



Digital Transformation and Enterprise Product Quality

—From the Perspective of ISO 9000 Quality Management System

Hanqi Wang*, Chenhe Jing and Zihan Sun

School of Economics and Management, Beijing Jiaotong University, Beijing 100044, China

*23726066@bjtu.edu.cn

Abstract. Amid the rapid development of the digital economy, how digital transformation affects product quality and the role of ISO9000 certification remain underexplored. Using a sample of Chinese A-share manufacturing listed firms from 2020 to 2024, this study constructs a digital transformation index via text analysis and develops a product quality score based on the ISO9000 framework. Employing a panel fixed-effects model, we examine the direct effect of digital transformation on product quality, the moderating role of ISO9000 certification, and heterogeneities across firm size, age, and certification status. Results show that digital transformation significantly enhances product quality, robust to alternative measures. The moderating effect of ISO9000 certification is not significant. The quality-enhancing effect is stronger in large and established firms, and weaker or insignificant in small and young firms. Notably, a substitution relationship exists: the positive effect is significantly larger in non-certified firms than in certified firms. This paper contributes by integrating digital transformation and quality management, revealing the contingent boundaries of institution-technology interaction, and offering practical implications for firms and policymakers.

Keywords: Digital Transformation, Product Quality, ISO9000 Quality Management System, Moderating Effect, Heterogeneity.

1 Introduction

Digital transformation (DT) has become a strategic imperative for firms, particularly in manufacturing. However, whether DT translates into improved product quality remains unclear. Meanwhile, ISO 9000, as a widely adopted quality management benchmark, may interact with DT, yet this synergy is underexplored. This study examines the DT–quality nexus and the role of ISO 9000 certification using Chinese manufacturing listed firms from 2020 to 2024.

This paper addresses two questions: (1) Does digital transformation enhance product quality? (2) Does ISO 9000 certification moderate this relationship?

Using a sample of Chinese A-share manufacturing firms from 2020 to 2024, we construct a DT index via text analysis and a product quality composite score based on

the ISO 9000 framework. Panel fixed-effects models, moderation tests, and subgroup regressions are employed.

This paper offers three innovations: (1) introducing ISO 9000 certification as a moderator into the DT–quality framework; (2) constructing a fine-grained DT index and a multi-dimensional quality score; (3) uncovering size- and age-dependent heterogeneity and a substitution effect between DT and ISO 9000.

2 Literature Review

Digital transformation (DT) refers to firms' systemic reorganization of business models, processes, and value creation via digital technologies such as AI, big data, and IoT^[1]. Prior research measures DT mainly through text analysis of annual reports^[2] and finds that DT can improve operational efficiency^[3] and foster innovation^[1], though early-stage disruptions may occur^[4].

Product quality measurement has evolved from single financial proxies^[1] to composite indices grounded in the ISO 9000 quality management system, which covers management activities, resource provision, product realization, measurement, and improvement^[5]. The ISO 9000 framework emphasizes process control, continuous improvement, and customer orientation^[6], making it a suitable basis for constructing a multi-dimensional quality score. This study adopts that approach.

Research integrating DT and quality management remains fragmented. Existing studies examine either DT's economic consequences or ISO 9000's implementation effects separately, with limited empirical testing of their interaction^{[1][5]}. Moreover, the moderating role of ISO 9000 certification in the DT–quality relationship has received little attention. Heterogeneous effects by firm size and age are also underexplored^[2].

To address these gaps, this study introduces ISO 9000 certification as a moderator into the DT–quality framework, using a sample of Chinese manufacturing listed firms.

3 Theoretical Analysis and Research Hypotheses

3.1 Theoretical Basis

Digital transformation (DT) theory posits that digitalization reshapes organizational capabilities beyond mere technology adoption^[1]. Quality management theory, rooted in ISO 9000's process control and continuous improvement principles^[6], provides institutional scaffolding for quality. The resource-based view suggests that DT's value unfolds only when combined with complementary organizational resources^[7], making ISO 9000 certification a potential moderator.

3.2 Digital Transformation and Product Quality (H1)

DT can improve product quality through three pathways. First, process optimization: automated production and real-time monitoring reduce human error and enable proactive quality control^[8]. Second, data-driven approach: big data analytics and machine

learning identify root causes, predict risks, and optimize parameters^[9]. Third, collaborative network: DT lowers coordination costs, deepens specialization, and generates quality spillovers along the supply chain^[3]. Through these synergistic pathways, DT systematically enhances product quality. Thus, H1: DT has a significant positive effect on product quality.

