

# Impact Factors on Sustainable Development of Modernization for the Construction Site at Nanchang, China

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## Abstract

The main purpose of this study is to analyze the key factors of the modernization of construction sites in Nanchang, and their impact on sustainable development, and to make suggestions to improve the level of sustainable development. The construction industry plays a key role in urban development, life improvement and economic growth, but faces challenges such as inefficient management, poor technology lag, low construction efficiency and safety issues. The research methods include literature review, questionnaire survey and case analysis, taking Nanchang city as a case, focusing on the impact of project management on project modernization and sustainable development. The study found that factors such as dynamic ability, knowledge innovation, quality improvement and operational development have a positive impact on project modernization, and market reputation plays an intermediary role between dynamic capability and sustainable development. Finally, the study makes feasible suggestions to improve the level of project modernization and sustainable development.

This study is crucial to the modernization and sustainable development of the construction industry in Nanchang, providing scientific strategic and policy advice for the government, enterprises and employees, and promoting the construction industry to the direction of sustainable, efficient and innovative. At the same time, it also provides a foundation for future research in related fields, and has academic value. Despite some limitations, this study has an important reference value for promoting the modernization of the construction industry.

**Keywords:** Modernization and Sustainable Development; Construction Project; Nanchang City

## Introduction

In today's modern era, the construction industry is a key pillar of economic development, contributing significantly to urban growth and improving quality of life. In China, one of the world's largest construction markets, the industry plays a crucial role in national modernization. However, it faces several challenges such as inefficient management, outdated

technology, low productivity, and safety concerns. These issues hinder sustainable development and highlight the need for thorough analysis of factors affecting construction site modernization.

Nanchang, the capital of Jiangxi Province, has shown steady economic growth, with GDP rising from 527.47 billion yuan in 2018 to 720.35 billion yuan in 2022. Despite a slight drop in per capita income in 2022 to 44,422 yuan, the city remains a vital economic hub in central China. As urban development expands, the construction industry—crucial to China's economy—faces challenges such as inefficient management, low technical standards, and inadequate safety measures. Traditional methods can no longer meet modern demands. To ensure quality and sustainability, construction sites must adopt smarter, more efficient management systems. This transformation is essential for supporting both local development and the long-term growth of China's construction sector (Ding, 2014).

The COVID-19 outbreak in 2020 disrupted China's construction industry, causing project delays and rising costs, especially in cities like Nanchang. These issues exposed weaknesses in site management, including poor supervision, weak quality control, and outdated systems (Zhang Yu, 2014; Ma, 2023). While new technologies in construction offer advantages, challenges in concrete quality, structural safety, and technical processes remain (Li-na Cao, 2017). China's major role in global projects like the 2022 Qatar World Cup highlights its potential, but domestic site management still requires improvement. This study explores key factors affecting construction site modernization and offers strategies to support sustainable development and higher project efficiency.

The construction industry in Nanchang is facing increasing pressure to meet sustainability and environmental standards. Green materials, renewable energy, and energy-efficient practices are now essential, not optional. However, challenges such as labor shortages, cost fluctuations, and rising compliance requirements persist. Technological advances—such as automation, BIM, and AI—offer opportunities, but also demand constant learning and innovation. Furthermore, globalization introduces new complexities, including multicultural project coordination and diverse regulatory environments. Sustainable supply chain management, land-use constraints, and growing demand for building maintenance further complicate project execution. To thrive, construction companies must adopt comprehensive strategies encompassing green practices, technological adaptation, cost control, global competitiveness, and social responsibility.

### **Study Objectives**

1. Systematic analysis of various factors affecting the long-term sustainable development of construction site modernization, including but not limited to management strategies, technology application, technological innovation and dynamic capabilities, so as to reveal their mutual relationship and impact on sustainable development.

2. Explore the specific impact mechanism of dynamics, technology, science and technology on the modernization of the construction site, and deeply explore their role in

improving construction efficiency, collaborative work, customer satisfaction, project quality and sustainability.

3. Study the key factors related to the competition in the construction industry, including the market share and reputation, etc., analyze their role in the modernization construction, and put forward the strategies to enhance the competitiveness.

