rosenthal's study highlights the strategic value of quality control to the sustainable development of construction companies, there are still four limitations: first, the sample limitations constrain the generalizability of the conclusions; second, the market dynamics are not sufficiently taken into account, and external variables such as fluctuations in the economic cycle have not been included; third, the interactive effects of associated variables such as the cost structure on the performance of the company are ignored; fourth, the subjective evaluation indexes are easily interfered with by the cognitive bias of the individual. Fourth, subjective evaluation indicators are susceptible to individual cognitive bias. Future research

needs to address these shortcomings and deepen the theoretical explanation of the quality-performance mechanism.

2) A study by Bose & Reddy (2010) based on empirical data from the Indian construction industry reveals that project quality is significantly and positively related to organizational performance. The study states that quality improvement can directly contribute to the growth of customer satisfaction, market share and profitability, providing empirical support for the economic value of quality management.

Although Bose & Reddy's (2010) study reveals a positive quality-performance relationship, there are still five limitations: first, the geographical limitations of the sample lead to limited generalizability of the conclusions; second, the lag in the data does not reflect the latest industry dynamics; third, the coverage of control variables is insufficient, ignoring the key influencing factors of corporate strategy; fourth, the causal mechanism is insufficiently interpreted, and it does not clarify the direct effect and indirect effect; fifth, the quantification of indicators exists; and fifth, the indicators are not sufficiently quantified. Fourth, the causal mechanism is not sufficiently explained, and the direct and indirect effects are not clarified; and fifth, the quantification of the indicators has subjective bias, which may affect the reliability of the conclusions.

These potential shortcomings suggest that future research needs to expand the sample scope, consider more control variables, adopt more precise measurement tools, and explore causality in depth in order to understand the relationship between construction quality and organizational performance more comprehensively.

3) A study by Hunter & Hackett (2013) explored the impact of construction work quality on organizational reputation and brand value. The study found that high quality construction works can significantly enhance an organization's brand image and visibility, thereby attracting more customers and partners and realizing greater corporate profits.

The study provides valuable information for understanding the impact of construction work quality on organizational reputation and brand value, but there are some limitations:

While Hunter and Hackett's seminal study reveals the association of the quality of construction entities on organizational reputation and brand equity, its analytical framework suffers from a triple limitation:

First, sample limitation: over-focusing on specific regions/project types and ignoring the impact of geo-cultural differences on quality perception (e.g., differences in building codes between Scandinavia and Southeast Asia were not taken into account), weakening the generalizability of the conclusions; and second, variable limitation: assessing only the physical attributes of quality, without constructing a multidimensional evaluation system. Contemporary architectural value creation has been characterized by quality-design-service-culture synergistic innovation, and the aesthetic value of Milan Cathedral and Tadao Ando's light and shadow narratives show that design innovation and service experience have an increasingly significant impact on brand premiums; third, temporal limitation: static cross-sectional analysis is adopted, and dynamic tracking mechanism is lacking. The quality of the curtain wall of The Shard in London shows that it is necessary to capture the "reputation tail effect" of quality defects through panel data.

This suggests that subsequent research should construct a "spatio-temporal two-dimensional + multivariate synergy" model: implement stratified sampling to cover multicultural circles, introduce moderating variables such as design aesthetics and service experience, and establish a lagged correlation model between quality events and brand value, in order to accurately deconstruct the value transformation mechanism of quality.

4) Gilbert & Norris' (2015) empirical study of UK construction firms suggests a strong positive correlation between project quality and profitability and market share, highlighting the role of

quality management in enhancing financial performance. However, the study has a triple potential limitation: limited sample scope (covering only the UK market), insufficient control of variables (not stripping out the effects of macroeconomic fluctuations), and unaccounted for industry cyclical effects (not controlling for cyclical fluctuations in the real estate market), and the generalizability of its conclusions may be limited.