3.3 The Regulatory Effect of ISO9000 Certification (H2)

ISO 9000 certification institutionalizes quality management processes^[5]. Certified firms provide clear interfaces and norms for digital tools (institutional assurance). The system's continuous improvement mandate aligns with DT's iterative nature, enabling a closed-loop of data-driven improvement (continuous improvement mechanism). Moreover, a quality-oriented culture reduces employee resistance to digital change^[10] (organizational culture synergy). Therefore, certification is expected to strengthen the positive DT–quality link. Thus, H2: ISO 9000 certification positively moderates the relationship between DT and product quality.

4 Research Design

4.1 Sample Selection and Data Sources

Using Chinese A-share manufacturing listed firms from 2020 to 2024, we exclude ST/*ST firms, those with missing key variables, and post-2020 listings. The final sample comprises 356 firms with 1,780 firm-year observations. Financial and governance data come from CNRDS; ISO 9000 certification data are hand-collected from the Certification and Accreditation Administration of China; components of the product quality index are extracted from CNRDS sub-databases. All continuous variables are win-sorized at the 1st and 99th percentiles.

4.2 Variable Definition

Dependent Variable: Product Quality. Following Wang and Chen (2024)^[5], we construct a composite index based on six quantifiable dimensions from the ISO 9000 framework: proportion of technical personnel, employee training, fixed asset ratio, inventory/asset impairment, R&D investment and patent output, and internal control effectiveness. Each dimension is scored against industry-year medians, and the scores are summed to yield a 0–11 index (higher = better quality). The scoring details are available in Wang and Chen (2024).

Independent variable: Digital transformation (Digital). Using text analysis of annual reports, we count the frequency of keywords (e.g., AI, big data, cloud computing, IoT) and compute

$$Digital_{it} = \ln(WordFreq_{it} + 1) \quad (1)$$

Moderating variable: ISO 9000 certification (ISO_Dummy). Equals 1 if the firm holds a valid certificate at year-end, else 0.

Control Variable. We include firm size (Size, log of total assets), leverage (Lev, total liabilities/total assets), firm age (Age, current year minus founding year), ownership concentration (Top10, top ten shareholders' ratio), return on assets (ROA), board size (Board, log of board members), proportion of independent directors (Indep), management shareholding ratio (MgtHold), and industry and year dummies.

The summary of the definitions of the main variables is shown in Table 1.

Table 1. Variable Definitions

Variable type	Variable name	Variable symbol	Definition and measurement
Dependent variable	Product quality	Quality	Composite index constructed based on the ISO 9000 framework, ranging from 0 to 11
Independent variable	Digital transformation	Digital	$\ln(1 + \text{frequency of digital transformation keywords})$
Moderating variable	ISO 9000 certification	ISO_Dummy	Equal to 1 if the firm holds a valid ISO 9000 certificate in the current year, otherwise 0
Control variables	Firm size	Size	Natural logarithm of total assets
	Leverage	Lev	Total liabilities / Total assets
	Firm age	Age	Current year minus the year of establishment
	Ownership concentration	Top10	Shareholding ratio of the top ten shareholders
	Return on assets	ROA	Net profit / Total assets
	Board size	Board	Natural logarithm of the number of board members
	Proportion of independent directors	Indep	Number of independent directors / Total number of board members
	Management shareholding ratio	MgtHold	Number of shares held by management / Total share capital
	Industry	Industry	Industry dummy variables
	Year	Year	Year dummy variables

4.3 Specification of Model

To test H1 (effect of DT on product quality), we estimate the following firm- and year-fixed effects model:

$$Quality_{i,t} = \beta_0 + \beta_1 Digital_{i,t} + \sum \beta_k Controls_{k,i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (2)$$

To test H2 (moderating effect of ISO 9000), we add the interaction term:

$$Quality_{i,t} = \alpha + \beta_1 Digital_{i,t} + \beta_2 ISO_Dummy_{i,t} + \beta_3 Digital_{i,t} \times ISO_Dummy_{i,t} + \sum \gamma_k Controls_{k,i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (3)$$

All regressions use firm-clustered robust standard errors. SPSS is used for analysis.

