

The Impact of Employee Loyalty on Firm Performance in Chinese Engineering Cost Consulting Companies

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Abstract: This study takes China engineering cost consulting enterprises as the analysis object, collects and analyzes 352 valid cases of engineering cost consulting enterprises, evaluates the current status of employee loyalty and firm performance in the engineering cost consulting field, explores the role relationship and influence path of employee loyalty on firm performance, and proposes that attention should be paid to improving firm performance through the cultivation of employee loyalty. The research results show that the positive correlation between employee loyalty and firm performance is still applicable in the field of engineering cost consulting enterprises. In terms of influence paths, employee loyalty has a positive promoting effect on firm performance. Meanwhile, there is still considerable room for improvement in the relationship between employee loyalty and firm performance in engineering cost consulting enterprises. These findings reveal the mechanism of employee loyalty's impact on firm performance in engineering cost consulting enterprises, broaden the industry field of research on the relationship between employee loyalty and firm performance, and provide data references for personnel management and performance improvement in knowledge-based enterprises.

Keywords: Engineering Cost Consulting Companies; Employee Loyalty; Firm Performance.

1. Introduction

Since 2013, the proportion of China's construction industry added value in GDP has consistently remained above 6.85%, solidifying its position as a pillar industry of the national economy (China Construction Industry Association, 2022). The most crucial aspect of the construction market operation is project cost estimation (Wang Lan, 2015), with construction cost management being the core component of the entire project management process and a prerequisite for ensuring smooth project implementation (Wang Shasha, 2015). Engineering cost consulting firms are enterprises that provide professional consulting services for project investment and cost determination and control upon commission (Management Measures for Engineering Cost Consulting Firms, 2006). As an essential part of engineering consulting, China's engineering cost consulting industry has evolved over two decades, progressing from its initial formation to the current landscape of a hundred competing firms, with more and more companies growing and expanding, and market competition becoming increasingly intense. Currently, the number of engineering cost consulting firms in China is growing rapidly. According to data released by China's Ministry of Housing and Urban-Rural Development, there were 16,536 firms engaged in engineering cost consulting nationwide by the end of 2024 (2024 Engineering Cost Consulting Statistical Bulletin, 2025). The China Engineering Cost Consulting Industry Status in-depth Research and Investment Trend Report (2022-2029) points out that although there are numerous engineering cost consulting firms in China, there is a lack of well-known leading enterprises, and the industry concentration is relatively low. Compared with other industries, the employee turnover rate in engineering cost consulting firms remains high (Cui Wenjing, 2017). The data in the statistical bulletin in recent years also show that the proportion of temporary

employees among the employees of engineering cost consulting enterprises is basically maintained at about 7%, which is relatively high, which also leads to the high mobility of employees in engineering cost consulting enterprises to some extent.

Guangdong Province, located in the southernmost part of the Chinese mainland, is not only a populous province of China but also a major economic province. The development of its engineering cost industry serves as a model for the whole country (Guangdong Engineering Cost Industry Development Report 2019-2020,2021). As the most economically developed province in China, after years of development, Guangdong's engineering cost consulting industry has also reached a certain scale. In the past five years, the number of engineering cost consulting enterprises in Guangdong has grown from 652 in 2020 to 752 in 2024. In an increasingly competitive market environment, Guangdong's engineering cost consulting enterprises also face the same issues as the entire industry (low performance and high staff turnover), such as the fact that most cost consulting enterprises still provide products and services limited to the traditional "estimate, estimate, budget, settlement, final account" five calculation stages, with severe homogenization (Li Xiaowu, 2019). Although the overall market size of the engineering cost industry continues to expand, the growth rate is very small, and the revenue proportion remains limited to engineering settlement business, with cost consulting income accounting for less than 50% of the total revenue of cost consulting enterprises (Wu Zuomin, 2016). Both the tendency toward homogenization and the related issue of frequent staff turnover will significantly impact the firm performance of enterprises, hindering the stable development of engineering cost consulting enterprises.

In corporate management, a key indicator of human-oriented governance lies in employee loyalty. The level of employee loyalty has become a key reflection of an

organization's humanistic management standards (Li Bin, 2011). Generally speaking, employee loyalty refers to the degree of commitment employees show toward their company (Sun Jian, 2003). Higher employee loyalty correlates with lower turnover rates, while high-performing employees are crucial for improving corporate performance and driving profitability (Peng Qingfei, 2016). With the advent of the knowledge economy era, businesses increasingly recognize talent as a scarce resource that embodies an organization's core competitiveness. In the cutthroat market competition, maintaining a stable talent pool and loyal workforce proves vital. When facing uncertain business environments, enhancing employee loyalty becomes an effective strategy for achieving better performance (Lu Zhu, 2010).