4. Put forward scientific and reasonable suggestions and strategies to guide the construction site to realize the sustainable development of modernization in a long-term period. By digging into the nature of the research problem, this paper aims to provide practical theoretical support and practical guidance for decision makers, practitioners and researchers, and to promote the construction industry towards a more modern, sustainable and competitive development direction.

## **The scope of this study**

### **Modernization and Sustainable Development**

The concept of “modernization and sustainable development” integrates two key ideas. Modernization refers to the transformation of society, economy, technology, and culture to align with the demands of modern life. It includes economic diversification, technological advancement, democratic governance, and cultural renewal, all aiming to enhance quality of life and national competitiveness (Inglehart, 2020). Sustainable development, on the other hand, focuses on fulfilling present needs without compromising future generations. It emphasizes a balance between economic growth, social inclusion, and environmental protection (Emas, 2015). In the construction industry, this combined concept has evolved over time, shaped by global concerns about climate change and the need for greener practices.

### **Sustainability Theory**

Sustainability theory emphasizes meeting the needs of the present without compromising the ability of future generations to meet theirs. It seeks a balance between social well-being, environmental protection, and economic development (Shao Zhuhui et al., 2023). Core elements include social justice, ensuring basic human needs such as health and education; environmental sustainability, through resource conservation and pollution reduction; and economic sustainability, by promoting responsible growth and efficient resource use (Harillam et al., 2023). In the construction sector, this theory guides site modernization through renewable energy, green materials, and efficient systems, fostering a livable and low-impact built environment. Influential figures such as Rachel Carson, Donella Meadows, and the Brundtland Commission have shaped this theory over decades, laying the foundation for global sustainability principles (Carson, 2015).

### **Theory of Modernization Development**

The theory of modernization development explores how societies evolve through technological innovation, market dynamics, and cultural transformation. It emphasizes that progress in science, technology, and management is central to social and economic

development (Willis, 2023). In construction engineering, this theory highlights the role of advanced technologies, modern project management, and skilled human resources in improving efficiency, quality, and sustainability. Modernization theory also forms a foundation for organizational and enterprise management, especially in human resource development. It stresses the need for professional competencies and adaptive capabilities in a rapidly changing environment. Management practices, in turn, reinforce and shape the application of modernization theory. Key scholars such as Walt Rostow, Daniel Bell, and Francis Fukuyama have contributed significantly to the theory's evolution. Rostow proposed a five-stage model of economic growth (1990), Bell analyzed the shift to a post-industrial society (2019), and Fukuyama envisioned liberal democracy as the endpoint of modernization (2006). Their work collectively provides a multidimensional view of modernization, offering valuable insights for analyzing and guiding the transformation of the construction industry.

## Research Methods

This study employs a mixed-methods approach, combining literature review, questionnaire survey, and case analysis. The literature review synthesizes existing research on construction modernization and sustainability. A questionnaire survey was then conducted among construction professionals in Nanchang to gather data on product innovation, process innovation, and management practices. Additionally, case studies and focus group interviews were used to explore the practical implications of modernization at the construction site level.

Quantitative analysis involved the use of statistical tools such as SPSS to conduct descriptive statistics, correlation analysis, and regression modeling. These techniques helped assess the relationships and impact of innovation on modernization and sustainable development. Qualitative data from interviews and focus groups were analyzed through thematic coding to identify key patterns and insights.

By integrating both data types, the study constructed and validated a model illustrating how product and process innovation influence the modernization of construction projects in Nanchang. This comprehensive approach ensures theoretical depth and practical relevance in addressing the challenges of sustainable development in the construction industry.

## Population

The population of this study includes project managers, chief engineers, and site supervisors from key municipal construction projects in Nanchang City, Jiangxi Province in 2022, totaling 756 projects. One representative per project was selected to complete the survey. The sample covers various project types, including industrial, service, urban construction, ecological, and social development projects. Data were collected through structured questionnaires and interviews conducted on-site between [insert time period]. While the sample aims to represent the diversity of construction projects in Nanchang, limitations may arise due to non-random sampling and potential response bias. Participant characteristics such as job role and work experience were considered relevant to ensure meaningful analysis.