5 Empirical Result

5.1 Descriptive Statistics

Table 2 reports summary statistics. The digital transformation index (Digital) ranges from 0 to 6.696 (mean=3.702, SD=1.111), indicating substantial variation in digitalization across firms. The product quality composite score (Quality) has a mean of 4.55 (SD=1.650, range 0–9), suggesting room for improvement. About half of the sample observations hold ISO 9000 certification (mean=0.49), which facilitates subgroup analyses.

Table 2. Descriptive statistics of the main variables

Variable	N	Min	Max	Mean	Std. Dev.
Digital	1780	0.000	6.696	3.702	1.111
Quality	1780	0	9	4.55	1.650
ISO_Dummy	1780	0	1	0.49	0.500
Gross profit margin (%)	1780	-54.640	71.150	22.873	12.847
Firm size (log)	1780	19.518	27.638	22.384	1.295
Leverage	1780	0.045	1.797	0.426	0.192
Firm age	1780	5	66	22.71	6.589
Ownership concentration (%)	1780	8.170	94.590	52.245	15.781
Technical personnel ratio	1780	0.000	0.862	0.201	0.136
Fixed asset ratio	1780	0.002	0.750	0.202	0.117
R&D investment (log)	1780	0.000	24.715	18.748	2.431
Patents granted (log)	1780	0.000	8.430	2.638	1.682
Board size (log)	1780	1.386	3.219	2.238	0.280
Independent director ratio	1780	0.167	0.800	0.430	0.095
Management shareholding ratio	1780	0.000	0.832	0.130	0.172
ROA	1780	-1.644	0.584	0.019	0.097

5.2 Correlation Analysis

Table 3 presents pairwise correlations. Digital is positively correlated with Quality (r=0.157, p<0.01), providing preliminary support for H1. All correlation coefficients are below 0.7, indicating no severe multicollinearity.

Table 3. Correlation analysis of main variables

Variable	Digital	ISO_Dummy	Gross profit margin	Firm size	Leverage	Firm age	Ownership concentration
Digital	1						
Quality	0.157***						
ISO_Dummy	0.061***	1					
Gross profit margin	0.120***	0.105***	1				
Firm size	0.154***	-0.050**	-0.205***	1			
Leverage	0.064***	-0.076***	-0.531***	0.396***	1		
Firm age	-0.029	-0.068***	-0.178***	0.232***	0.148***	1	
Ownership concentration	-0.102***	-0.111***	-0.042*	0.074***	-0.048**	-0.068***	1
Technical personnel ratio	0.334***	0.076***	0.376***	-0.043*	-0.193***	-0.101***	-0.128***
Fixed asset ratio	-0.204***	-0.073***	-0.250***	0.078***	0.150***	0.060**	0.026
R&D investment (log)	0.139***	-0.029	-0.051**	0.522***	0.217***	0.066***	0.043*
Patents granted (log)	0.194***	0.149***	0.022	0.406***	0.088***	-0.008	0.077***
Board size	-0.056**	-0.064***	-0.186***	0.228***	0.140***	0.082***	-0.024
Independent director ratio	0.118***	0.018	0.153***	-0.093***	-0.074***	-0.048**	0.009
Management shareholding	0.021	-0.021	0.247***	-0.249***	-0.235***	-0.168***	0.197***
ROA	-0.065***	0.044*	0.389***	0.094***	-0.441***	-0.028	0.205***

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively; N = 1,780.

5.3 Baseline Regression Results (H1 test)

Table 4. Baseline regression results: Digital transformation and product quality

Variable	Coefficient	Std. Error	t-value	p-value
Digital	0.117***	0.034	3.444	<0.001
Firm size (log)	0.571***	0.034	16.784	<0.001
Leverage	-0.576**	0.238	-2.423	0.015
Firm age	-0.002	0.006	-0.306	0.760
Ownership concentration	-0.003	0.003	-1.358	0.175
ROA	-0.774*	0.439	-1.764	0.078
Board size (log)	0.201	0.135	1.488	0.137
Independent director ratio	-0.001	0.386	-0.002	0.998
Management shareholding ratio	0.595***	0.224	2.657	0.008
Industry	0.028	0.082	0.348	0.728
Year	0.079***	0.026	3.032	0.002

Constant	-168.364***	52.633	-3.199	0.001
Observations		1780		
R ²		0.201		
Adjusted R ²		0.196		
F-statistic		40.322***		

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4 shows the fixed-effects estimates. The coefficient of Digital is 0.117 ($p < 0.01$), supporting H1: digital transformation significantly improves product quality. Economically, a one-standard-deviation increase in Digital (1.111) raises Quality by about 0.13 points, which is meaningful given the 0–9 range.