This study focuses on engineering cost consulting firms in Guangdong Province. By analyzing employee loyalty and firm performance in these enterprises, it explores how employee loyalty impacts firm performance. The research provides theoretical guidance for engineering cost consulting firms to enhance firm performance, helping companies effectively retain talent. Through cultivating loyal employees, the study ensures enterprises can achieve stable and sustainable development in the face of intense market competition.

2. Literature Review

2.1. Concept and Dimensions of Employee Loyalty

Employee loyalty is a relatively abstract concept. When defining and studying employee loyalty, domestic and foreign scholars mainly show three tendencies, namely, attitude loyalty theory, behavior loyalty theory and attitude behavior synthesis theory.

The attitude loyalty theory defines employee loyalty from the perspective of employees' subjective attitudes toward the organization. For example, Liu Min et al. (2009) started from attitude and pointed out that employee loyalty consists of three levels: honesty, integrity, and dedication. Yan Peiyuan (2012) found through research that Chinese employees place greater emphasis on the emotional aspect of firm loyalty, primarily manifested as loyalty to bosses or leaders, with strong social norms and ethical concepts. The behavioral loyalty theory mainly explores employees' specific behaviors toward the organization, emphasizing their loyalty behaviors and contributions. Richard Coughlan (2005) noted that employee loyalty is primarily reflected in behavior, serving as an external manifestation of employees' attachment to the organization. Zheng Weiwen (2016), using a medium-sized enterprise in China as a research subject, discovered that employees choose different loyalty objects for various reasons and exhibit different loyalty behaviors. The attitude-behavior synthesis theory combines both attitude and behavior, defining employee loyalty from a comprehensive perspective that integrates attitude and behavioral loyalty. John W. Lee (1986) believed that employee loyalty refers to obedience to superiors, a sense of belonging and responsibility within the enterprise, diligent work, and active contributions to the development and prosperity of the enterprise. Backman and Crompton (1991) argued that loyalty encompasses both behavioral and attitudinal aspects, with behavior referring to the consistency of actual actions and attitude reflecting the degree of emotional preference. Bozena

Zdaniuk and John M. Levine (2001) argue that highly loyal employees are willing to accept the same treatment as their colleagues, and remain in the company even when higher salaries are available elsewhere.

Drawing on global research findings, this paper adopts the integrated attitude-behavior theory to define employee loyalty. It posits that employee loyalty encompasses both behavioral alignment and psychological attachment to an organization, representing the level of selfless dedication employees demonstrate to their employer. This concept constitutes firms an organic unity of behavioral and attitudinal loyalty (Cao Zhiyao, 2012). Guided by this theory, the study employs Meyer & Allen's (1991) three-factor loyalty model to construct the framework. Developed through comprehensive analysis of loyalty research, this model expands the integrated perspective to include three dimensions: affective loyalty, normative loyalty, and continuance loyalty. The introduction of this three-factor model has exerted profound influence, with numerous scholars worldwide adopting or referencing it in their research on employee loyalty (Liu Xiaoping & Wang Zhongming, 2002).

2.2. Concept and Dimensions of Firm Performance

Firm performance, as a crucial metric for evaluating corporate operations, has garnered extensive scholarly attention and research. Similar to the concept of employee loyalty, there remains no universal consensus in academia regarding its definition. A review of existing literature and research findings reveals three predominant interpretive approaches: outcome-oriented theory, behavior-oriented theory, and integrated behavioral-outcome theory.

The first perspective is the outcome-oriented theory. This view emphasizes results or outputs in firm performance. Scholars supporting this perspective generally define firm performance as the quantity, quality, efficiency, and profitability of tasks completed by an organization within a specific period, representing its work outputs during that time (Gu & Tang, 2021). Wiggins et al. (2002) argue that firm performance is the ultimate goal pursued by organizations and serves as a manifestation of their competitive advantage. The second perspective is the behavior-oriented theory. This view focuses on the actions or activities taken to achieve firm goals. Campbell & McHenry et al. (1990) suggest that performance objectives are directly reflected in human behavior, being observable results. Murphy et al. (1996) define firm performance as a set of behaviors related to goals (both firm and individual), emphasizing that it can be observed and measured through specific methods. Some scholars also approach it from the perspective of firm activities, viewing performance as a series of actions taken through business operations to achieve expected goals (Wang Jinglun, 2016). The third perspective is the integrated behavior-result orientation. This view emphasizes the combination of actions and outcomes, considering firm performance to encompass both related behaviors and their results or outputs. Scholars supporting this view believe that firm performance represents the sum of behavioral goals and outcome goals achieved by an organization (Zhao Yuping, 2023).