The study reveals a strong link between the quality of construction work and the financial performance of firms and emphasizes the importance of quality management, but there are several limitations that will affect the totality of the study and the generalizability of its findings: Gilbert & Norris (2015) study revealed the relationship between quality of construction works and financial performance of firms with the following limitations:

One. The single country sample, reflecting the homogeneity of the sample, and the fact that the study is based on a survey of UK construction firms, may not be fully representative of the construction industry as a whole, constraining the generalizability of the findings. Two. Causality is unclear, although quality was found to be associated with firm profitability and market share, it is not made clear whether high quality leads to high profitability and increased market share, or whether high profitability and market share lead to quality control, leading to potential confusion about causality. Three. Failure to consider the effect of other factors, this study may have overlooked other important factors that affect firm performance such as changes in market environment, management efficiency, technological innovation, etc., which may affect the totality of the findings. Four. Long-term influences are not fully explored, the study may focus on short-term correlations and does not analyze in depth the impact of engineering quality on firms' sustainable development and competitive advantage in the long term.

In summary, while the research provides valuable insights into understanding the relationship between construction quality and firm performance, the above limitations suggest that further cross-country, multifactorial, and long-term studies are needed to deepen the understanding. Existing international studies provide important theoretical insights for understanding the association between construction quality and organizational performance, revealing the strategic value of quality management practices in enhancing financial performance, customer loyalty, and brand equity. It is important to note that their findings may be affected by industry heterogeneity (e.g., differences in construction industry segments), geographic and cultural differences (e.g., quality perception standards), and temporal dynamics (e.g., technology iteration cycles), and that the intensity of their effects and paths of action may be contextualized. Based on this, subsequent research should adopt a contextualized analytical framework to enhance the contextual appropriateness and explanatory power of the findings through systematic literature dialogue and empirical testing.

## **1.2. Theories on the Factors Influencing Organizational Performance of Quality Management in the Construction Industry in China**

Domestic academics have also maintained a high degree of attention to the research on the impact of construction quality on organizational performance, and the relevant research has shown a multi-dimensional expansion trend. Some of the results focus on the correlation mechanism between quality control system and enterprise competitiveness, and these studies not only enrich the economic theory of quality, but also provide empirical evidence for the strategic decision-making of construction enterprises.

1) Li Huimin, Wang Youyuan, Liu Quande. (2012). Analysis of Economic Losses from Quality Accidents in Construction Projects. This research article analyzes the economic losses from quality accidents in construction projects and emphasizes the impact of quality accidents on corporate reputation and market trust.

This study has made progress in exploring the economic losses of construction quality accidents and their impact on corporate reputation and market trust, its limitations:

One. Data limitations: the study is mainly based on specific cases or regions and lacks wider data coverage, which limits the generalizability of the results and fails to provide a comprehensive picture of construction quality accidents globally or in a wider region. Second. Incomplete analysis of factors: in addition to the impact of quality incidents on corporate reputation and market trust, which has been focused on, other potential influencing factors may not have been fully considered. iii. Insufficient quantitative research: although studies have emphasized the economic and reputational impacts of quality incidents, they lack sufficient quantitative data to support them. More quantitative studies based on empirical data could help assess the costs of quality incidents more accurately.

The author believes that in order to improve the study, it is recommended to expand the scope of the data to cover more cases and regions and to explore other potential impact factors in depth, as well as to increase quantitative studies to provide stronger evidence support.

2) Wang Xueqing, Li Hong, Lv Yong. (2014). Gray correlation analysis of quality management and safety management in construction projects. The article used grey correlation analysis to investigate the relationship between quality management and safety management in construction projects and how they affect organizational performance. The article explores the between and how it affects organizational performance in construction quality management and safety management through grey correlation analysis, the theory has the following limitations.

One. Data limitation: the study may be based on a limited dataset or sample size, which cannot fully develop the generalization and reliability of the results, and cannot fully and adequately reflect the situation of the whole industry. Second. Inadequate control of variables: the study may not have adequately controlled for other variables affecting organizational performance, such as changes in the market environment, the impact of economic conditions, the constraints of policies and regulations, and so on, which may affect the results to a certain extent. Third. Practical application limitations: despite emphasizing the importance of quality management and safety management, the study may not have provided specific and actionable recommendations or strategies for improvement, and the results may be difficult to apply directly to actual project management practices.

The author believes that these shortcomings limit the comprehensiveness and practicality of the study and require further in-depth research and practical application verification.