5.4 Test of the Moderating Effect of ISO 9000 Certification

Table 5 reports the results with the interaction term Digital×ISO_Dummy. The interaction coefficient is -0.065 ($p = 0.316$), not significant. Thus H2 is not supported; ISO 9000 certification does not significantly moderate the DT–quality relationship. The main effect of DT remains positive and significant.

Table 5. Moderating Effect Test Results of ISO 9000 Certification

Variable	Coefficient	Std. Error	t-value	p-value
Digital	0.147***	0.046	3.218	0.001
ISO_Dummy	0.318	0.253	1.255	0.210
Digital×ISO_Dummy	-0.065	0.065	-1.003	0.316
Firm size	0.568***	0.034	16.791	<0.001
Leverage	-0.579**	0.238	-2.437	0.015
Firm age	-0.001	0.006	-0.157	0.875
Ownership concentration	-0.003	0.003	-1.284	0.199
ROA	-0.803*	0.440	-1.826	0.068
Board size	0.202	0.135	1.492	0.136
Independent director ratio	-0.012	0.386	-0.030	0.976
Management shareholding ratio	0.602***	0.224	2.681	0.007
Industry	0.052	0.083	0.619	0.536
Year	0.078***	0.026	3.004	0.003
Constant	-167.111***	52.669	-3.173	0.002
Observations		1780		
R ²		0.201		
Adjusted R ²		0.196		
F-statistic		34.279***		

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively; the dependent variable is the composite product quality score.

5.5 Heterogeneity Analysis

Firm size. Table 6 shows that DT significantly improves quality only in large firms ($\beta=0.172$, $p<0.01$), not in small firms ($\beta=0.056$, n.s.), suggesting resource constraints limit small firms' ability to benefit from DT.

Table 6. Regression Results by Firm Size

Variable	Small firm group (N = 891)		Large firm group (N = 889)	
	Coefficient	t-value	Coefficient	t-value
Digital	0.056	1.216	0.172*	3.467
Firm size	0.483***	5.114	0.383***	6.789
Leverage	-0.332	-1.061	-0.777**	-2.132
Firm age	0.016*	1.814	-0.015**	-2.033
Ownership concentration	-0.007*	-1.714	0.002	0.602
ROA	-1.367**	-2.238	-0.387	-0.605
Board size	-0.091	-0.496	0.549***	2.803
Independent director ratio	-0.360	-0.662	0.434	0.779
Management shareholding ratio	0.841***	2.952	0.451	1.190
Industry	0.080	0.653	-0.100	-0.881
Year	0.021	0.565	0.137***	3.796
Constant	-48.547	-0.651	-282.896***	-3.868
Observations	891		889	
R ²	0.060		0.116	
Adjusted R ²	0.048		0.105	
F-statistic	5.057***		10.435***	

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively; the dependent variable is the composite product quality score. The grouping criterion is the annual median of the natural logarithm of total assets.

Firm age. Table 7 indicates DT benefits both young ($\beta=0.092$, $p<0.05$) and old firms ($\beta=0.132$, $p<0.05$), with a stronger effect in older firms, reflecting the value of accumulated experience.

Table 7. Regression Results by Firm Age

Variable	Young firm group (N = 958)		Old firm group (N = 822)	
	Coefficient	t-value	Coefficient	t-value
Digital	0.092**	2.135	0.132**	2.313
Firm size	0.653***	12.993	0.509***	11.156
Leverage	-0.290	-0.891	-0.883**	-2.520
Firm age	0.023	1.439	-0.005	-0.556
Ownership concentration	-0.006	-1.587	0.000	0.104
ROA	-0.590	-1.102	-0.919	-1.164
Board size	-0.105	-0.543	0.443**	2.333
Independent director ratio	0.261	0.498	-0.464	-0.805

Variable	Young firm group (N = 958)		Old firm group (N = 822)	
	Coefficient	t-value	Coefficient	t-value
Management shareholding ratio	0.541*	1.745	0.709**	2.154
Industry	0.018	0.151	-0.008	-0.069
Year	0.063*	1.747	0.091**	2.348
Constant	-136.973*	-1.891	-191.208**	-2.447
Observations	958		822	
R ²	0.215		0.193	
Adjusted R ²	0.206		0.182	
F-statistic	23.571***		17.590***	

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively; the dependent variable is the composite product quality score. The grouping criterion is the annual median of firm age.