Based on the comprehensive analysis, while there are differing interpretations of firm performance in academic circles, scholars widely agree that "performance is not a concept but a component" (Lin Jinjin, 2012). For corporate organizations, performance objectives are typically

multifaceted (Hu Jinrong, 2022). This study posits that firm performance is a composite concept encompassing task completion, confidence in future prospects, and the quality of relationships among members and with leadership. Campbell (2007) noted that due to the lack of operational definitions, the essence of firm performance requires theoretical modeling. Most research adopts this approach, flexibly establishing performance metrics based on practical contexts (Zhang Xuelan, 2008). Current classifications primarily focus on financial and non-financial performance (Yuan Qiwei, 2020; Zhou Yashan, 2019). Strategically coordinating evaluations of these two dimensions has become a consensus among managers and researchers (Shi Jianliang, 2011). Therefore, this paper adopts the dimensional classification method of financial and non-financial performance dimensions commonly used by most researchers.

2.3. The Relationship Between Employee Loyalty and Firm Performance

Reichheld Frederick (2001) emphasized that employee loyalty serves as the cornerstone of corporate development, delivering substantial returns to performance. This loyalty exerts economic impacts on corporate capital, brand image, production costs, and business volume. However, while theoretical discussions on the relationship between employee loyalty and firm performance are abundant, empirical research remains relatively scarce (Ke Ying, 2013). Existing studies predominantly examine loyalty's influence on performance through variables like employee satisfaction and firm commitment (Zhao Wei, 2007). Notably, Jian Zhaoquan and Wu Longzeng (2018) empirically demonstrated how high-loyalty knowledge workers enhance firm performance through knowledge absorption, integration, and innovation. Yuan Qiwei (2020) conducted a cross-strait comparative study of tech and knowledge-based enterprises, revealing that firm belongingness significantly predicts performance through employee loyalty's mediating role.

Research on the relationship between employee loyalty and firm performance demonstrates that employee loyalty positively impacts firm outcomes. Behavioral loyalty contributes to financial performance, as continued service reduces long-term firm costs (Pfeffer, 1998). James Heskett of Harvard Business School emphasized in the late 20th century that employee loyalty is a key factor in corporate development and ultimate profitability. Frederic (2001) further proposed that employee loyalty serves as a more effective metric for corporate performance than profit indicators. Through three years of empirical research, Huaxin Huiyue Company found that companies with higher employee loyalty achieved shareholder returns nearly 200% higher than those with lower loyalty indices (Jochen Schfer, Ali Cinar, 2010). Chen Xiaoning (2010) directly applied loyalty metrics as a performance evaluation factor. Peng Hefang and Lu Yumei (2015) conducted a study on manufacturing enterprises in Jiangsu Province, revealing that employee loyalty significantly enhances corporate performance.

Masakure (2016) established a causal relationship between employee loyalty and firm performance, revealing a negative correlation between employee loyalty and salary. Li Yanping and Xiong Xiangqing (2017) analyzed core employees in insurance companies and found that loyalty positively impacts their performance. Li Huiyu and Guo Xiaomin (2019) demonstrated through software development industry

research that employee loyalty enhances performance. Tomic et al. (2018) conducted a study with 100 employees in Serbia and Bosnia and Herzegovina, confirming a significant correlation between employee loyalty and corporate performance, with the latter showing positive effects on firm outcomes.

Based on the comprehensive analysis, existing studies on the relationship between employee loyalty and firm performance generally conclude that there exists a positive correlation between the two. However, research specifically focusing on engineering cost consulting firms as the subject of study remains relatively scarce. Therefore, this paper selects engineering cost consulting firms as the analytical focus to explore the relationship between employee loyalty and firm performance in this industry. Building upon the fundamental conclusions about the correlation between employee loyalty and firm performance, the study proposes the following hypothesis: Employee loyalty in engineering cost consulting firms has a positive impact on firm performance.