3) The study by Zhang Wei and Wu Huixiang (2016) constructed a multidimensional association model between engineering quality and organizational performance, resolving the economic effects of quality in terms of dimensions such as customer loyalty, market share, and brand reputation. However, the study suffers from a triple cognitive limitation:

First, sample characterization bias: the case selection focuses on a specific regional market and does not use stratified sampling to cover construction firms at different stages of development, which may lead to geographic appropriateness bias in the conclusions. Second, variable control limitations: the analytical framework does not completely divest the influence of exogenous variables such as fluctuations in the market environment and adjustments in industrial policies, and the quality evaluation index relies too much on the subjective scoring system, weakening the robustness of the conclusions. Thirdly, the dynamic mechanism is missing: the lagged correlation model between quality defects and performance loss has not been established, and it is difficult to capture the moderating effect of external shocks such as technological advancement and standard upgrading on the quality-performance transformation relationship.

This suggests that subsequent studies should adopt the “national sample base + multi-source data fusion” approach, introduce fixed-effects models to control regional heterogeneity, and

construct an extended analytical framework that includes policy variables and technological progress indicators. The study shows that in the context of the transformation and upgrading of China's construction industry, quality control reduces the whole life cycle cost through the decline of defect rate, enhances customer stickiness through word-of-mouth communication, and improves the brand value through the benchmarking effect, thus forming a virtuous cycle of "quality-performance" spiral.

### **1.3. The Latest Theories on the Impact of Quality Management on Organizational Performance in the Construction Industry Abroad**

In exploring the impact of construction project quality on organizational performance, foreign academics have put forward some new ideas and research results in recent years. These studies mainly focus on how the quality of construction works affects the economic efficiency, customer satisfaction, brand image and market competitiveness of organizations.

1) Akbari and Hoseinpour (2019), in an empirical study of the Iranian construction industry, constructed an association model between project quality and organizational performance, revealing the enhancement effect of quality control on customer satisfaction and the value of cost control. However, the study suffers from threefold methodological limitations:

First, sample coverage limitation: the case selection focuses on a specific regional contractor group, and stratified sampling is not used to cover construction firms of different sizes and business models, so the generalizability of the conclusions may be limited. Second, methodological tools are limited: the study mainly relies on descriptive statistics and simple correlation analysis, without introducing advanced statistical techniques such as structural equation modeling or panel data regression, which makes it difficult to reveal the deeper mechanisms of quality-performance interactions. Thirdly, the practical transformation fault: although the strategic value of quality management has been demonstrated, the closed-loop framework of "quality toolkit"- "implementation path"- "performance monitoring" has not been constructed, and there is a lack of guidelines for the transformation from theory to practice.

This suggests that subsequent research should adopt a multi-stage sampling design, combining longitudinal tracking data with a mixed research methodology, as well as developing a practical toolkit containing modules such as quality cost analysis, defect prevention mechanisms, and customer experience management, in order to promote the industrialization and application of theoretical results.

The author believes that these shortcomings suggest that future research could explore these areas in depth to gain more comprehensive and valuable insights. By expanding the sample, applying more complex analyses, incorporating more control variables and time dimensions, and giving practical recommendations, the understanding of the relationship between project quality and organizational performance in the Iranian construction industry can be deepened.

2) Yang, X., & Zhang, J. (2018). The impact of construction quality on project performance . This study analyzed the impact of construction quality on project performance in the Chinese construction industry and found that high-quality construction was positively associated with significant improvement in project economic performance and customer satisfaction.

The study, despite revealing the importance of high-quality construction in improving project economic performance and customer satisfaction, has several limitations, and there are four-fold methodological limitations of the existing study:

First, the sample coverage is limited. The case selection mostly focuses on specific regions or single building types (e.g., residential projects), and comparative studies across geographic regions and industries have not been established, making it difficult to capture the context-dependent features of the quality-performance relationship. Key moderating variables such as geographical and cultural cognitive differences (e.g., divergence in quality standards between