## Analysis and findings

This chapter presents and analyzes the data collected from construction projects in Nanchang City to explore how dynamic capabilities influence sustainable development. Key focus areas include the mediating roles of knowledge creativity, quality improvement integration, operational development, and competitive market reputation. Findings reveal that dynamic capabilities—such as talent training, innovation planning, and operational optimization—play a critical role in enhancing project sustainability and market competitiveness. The analysis is based on data from questionnaires and interviews, using both statistical and content analysis methods. This chapter also discusses performance evaluation, strategic development, and future research directions to strengthen the modernization and sustainability of Nanchang's construction sector.

## Analysis and reporting and survey results

This section presents the data collected from the study on the modernization and sustainable development of construction projects in Nanchang. A total of 643 questionnaire responses were initially collected from construction professionals. After screening and removing incomplete or invalid responses, 385 valid samples were retained for further analysis. These valid responses form the core dataset for assessing the factors influencing dynamic capabilities, innovation, and sustainability in construction site modernization.

Total number of samples	Number of valid samples
643	385

## Description and statistical analysis:

**Table 1** Basic information description statistics of the respondents

variable	category	Frequency	Percent
sex	man	246	63.90
	woman	139	36.10
age	Under 25	74	19.22
	25~35	117	30.39
	35~45	86	22.34
	45-55	70	18.18
	55 Years and older	38	9.87
Education level	High school and below	71	18.44
	junior college education	95	24.68
	undergraduate course	185	48.05
	Master's degree or above	34	8.83
form of business enterprise	state-owned enterprises	81	21.04
	private enterprise	199	51.69

variable	category	Frequency	Percent
	Foreign investment or joint ventures	53	13.77
	other	52	13.51
entire period of actual operation	Under 2 years	75	19.48
	2-5 Years	106	27.53
	6-10 Years	133	34.55
	11-20 Years	64	16.62
	More than 20 years	7	1.82
Job type	Grassroots staff	287	74.55
	Junior manager	77	20.00
	Middle managers and above	21	5.45

From the table above shows, there are 246 males, accounting for 63.90% and 139 females, accounting for 36.10%. For age, 117 from 25-35, accounting for 30.39%; 86 from 35-45, accounting for 22.34%; 74 under 25, accounting for 19.22%; 70 from 45-55, accounting for 18.18%; and 38 aged 55 and above, accounting for 9.87%. Among them, 25 to 35 (30.39%) were the highest, and 55 years old and above (9.87%) were the lowest. For education level: 185 undergraduate students, accounting for 48.05%; 95 junior students, accounting for 24.68%; 71 high school or below, accounting for 18.44%; 34 master's degree or above, accounting for 8.83%. For the frequency of enterprise types, 199 private enterprises, accounting for 51.69%; 81 state-owned enterprises, accounting for 21.04%; 53 foreign or joint venture enterprises, accounting for 13.77%; and 52 others, accounting for 13.51%. 133 people, accounting for 34.55%; 106 in 2-5 years, accounting for 27.53%; 75 below 2 years, accounting for 19.48%; 64 in 11-20 years, accounting for 16.62%; 7 over 20 years, accounting for 1.82%. For job types, there are 287 grassroots employees, accounting for 74.55%; 77 junior managers, accounting for 20.0%, and 21 middle managers or above, accounting for 5.46%.

**the structural equation model**

**(1) Model construction** Structural equation model (SEM analysis method): structural equation model and regression analysis, is the relationship between the variables of multiple statistical method, and linear regression difference is SEM can study the path relationship between multiple variables, and consider the role of the measurement variables, this paper through the structure equation model (SEM).