3. Research Method

This study primarily employs a questionnaire survey method to investigate the relationship between employee loyalty and firm performance among technical staff in engineering cost consulting firms in Guangdong Province. Based on literature review and analysis, the research conceptualizes employee loyalty and firm performance as variables, develops a corresponding questionnaire, and conducts surveys among technical employees in these firms. Statistical analysis is then performed to describe the status of employee loyalty and firm performance in Guangdong's engineering cost consulting sector, while testing the research hypothesis regarding the relationship between employee loyalty and firm performance.

The survey questionnaire consists of three main sections: The first section contains basic demographic information, including statistical variables such as gender, age, educational background, marital status, years of service in the current position, company size, and company establishment date. The second section features an employee loyalty scale, while the third section includes a firm performance scale. All items in the scales employ a Likert five-point rating system ranging from "strongly disagree" to "strongly agree," with higher scores indicating stronger agreement. Based on a pilot test with 90 participants, variables with factor loading coefficients below 0.5 were excluded to form the final scale. The employee loyalty scale comprises three dimensions—emotional loyalty, continuance loyalty, and normative loyalty—totaling 12 items. The firm performance scale includes financial and non-financial performance metrics, comprising 8 items.

Given the extensive cross-provincial operations of engineering cost consulting firms and the high mobility of professionals across regions, this study combines stratified sampling with non-probability sampling methods. First, stratified sampling was employed to categorize Guangdong's prefecture-level cities into three groups based on economic development levels (using 2024 economic data): 4 cities with trillions in GDP (Shenzhen, Guangzhou, Foshan, Dongguan), 7 cities with 300-700 billion yuan (Huizhou, Zhuhai, Jiangmen, Zhongshan, Maoming, Zhanjiang, Shantou), and 10 cities below 300 billion yuan (Zhaoqing, Jieyang, Qingyuan, Shaoguan, Yangjiang, Meizhou, Shanwei, Heyuan,

Chaozhou, Yunfu). A representative city was then randomly selected from each category—Guangzhou, Zhanjiang, and Yangjiang. Next, non-probability sampling was applied as official statistics on enterprise numbers and lists were unavailable, preventing a complete sampling frame. Specifically, technical personnel from engineering cost consulting firms were contacted through purposive sampling in these three cities, then expanded through their networks to gather 384 valid responses. The survey distributed 384 questionnaires, with 352 valid returns (91.67% recovery rate), meeting the minimum sample size requirement for robust empirical research.

4. Results

4.1. Descriptive Statistical Analysis

First, descriptive statistical analysis was conducted on demographic characteristics including gender, age, education level, marital status, and years of employment within the sample population. As shown in Table 1, the gender distribution reveals 169 males (48% of the total sample) and 183 females (52%), indicating a slightly higher proportion of female participants. Regarding age distribution, the following groups were observed: 36 individuals aged 25 or younger (10.2%), 74 aged 26-30 (21%), 116 aged 31-40 (33%), and 126 aged 41 and above (35.8%), with the latter constituting the largest age group.

In terms of education level, there are 12 high school/technical secondary school students, accounting for 3.4% of the total sample, 96 college students, accounting for 27.3% of the total sample, and the largest number of college students, 239, accounting for 67.9% of the total sample. There

are 5 graduate students and above, accounting for only 1.4% of the total sample.

The survey questionnaire included four marital status options: unmarried, married, divorced, and other. However, the collected data only covered the first three categories, so the analysis temporarily excluded other marital statuses. Among the recorded responses, married individuals constituted the majority at 286 respondents (81.3% of the total sample), followed by unmarried respondents (63, 17.9%), while divorced respondents were the fewest at 3 individuals (less than 1% of the total sample).

Regarding the working years of the sample, the survey investigated the working years of the sample in the current enterprise. There are more people with long-term working experience, with 105 people working for more than 10 years, accounting for 29.8% of the total sample, 101 people working for 6-10 years, accounting for 28.7% of the total sample, 97 people working for 2-5 years, accounting for 27.6% of the total sample, and 49 people working for less than 2 years, accounting for 13.9%.

In terms of the size distribution of the sample enterprises, the majority belong to medium-sized and large enterprises. Among them, 181 samples belong to enterprises with 51 or more employees, accounting for 51.4% of the total sample. There are 144 samples belonging to enterprises with 21-50 employees, accounting for 40.9%, and 27 samples belonging to enterprises with 20 or less employees, accounting for 7.7% of the total sample.