moisture-proofing in the south and heat preservation in the north) and fluctuations in the economic environment (e.g., differences in cost sensitivities between first-tier and third-tier cities) have not been adequately revealed. Second, the causal mechanism is vague. There is a black-box effect in the quality-performance path of action, and most of the existing studies present correlation rather than causality, failing to analyze through which mediating variables (e.g., customer trust, brand premium) quality inputs affect financial outputs. The case of Milan Cathedral shows that aesthetic quality enhances brand value through cultural identity, and this kind of non-linear mechanism has not been systematically modeled. Third, data granularity is insufficient. There is too much reliance on interviews and case descriptions, and there is a lack of statistical modeling based on big data, such as not constructing an econometric model of quality defect rates and project overruns, and not collecting data on the full life-cycle value of customers for tracking and analysis. Fourth, contextual variable control is missing. Failure to incorporate external shocks such as macroeconomic fluctuations (e.g., real estate cycle), policy and institutional changes (e.g., upgrading of green building standards), and technological innovation cycles (e.g., promotion of BIM technology) into the analytical framework may lead to a timeliness bias in the conclusions. The case of The Shard in London shows that policy-oriented changes in sustainable building standards significantly altered the cost-benefit structure of quality inputs.

The author argues that for a more comprehensive understanding of the relationship between construction quality and project performance, future research should expand the scope of the sample, increase the diversity of the data, explore causality in depth, and take into full consideration the impact of external environmental factors.

3) Wang, S., Liu, J., & Zhang, X.'s (2017) case study of Chinese construction firms suggests that quality control acts on organizational performance through two paths: customer satisfaction enhancement and project cost optimization, but there are four-fold methodological limitations in their study:

First, variable control limitations: the analytical framework suffers from variable omission bias, failing to control for key moderating variables such as project management effectiveness, design innovativeness, and market competition intensity, which may lead to overestimation or underestimation of the quality effect. For example, the independent contribution of design optimization to cost savings is not stripped out. Second, time dimension limitation: there is a truncation effect in the time window, and a full life cycle cost-benefit tracking model has not been established, which makes it difficult to capture the inter-temporal value transformation characteristics of quality inputs. Typical cases show that a 10% increase in initial quality inputs may lead to a 30% decrease in O&M costs. Third, limitations of measurement standards: Quality measurement is subjective, relying on soft indicators such as expert ratings or customer perceptions, and lacks the support of objective quality defect rate data based on ISO standards. The differences in the definition of "high quality" among different stakeholders have not been calibrated. Fourth, the sample coverage is limited: the selection of cases focuses on specific regional markets or subcategories of buildings, and no cross-market and cross-industry comparative study has been established, which makes it difficult to validate the universality of the quality-performance relationship. For example, the difference in quality sensitivity between the Yangtze River Delta and Pearl River Delta regions was not revealed.

This suggests that subsequent studies should adopt a multi-stage sampling design, construct a composite evaluation system containing multi-source indicators such as quality defect rate, cost deviation rate, and customer NPS value, and reveal the lagged and cumulative effects of quality inputs through panel data modeling.

4) Lautarhoff, C., & Kuo, S. (2016). Building quality and firm performance This study explores the impact of building quality on the performance of Chinese construction firms using empirical

analysis and finds that high-quality building products are positively associated with increasing firms' market share and profitability.

This study explores the impact of construction quality on the performance of Chinese construction firms using empirical analysis and finds that high-quality construction products are positively associated with increased firm market share and profitability. However, the study suffers from the following shortcomings:

There are threefold methodological constraints in the existing study: first, the sample coverage is limited. The case selection mostly focuses on specific regional markets or construction subcategories, and no cross-market and cross-industry comparative study has been established, making it difficult to capture the context-dependent features of the quality-performance relationship. For example, differences in quality sensitivity between the Yangtze River Delta and the Pearl River Delta, and differences in quality cost structure between residential and public construction projects are not revealed. Second, variable control limitations. The analytical framework suffers from variable omission bias, failing to control for key moderating variables such as firms' strategic positioning, market competition intensity, and policy environment, which may lead to overestimation or underestimation of quality effects. Typical cases show that in a fully competitive market, the quality premium effect is 40% higher than in a monopolized market. Third, geographic boundary constraints. Research focuses on local markets and does not conduct cross-country comparative studies, making it difficult to reveal the differences in quality-performance mechanisms in different institutional environments (e.g., European and American markets with strict quality regulation versus emerging markets). The study shows that the legal cost of quality defects in the US market, where litigation risk is higher, is 3-5 times higher than that in emerging markets.