Based on the above test results can be obtained, the measurement model has a good reliability and validity. The software AMOS23.0 is now used to preliminarily construct the structural equation model based on the research hypothesis, This model contains six pathway relationships among the latent variables, Among them, five measures of DC1-DC5 for Dynamic



Capability, five measures of KE 1-KE 5 for Knowledge Creativity, five measures of QII 11-QII 5 for Quality Improvement Integrating, and ODE 1-ODE 5 for COperation Development Excellence The five measurement indicators, Competition, five measurement indicators of C1-C5, Value perception, VP1-VP5, Sustainable Development Of Modernization, five measurement indicators of SDM 1-SDM 5, and the residual items of the variables are successively marked with e1-e33 (unexplained error). The latent variable single arrow indicates causality, double arrows indicate correlation, and the preliminary model construction in Fig.

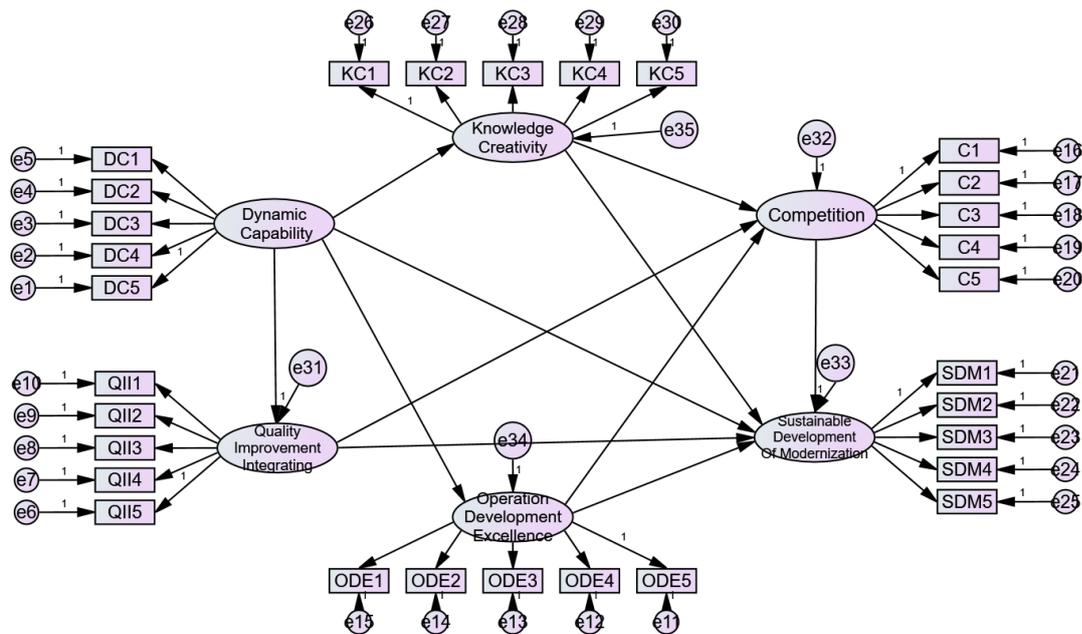


Figure 1 initializes the structural equation model in Fig

## (2) Model test

Table 2 Model fit degree

Adaptation index	Adaptation standard	Model fit values
$\chi^2$	The smaller the better	715.229
$\chi^2/df$	<3	1.819
GFI	> 0.90	0.889
AGFI	> 0.85	0.869
RMSEA	<0.08	0.046
NFI	> 0.9	0.909
RFI	> 0.9	0.900
TLI	> 0.9	0.952

Adaptation index	Adaptation standard	Model fit values
CFI	> 0.9	0.957

From the above table, the results of model fit in this study are  $\chi^2 / DF=1.819$  is less than 3, RMSEA = 0.046, less than 0.05 respectively, AGFI, NFI, RFI, TLI, CFI are 0.869,0.909,0.900,0.952,0.957, more than 0.9. Because GFI does not reach the test standard of 0.9, and the RFI is significantly higher than 0.9, the model can be further modified.

**Table 3** Model correction index

The relationship between co-variation			M.I.	Par Change
e34	<-->	e35	21.744	.088
e31	<-->	e35	21.718	.073
e31	<-->	e34	19.505	.078

From the above table, according to the M.I. The model index is model corrected, and the general MI value is larger than 15), indicating a strong relationship between the two residual measurement terms. It can be considered to correct the covariance relationship and analyze it again. From the above table, we can see that the residual e34 and e35 e31 and e35, e31 and e34, M.I. The indices were greater than 15,116.116, and Par Change were greater than 0.05, indicating the need for e34 and e35 e31 and e35, e31 and e34.