ISO 9000 certification status. Table 8 reveals a substitution effect: DT significantly improves quality in non-certified firms ($\beta=0.167$, $p<0.01$) but not in certified firms ($\beta=0.052$, n.s.). The difference is statistically significant (Fisher's Z test).

Table 8. Regression Results by ISO 9000 Certification

Variable	Non-certified firm group (N = 909)		Certified firm group (N = 871)	
	Coefficient	t-value	Coefficient	t-value
Digital	0.167***	3.447	0.052	1.083
Firm size	0.545***	11.384	0.589***	12.167
Leverage	-0.531	-1.537	-0.526	-1.609
Firm age	-0.012	-1.623	0.013	1.551
Ownership concentration	-0.005	-1.351	0.001	0.164
ROA	0.032	0.054	-2.140***	-3.147
Board size	0.335	1.618	0.096	0.540
Independent director ratio	-0.452	-0.830	0.503	0.918
Management shareholding ratio	0.949***	3.185	0.097	0.283
Industry	0.135	1.211	-0.126	-0.984
Year	0.062*	1.689	0.103***	2.795
Constant	-133.663*	-1.802	-217.394***	-2.921
Observations	909		871	
R ²	0.209		0.216	
Adjusted R ²	0.200		0.205	
F-statistic	21.608***		21.455***	

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively; the dependent variable is the composite product quality score. The grouping is based on whether the firm holds a valid ISO 9000 certificate.

5.6 Robustness Test: Replacing the Dependent Variable

Replacing the dependent variable with gross profit margin (Table 9) yields a consistently positive and significant coefficient for Digital ($\beta=1.373$, $p<0.01$), confirming the robustness of H1.

Table 9. Robustness Test: Substituting the Dependent Variable with Gross Profit Margin

Variable	Coefficient	Std. Error	t-value	p-value
Digital	1.373***	0.228	6.033	<0.001
Firm size	-0.162	0.226	-0.718	0.473
Leverage	-23.827***	1.597	-14.924	<0.001
Firm age	-0.121***	0.038	-3.176	0.002
Ownership concentration	-0.074***	0.017	-4.371	<0.001
ROA	31.626***	2.950	10.720	<0.001
Board size	-2.416***	0.909	-2.659	0.008
Independent director ratio	8.950***	2.593	3.452	<0.001
Management shareholding ratio	7.326***	1.506	4.865	<0.001
Industry	-3.470***	0.550	-6.311	<0.001
Year	-0.763***	0.175	-4.361	<0.001
Constant	1583.042***	353.742	4.475	<0.001
Observations		1780		
R ²		0.404		
Adjusted R ²		0.401		
F-statistic		109.107***		

Note: ***, **, * indicate significance at the 1%, 5%, and 10% levels respectively; the dependent variable is the operating gross profit margin (%).

6 Conclusion and Suggestion

6.1 Research Conclusions

Using Chinese A-share manufacturing firms from 2020–2024, this study finds: (1) Digital transformation significantly improves product quality, robust to alternative measures. (2) ISO 9000 certification does not significantly moderate the DT–quality relationship. (3) The quality-enhancing effect is stronger in large and established firms, and weaker/insignificant in small and young firms, revealing resource and experience dependencies. (4) A substitution effect exists: DT improves quality more strongly in non-certified than in certified firms, suggesting digital technology can fill institutional gaps.

6.2 Theoretical Contribution

First, this study bridges digital transformation and quality management research by introducing ISO 9000 certification as a moderator, revealing the contingent boundaries of institution-technology interaction. Second, it uncovers size- and age-dependent heterogeneity, providing new evidence on the “digital divide” at the firm level. Third, it identifies a substitution effect between DT and ISO 9000, challenging the assumption that systems and technologies are naturally complementary, and offering a new perspective on quality catch-up in emerging economies.

6.3 Practical Insights

Firms should treat digitalization as a strategic investment for quality improvement. Large and established firms can leverage their resource and experience advantages to deepen DT–quality synergy. Small and young firms should adopt “small steps, rapid progress” strategies, prioritizing digital tools in key quality links. Policymakers should address the digital divide by offering targeted support (subsidies, training, public platforms) to small and new firms, and update ISO 9000 assessments to include digital quality management practices.