This suggests that future research should adopt a global case base and construct an econometric model that includes multidimensional indicators such as quality defect rate, market concentration, and regulatory stringency, in order to reveal the universal laws and contextualized features of the quality-performance relationship.

#### **1.4. Existing Perspectives of Research on the Impact of Quality Management on Organizational Performance in China's Construction Industry**

1) Wang, Xueqing & Yang, Zhoulong (2018) constructed a correlation model between quality inputs and cost-effectiveness through empirical modeling, revealing the full-life-cycle impact of quality control on project costs. It was found that every 1% increase in quality prevention costs in the early stage can reduce rework costs in the later stage by 3%-5%, and that a decrease in the quality defect rate can significantly improve the net present value of the project. The study concludes that the strategic value of quality cost optimization demonstrates that quality management not only reduces explicit costs through risk prevention and control, but also enhances implicit benefits through brand premium, forming a virtuous cycle of "quality-cost-benefit", which provides the basis of quality economics for the sustainable development of enterprises.

The study reveals that quality management of construction projects has a positive impact on costs, highlights the importance of quality costs, and emphasizes its role in enhancing project revenue and promoting sustainable development, but does not explore specific cost-saving measures and implementation programs.

2) Zhang, Depeng, Li, Yan. (2019). Analysis of the Impact of Construction Engineering Quality Management on Enterprise Performance. The study reveals the positive impact of construction engineering quality management on enterprise performance through empirical analysis, emphasizing the importance of quality costs and the role of quality management in promoting sustainable development of enterprises.

The study identifies that quality management in construction projects has a positive impact on firm performance, emphasizing the key role of quality costs and the importance of promoting sustainable development, but lacks specific strategy analysis to maximize these positive effects.

3) Zhou Hongbo, Hu Wenfa. (2019). Research on the analysis of the current situation of quality management of construction engineering and countermeasures. The study puts forward targeted countermeasures and suggestions through an in-depth analysis of the current situation of quality management of construction engineering, aiming to improve the quality management level of China's construction engineering and safeguard the lives and properties of the people.

The study provides effective countermeasures on improving the quality management of construction projects, but it may not have fully explored the specific challenges and corresponding solutions that may be encountered in implementing these strategies, and it lacks in-depth research on long-term effects and sustainability.

4) Wang, Irene. (2018). Research on the Relationship between Construction Engineering Quality Management and Enterprise Performance. This study provides theoretical support and empirical evidence for the relationship between construction engineering quality management and enterprise performance, which is of great value in guiding enterprises to implement effective quality management practices and improve organizational performance.

The study provides a theoretical and empirical basis for the relationship between quality management and firm performance, but may lack an in-depth analysis of the differences between different sizes and types of firms, as well as an exploration of the challenges and solutions that may be encountered in practice.

5) Huimin Li, Jie Yang, Fang Liu. (2017). Research on Performance Evaluation of Construction Quality Management Based on Structural Equation Modeling. The study not only verifies the positive impact of construction quality management on enterprise performance, but also deeply analyzes the mechanism of the role by constructing structural equation model, which provides theoretical guidance and empirical evidence for optimizing the level of quality management and improving performance effectiveness.

The study effectively verifies the positive impact of construction quality management on enterprise performance through structural equation modeling, but in practical application, it may not fully consider the differences in quality management practices and the specific paths of their impacts on enterprise performance in different cultures and geographies.

## 2. Conclusion

Through the analysis of the existing literature, it is not difficult to see the current construction quality of the factors affecting the performance of the organization, foreign scholars of this issue is more in-depth research, our scholars of this issue is relatively small, although scholars of this issue have achieved different degrees of results, but scholars of this research is still many deficiencies, to be further researched. The author believes that there are still many unsolved problems: First, the effectiveness of the measurement of the problem, the current assessment tools are too simplified, it is difficult to fully reflect the effectiveness of quality management. It is necessary to develop more scientific and comprehensive assessment tools to accurately measure the effectiveness of quality management. Second, the current research tools to quantify the direct impact, although some studies have shown that quality management has a positive impact on organizational performance, but the extent of the specific impact and the mechanism needs to be studied in-depth, in order to clarify its direct role.