**Table 4** The corrected model fit

Adaptation index	Adaptation standard	Model fit values
$\chi^2$	The smaller the better	643.076
$\chi^2/df$	<3	<u>1.645</u>
G FI	> 0.90	0.902
AGFI	> 0.85	0.883
RMSEA	<0.08	0.041
NFI	> 0.9	0.919
RFI	> 0.9	0.909
TLI	> 0.9	0.962
CFI	> 0.9	0.966



From the above table, the results of the model fit in this study are:  $\chi^2$ ,  $\chi^2 / df$ , GFI, A G FI, and RMSEA The NFI, RFI, TLI, and CFI were 643.076,1.645,0.902,0.883,0.041,0.919, and 0.909, respectively 0.962 and 0.966, and the model fit well.

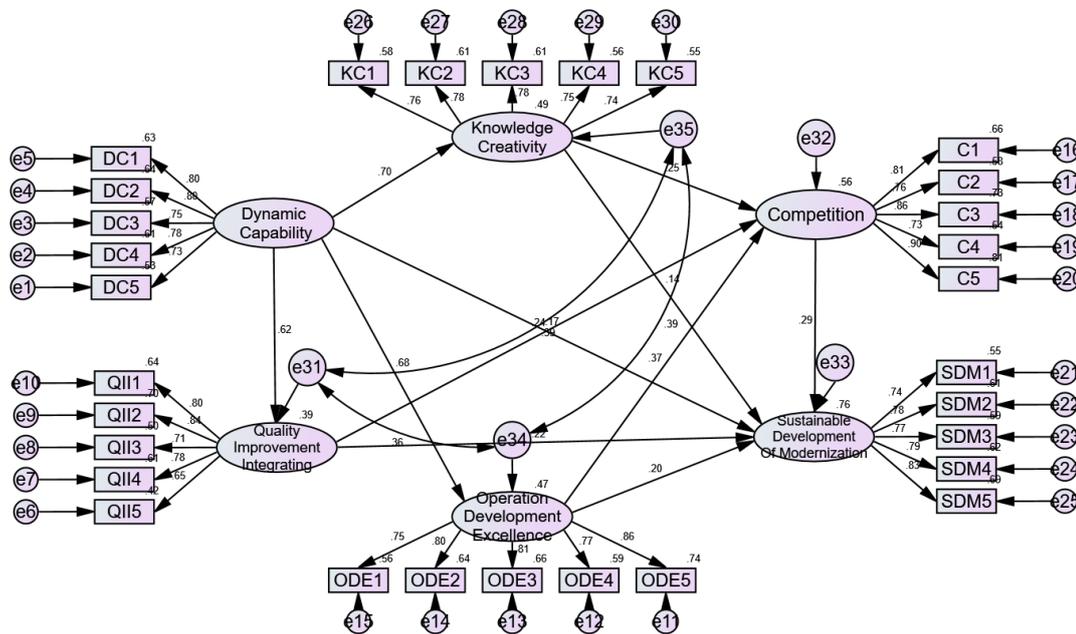


Figure 2 corrected model plot normalized estimates

Table 6 Squared Multiple Correlations

Knowledge Creativity	Quality Improvement Integrating	Operation Development Excellence	Competition	Sustainable Development Of Modernization
0.493	0.468	0.389	0.559	0.756