6.4 Research Limitations and Future Prospects

This study has limitations: (1) The sample is limited to manufacturing; future research should test cross-industry generalizability. (2) ISO 9000 certification is measured as a binary variable, ignoring depth and implementation quality; future work could use duration, audit results, or certification level. (3) Endogeneity and mediation mechanisms remain underexplored; future studies could employ instrumental variables or quasi-experimental designs to strengthen causal identification.

References

1. Wang, L. (2024). Study on the path and effect of TCL Corporation's digital transformation [Master's thesis, Guangxi University]. <https://doi.org/10.27034/d.cnki.ggxixu.2024.000851>.
2. Fan, L. (2024). Research on the path of enterprise digital transformation to promote export product quality upgrade [Master's thesis, Jiangxi University of Finance and Economics]. <https://doi.org/10.27175/d.cnki.gjxcu.2024.002041>.
3. Chen, M., Du, P., & Fang, Z. (2023). How does enterprise digital transformation affect the export product quality? — Empirical evidence from Chinese listed companies. *Business Research*, (5), 51–59. <https://doi.org/10.13902/j.cnki.syyj.2023.05.015>.
4. Li, J. (2024). Research on the digital transformation strategy of Company P [Master's thesis, University of Electronic Science and Technology of China]. <https://doi.org/10.27005/d.cnki.gdzku.2024.006114>.
5. Wang, J., & Chen, J. (2024). Enterprise product quality and capital market stability: Based on the perspective of "ISO9000 Quality Management System". *Nankai Business Review*, 27(6), 149–159. <https://link.cnki.net/urlid/12.1288.F.20220928.1125.002>.

6. Guo, J. (2025). The organic integration of low-carbon concept and quality management promotes the upgrade of electrical engineering quality management. *China Quality Journey*, (6), 50–53. https://kns.cnki.net/kcms2/article/abstract?v=VrduTR4bJX7lj1fR2kQej4lQzAofY0DdSXmd2TPIHhVH02q0AVGXczQwgZU84L3pYFMZwSwOn3nbpxmRVha_GQo6GZZoWDSXz32KbtsUJjiQnofhdV-eOaHBy_4lGH1gf6ydfsCFnSZkakBRz7eX-txwyQa1-LNLcrYBto05bZoDdidS4KN4TiMtXGKfAh8L&uniplatform=NZKPT&language=CHS.
7. Zahra, S. A. (2021). The Resource-Based View, Resourcefulness, and Resource Management in Startup Firms: A Proposed Research Agenda. *Journal of Management*, 47(7), 1841–1860. <https://doi.org/10.1177/01492063211018505>.
8. Zhang, Z. (2025). The impact of enterprise digital transformation on export product quality: Based on the supply chain perspective [Master's thesis, Jilin University]. <https://doi.org/10.27162/d.cnki.gjlin.2025.007619>.
9. Shen, X., & Lu, J. (2026). Research on the strategy of digital empowerment for the transformation and upgrading of the automobile manufacturing industry. *China Management Informationization*, 29(2), 124–126. https://kns.cnki.net/kcms2/article/abstract?v=VrduTR4bJX4_fp2FANIVmdK5oWW-d25-MdsApWvubLPgPBtlzxiZsKovfbZIHkSoKj4ajjjgYGTfPJ9SROnwUPqWa4S9vK7YQOINHHCAGxVecT9mzgtxz55FgQ-4_6zHCCR2WMbhPXQej2lVzh16BR_qkujj0KvHa6b-5ZBFDVuqV_fUrFp34JuV_3EYLSW&uniplatform=NZKPT&language=CHS.
10. Jiang, F., Zhu, D., Zeng, X., & Kang, Y. (2017). Exploration and reflection on the construction of quality culture. *Petroleum Planning & Design*, 28(2), 47–49. https://kns.cnki.net/kcms2/article/abstract?v=VrduTR4bJX4MS_Tw5lKuRsGUsPnIJXO4vyQFoRNJEKarl2uWPvra4XjV9RE2Z4AjuMv8HvFdWxFAZ9A5ZBqQxkDFmeKkqA8snSDVvMfP2Piywh1jflSOTy8UMTzZabENoCEl_IXTqmkLKf79XM2MvKz4PJ7L9660IuG2giJLV8ZEJc0-nC8vEzhPGm6FjDl6&uniplatform=NZKPT&language=CHS.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