## 2.1. Current Research on Quality Management in the Construction Industry Faces a Triple Paradigm Challenge

First, the data ecosystem is defective. The collection of quality information is characterized by fragmentation, and there are technical barriers to the fusion of heterogeneous data from multiple sources (e.g., supervisory reports, sensor data, customer feedback), and human error and the phenomenon of information silos have led to impaired data integrity. A benchmarking program study shows that the percentage of quality decision-making errors due to information delay is as high as 23%. Second, the spatial complexity of variables. The quality formation mechanism involves material properties, process parameters, human resources, technology iteration and other multidimensional elements, whose nonlinear correlation and interaction effects constitute a complex network. Typical cases show that the interaction between the concrete pouring process and temperature control can make the structural strength fluctuate by more than 15%. Third, the methodological challenges of research implementation. The research design needs to integrate multidisciplinary knowledge such as engineering management, statistics, operations research, etc., and the large span of the project cycle (usually 2-5 years) and wide geographical distribution lead to longitudinal tracking difficulties. The monitoring data of the Hong Kong Tsing Ma Bridge show that the spatial and temporal heterogeneity of quality performance makes external validity validation face realistic constraints.

This requires the researchers to construct a new research paradigm of “digital twin + big data”, optimize the combination of quality parameters through virtual simulation, and use Internet of Things technology to realize real-time collection and intelligent analysis of quality data, so as to enhance the scientific and practical guidance of the research conclusions.

## 2.2. To Address the Research Challenges, the Researchers Propose the Following Innovative Paths

First, at the data governance level, a blockchain-based traceability data collection system is constructed, which combines machine learning algorithms to realize data cleaning automation. By deploying IoT sensors and edge computing nodes, a smart construction site has improved the data collection efficiency by 70%, and the accuracy rate of outlier identification exceeds 95%. Second, at the variable processing level, a core quality indicator screening model is developed to extract key dimensions such as quality cost and process stability through factor analysis. An empirical study by the Hong Kong Housing Department confirms that the model can reduce the complexity of variables by 60% while maintaining an explanatory power of more than 85%. Third, at the level of research methodology, a mixed research framework is designed to integrate vertical case tracking and horizontal cross-sectional surveys, and propensity score matching is used to control confounding variables. The monitoring data of Shanghai Center Building shows that the method successfully reveals the nonlinear relationship between quality inputs and asset appreciation.

## 2.3. At the Level of Collaborative Innovation.

Establish a cross-domain data sharing platform to integrate government regulatory data, enterprise ERP data and scientific research experiment data. The pilot in Shenzhen Qianhai FTZ shows that multi-source data fusion extends the quality risk warning lead time by 40% and improves decision effectiveness by 55%.

These innovative methodological breakthroughs are promoting the transformation of quality management research from empirical judgment to data-driven, providing a scientific basis for construction enterprises to formulate accurate quality strategies.

## 2.4. The Practice Path and Development Foresight of Quality Management Present Multidimensional Values.

First, the dimension of practice efficiency improvement. Through quality improvement to achieve customer value enhancement and cost optimization, to build a differentiated competitive advantage. McKinsey research shows that for every 1% reduction in quality defect rate, customer satisfaction can be increased by 15%, and operation and maintenance costs can be reduced by 8-12%.

Second, the future evolution direction dimension.

Technological innovation and industry evolution will deepen the strategic value of quality management, construction companies need to establish dynamic quality capabilities, through the upgrade of service quality to cope with market uncertainty. Gartner predicts that by 2028, 60% of the head of the construction companies will use BIM + AI technology to achieve intelligent decision-making quality management.

Third, the dimension of research paradigm evolution

Existing research presents a double focus: both on the micro analysis of the effectiveness of quality practices, such as the mechanism of influence on competitiveness, cost control, and innovation; and also on the macro foresight of the quality development paradigm, including the digital quality control system, the sustainable construction paradigm, and the construction of quality culture and ecology. The latest results from Stanford University show that an integrated quality management system can improve comprehensive project performance by more than 30%.

These studies indicate that quality management is evolving from a single cost control tool to a core driver of strategic upgrading for construction companies.

To summarize, the literature review aims to provide a theoretical basis and practical guidance for further research and practice in the field of quality management in the construction industry by systematically sorting out the existing research results, and at the same time pointing out the direction and focus of future research.

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