The structural equation model (SEM) constructed in this study analyzes the relationships among six latent variables: Dynamic Capability, Knowledge Creativity, Quality Improvement Integrating, Operation Development Excellence, Competition, and Sustainable Development of Modernization. Each variable was measured by five indicators, with residual terms accounting for measurement errors. The results show that Dynamic Capability has a significant influence on Knowledge Creativity ( $R^2 = 0.493$ ), Quality Improvement Integrating ( $R^2 = 0.468$ ), and Operation Development Excellence ( $R^2 = 0.389$ ). These three factors, in turn, collectively influence Competition ( $R^2 = 0.559$ ). Overall, the combined effect of all preceding variables—Dynamic Capability, Knowledge Creativity, Quality Improvement Integrating, Operation Development Excellence, and Competition—on Sustainable Development of Modernization is strong, with an  $R^2$  value of 0.756. Model fit indices, including  $\chi^2$ ,  $\chi^2/df$ , GFI, AGFI, RMSEA, NFI, RFI, TLI, and CFI, indicate an acceptable fit after applying necessary model modifications based on suggested correction indices. The final model confirms that all path relationships are statistically significant, reinforcing the important mediating roles of creativity,

integration, and operational development in driving modernization and sustainability in Nanchang's construction sector.

## **Discussions and conclusions**

This chapter examines the modernization of construction projects in Nanchang, revealing that dynamic capability significantly influences knowledge creativity, quality improvement, and operational development. These factors, in turn, impact market share and reputation, with knowledge creativity showing a weaker effect. Market competitiveness serves as a mediator linking internal capabilities to sustainable development. The findings offer practical guidance for enhancing construction management and highlight the importance of innovation in advancing the industry. The chapter also addresses research limitations and suggests future research directions.

### **Brief summary of the findings**

Through this study, the independent variables cover the dynamics, construction level, the degree of science and technology application and related capabilities of the construction projects, and we find that these factors have a significant positive impact on the modernization of the construction projects. The first layer of intermediary variables, including only creativity, quality improvement and integration, operation development, and the second layer of competitive market share and reputation, have produced a positive intermediary effect on the modernization of construction projects. Further, the second layer of intermediary variables, namely the competitive market share and reputation, also plays an important role in promoting the modernization of construction projects. Finally, the dependent variable we focus on, namely the sustainable development of construction projects, is the core and goal of our research. The independent variables we selected cover the dynamic monitoring and response of the construction project, the level of the project infrastructure construction, the application and upgrading degree of the project technology, and the comprehensive ability of the project management team and the construction personnel. These variables represent the key influencing factors for the modernization of construction projects. The research results show that these independent variables have a significant positive impact on promoting the realization of intelligent, green, industrial and information modernization of construction projects. Specifically, the real-time monitoring and rapid response of the construction dynamics can ensure that the construction scheme is synchronized with the development direction of the industry and the market demand, and realize the adaptability and forward-looking of the construction project. The perfect project infrastructure provides the material basis and institutional guarantee for the application of innovative technology and the improvement of the management mode. The in-depth application of various new technologies, new processes and new equipment directly improves the construction efficiency, quality and safety of the project. Management And the construction team's knowledge update and innovation consciousness training, so that the project construction and

management in the concept and method of the upgrade. The intermediary variables studied were involved in the quality improvement of the whole process management of architectural design and construction, which verified the positive promotion effect of these quality elements on project modernization. We have paid special attention to the far-reaching impact of the overall improvement of engineering and management quality on the modernization of construction projects. In addition, we also verified the coupling degree of cooperation between the construction project and the direction of economic and social development, and the industrial technological progress and competition situation, which also plays a positive role in the modernization of the project.

Through an in-depth quantitative analysis, we validated the association between these key variables, thus providing solid empirical support for our study. These results provide valuable insights into our comprehensive understanding of the elements and driving factors of the modernization of construction projects in Nanchang. Our research not only stays at the theoretical level, but also provides guidance and inspiration for practice. We hope that these findings will make a positive contribution to the modernization and sustainability of the construction industry, laying the foundation for future research and practice. Finally, focus on the modernization and sustainable development of construction projects, which is the core requirements and development direction of the transformation and upgrading of the construction industry. The research has found that it provides valuable experience for all parties in the industry, and also provides theoretical support and practical guidance for promoting the high-quality development of the construction industry. Follow-up research can further expand the scope of samples, dig into the modernization path and experience of different types of projects, and enrich the academic accumulation in this research field.

### **Actual contributions**

This study has made multifaceted contributions at the practice level. First of all, we deeply study the product innovation and process innovation in the modernization construction of Nanchang city construction project, which opens up a new perspective for the research in this field. Innovation in modernization is clearly identified as an important driving factor, and our research provides a profound understanding of the role of innovation in the modernization of the construction industry. By focusing on the product innovation and process innovation in the process of construction project modernization in Nanchang city, we have deeply studied the internal dynamic mechanism of construction project modernization from both theoretical and empirical aspects. It is found that dynamic capacity is an important means to promote the intelligent, green and industrial modernization of construction projects, which provides a new perspective for construction units and relevant government departments to deeply understand and apply innovation-driven development. The development of this research perspective enriches and expands the innovation theory in the field of architecture.

Second, by employing quantitative analysis, we quantified the relationship between independent variables, mediation variables and dependent variables, revealing complex and

significant interactions among these key factors. This not only provides empirical support for theoretical research, but also provides a basis for formulating more accurate policies and strategies in practice. In this study, we used the quantitative research method of questionnaire survey, collected a large amount of raw data, and used statistical methods such as regression analysis to simulate the relationship between variables. Research Precisely quantifies the influence relationship and action mechanism between the factors of construction project, infrastructure investment, technology application and organizational capacity construction and the level of project modernization. This provides empirical support for relevant departments to formulate policies to promote the modernization of construction projects, and improves the pertinacity and effectiveness of policy formulation.

Finally, based on our research results, we make a series of relevant suggestions to guide the modernization and sustainable development of the construction project in Nanchang city. These recommendations cover multiple aspects from technological innovation to management innovation, providing substantial guidance for practitioners. We hope that these suggestions can make a substantial contribution to the modernization of construction projects in Nanchang city and even other regions, and promote the sustainable development of the industry. Based on the research conclusion, we put forward a series of operable suggestions for construction enterprises and government management departments. For example, strengthen the training of new technology and new equipment application, establish the think tank platform; build the information platform for engineering whole life cycle, realize the project data integration; increase the investment in scientific research and technology introduction, and stimulate the innovation vitality of buildings. These policy suggestions take into account the technical level and management level innovation, and can effectively promote the modernization process and sustainable development of construction projects in Nanchang and even the wider region. The research results will promote the transformation and upgrading of the construction industry and high-quality development.

#### **For study limitations and for future studies**

The limitations of this study mainly focus on the sample source and the scope of the study. First, our study is based on the construction project of Nanchang city, so the conclusions and results may be influenced by region-specific factors and may not be universal. Future studies could consider expanding the sample to cover more construction projects in order to obtain more comprehensive and representative study conclusions.

Second, we mainly focused on specific independent, mediating and dependent variables in model construction, without considering other potential influencing factors. Future studies can introduce more dimensions of influencing factors, such as socio-economic factors, policy factors, etc., to conduct a more comprehensive and comprehensive analysis. This will help to deepen the understanding of the impact mechanism of the modernization of building construction projects, and improve the explanatory power and predictive ability of the model.

In addition to the above limitations, future research can also further deepen the exploration of the modernization of construction projects. We can consider adding more intermediary variables to explore the influence mechanism of different intermediary variables on modernization, and expand the depth and breadth of research. At the same time, we can combine actual cases to deeply explore specific innovative strategies and management modes, so as to provide more targeted suggestions for practice.

Future research can be further improved and expanded in sample selection, variable setting and research depth, so as to make the research more representative and reliable, and provide more powerful theoretical and practical support for the development of modern construction projects.

### Conclusions and recommendations

The purpose of this study is to explore the impact of dynamic ability, knowledge creativity, quality improvement and integration, operational development, market share and reputation on the long-term sustainable development of construction site modernization, and to verify a series of assumptions. Through the statistical analysis of the questionnaire data, we draw the following conclusions:

1. Dynamic ability has a positive impact on knowledge creativity, quality improvement and integration, and operation development, which has verified the establishment of H1, H2 and H3.

2. Knowledge creativity has a positive impact on the market share and reputation and the long-term sustainable development of modernization, which verifies the establishment of H4 and H8.

3. Quality improvement and integration has a positive impact on market share and reputation and long-term sustainable development of modernization, which verifies the establishment of H5 and H9.

4. Operation development has a positive impact on market share reputation and long-term sustainable development of modernization, which verifies the establishment of H6 and H10.

5. The intermediary role of market share reputation in the dynamic capability and the long-term sustainable development of modernization has been verified, in line with the hypothesis of H11.

6. The intermediary role of market share and reputation in knowledge creativity, quality improvement and integration, and operation development has been verified, and the establishment of H12, H13 and H14 has been verified.

The results of this study show that there are significant positive influence relationships between dynamic ability, knowledge creativity, quality improvement integration, operational

development, and market share reputation in the modernization of the construction site. This emphasizes not only emphasizes the importance of the enterprise in improving the level of modernization and sustainability, but also the strategic value of maintaining a good reputation in the market. Based on the research results, the following suggestions are put forward for practitioners and decision-makers in the construction industry: 1. Strengthen the cultivation of dynamic capabilities. Enterprises should pay attention to improving their own dynamic capabilities, constantly adapt to market changes, and timely introduce new technologies and management methods. 2. Promote knowledge creativity, stimulate employees' creative thinking and improve the level of knowledge creativity by establishing a cultural atmosphere that encourages innovation. 3. Strengthen quality improvement and integration, enterprises should establish a sound quality management system, pay attention to the continuous improvement of the work process, and improve the quality of project implementation. Promote the development of operation, promote the all-round development of enterprise operation and enhance the market competitiveness by optimizing resource allocation and improving work efficiency. 4. Maintain the market share reputation, attach importance to the market reputation of the enterprise, build a positive image and improve through quality service and social responsibility to increase market share. 5. Pay attention to the comprehensive application of the intermediary role. In the strategic planning, the intermediary role of the market share and reputation should be fully considered and integrated into the strategy of long-term sustainable development of the enterprise. This study provides empirical data support for the modernization of the construction site, and provides useful management experience and in future studies, we recommend further in-depth exploration of these issues. The research scope can be expanded to consider the construction projects in more regions, and different types of construction projects, so as to obtain more universal research conclusions. At the same time, more research can be carried out in combination with emerging technologies, sustainable development concepts and other aspects, so as to promote the modernization of construction projects to a new level. Such research will provide more effective support and guidance for promoting the modernization drive, and promote the construction projects towards the direction of modern, intelligent and sustainable development.

## Reference

- Bell, D. (2019). *The coming of post-industrial society*. Basic Books.
- Carson, R. (2015). *Silent spring*. Houghton Mifflin Harcourt.
- David. (2021). *Modern sustainable architecture: Theory and practice*. [Publisher unknown].
- Ding, L. (2014). *Verification of causal influences of reasoning skills and epistemology on physics conceptual learning*. *Physical Review Special Topics: Physics Education Research*, 10(2), 023101

- Emas, R. (2015). The concept of sustainable development: Definition and defining principles. Florida International University, Brief for GSDR.
- Fukuyama, F. (2006). The end of history and the last man. Free Press.
- Harillam, N. P., Mekha, K. B., Suganthan, V., & Sudhakar, K. (2023). Triple-bottom-line approach in sustainable development: A global review. *International Journal of Environmental Science and Technology*, 20(1), 1–15.
- Inglehart, R. (2020). Modernization and postmodernization: Cultural, economic, and political change in 43 societies. Princeton University Press.
- Li-na, C. (2017). Construction technology and modernization trends in infrastructure engineering. China Architecture & Building Press.
- Ma, T. (2023). Construction site management practices and technical challenges. *Journal of Civil Engineering and Management*, 29(4), 250–265.
- Meadows, D., & Randers, J. (2012). The limits to grow : The 30-year update. Earthscan.
- Rostow, W. W. (1990). The stages of economic growth: A non-communist manifesto (3rd ed.). Cambridge University Press.
- Shao, Z., Li, H., & Li, Y. (2023). Sustainability theory and application in urban development. *Sustainability*, 15(2), 488–502.
- Willis, K. (2023). Theories and practices of modernization in developing economies. Routledge.
- Zhang, Y. (2014). Modern construction project management and site supervision. China Construction Industry Press.