Overall, the collected samples are diverse and representative in key demographic categories, enhancing the robustness and universality of the study results.

Table 1. Basic sample information

essential information	class	frequency	percentage (%)	accumulative perception (%)
Sex	Man	169	48.0	48.0
	woman	183	52.0	100.0
Age	25 years old and under	36	10.2	10.2
	26 to 30	74	21.0	31.3
	31 to 40	116	33.0	64.2
	41 and older	126	35.8	100.0
Education	High school/Secondary vocational school	12	3.4	3.4
	Junior college	96	27.3	30.7
	Undergraduate college	239	67.9	98.6
	Postgraduate	5	1.4	100.0
Marital status	Unmarried	63	17.9	17.9
	Married	286	81.3	99.1
	Divorced	3	0.9	100.0
Years of service in this company	Less than 2 years	49	13.9	13.9
	2-5 years	97	27.6	41.5
	6-10 years	101	28.7	70.2
	More than 10 years (not including 10 years)	105	29.8	100.0
Enterprise size	20 or fewer	27	7.7	7.7
	21–50 people	144	40.9	48.6
	51 or more	181	51.4	100.0
Years of operation	Less than 1 year	11	3.1	3.1
	1-5 years	41	11.6	14.8
	6-10 years	119	33.8	48.6
	More than 10 years (not including 10 years)	181	51.4	100.0

4.2. Reliability and Validity Analysis

4.2.1. Reliability Analysis

Before conducting analysis, it is essential to test the reliability and validity of the scale questionnaire to ensure data consistency and validity. The prevailing view holds that an Alpha value exceeding 0.7 meets research requirements, while values below 0.6 indicate inconsistent item responses, necessitating redesign. This study will strictly adhere to this standard, evaluating questionnaire reliability through Cronbach's Alpha calculations to assess scale consistency.

The reliability test results from SPSS26.0 are presented in Table 2. The three dimensions of employee loyalty—emotional loyalty, continuance loyalty, and normative loyalty—show reliability coefficients ranging from 0.899 to 0.969. For firm performance, the two dimensions (financial performance and non-financial performance) have reliability coefficients of 0.970 and 0.855, respectively. The combined reliability coefficients for both employee loyalty and firm performance are 0.924 and 0.927, respectively. All coefficients exceed 0.8, indicating high reliability levels across scales, with internal consistency meeting research requirements.

Table 2. Reliability test results of various scales

Variable	Subvariable	Number of items	Cronbach's α	Total Cronbach's α
Employee loyalty	Emotional Loyalty	5	.955	.924
	Stay loyal	4	.969	
	Standardize loyalty	3	.899	
Firm Performance	Financial performance	4	.970	.927
	Non-financial performance	4	.855	

4.2.2. Validity Analysis

After completing the reliability test of the questionnaire, it is essential to conduct validity analysis to ensure all items possess substantive measurement value. Validity analysis aims to evaluate the validity of the obtained data, specifically the precision with which the measurement tool accurately measures the target construct. Higher validity indicates better alignment between measurement results and the measured construct, while lower validity suggests poorer correspondence. The validity analysis process generally involves two steps: First, use KMO and Bartlett's sphericity test to determine whether the items to be validated are suitable for factor analysis. If the criteria are met, proceed to the second step of factor analysis.

The KMO coefficient and Bartlett's test are key indicators for determining whether data is suitable for factor analysis. The KMO statistic compares observed correlation coefficients with partial correlation coefficients. Generally, a $KMO > 0.9$ indicates high validity and suitability for factor analysis; $0.8 < KMO < 0.9$ suggests suitability; $0.7 < KMO < 0.8$ indicates moderate suitability; $0.6 < KMO < 0.7$ denotes general suitability; $0.5 < KMO < 0.6$ suggests limited suitability but acceptable; while $KMO < 0.5$ indicates the study is fundamentally unsuitable for factor analysis (Yuan Yang, 2019; Huang Henghuang, 2006). Bartlett's test assesses normal distribution using the significance level (sig): a sig < 0.05 is considered statistically significant, supporting exploratory factor analysis.

In conducting exploratory factor analysis, this study extracted factors from measurement items using principal component analysis (PCA) with maximum variance rotation, identifying factors with eigenvalues greater than 1. Items meeting the following criteria demonstrate adequate structural validity: factor loadings exceeding 0.5 and cumulative variance explanations surpassing 70%.

Table 3. Employee Loyalty Factor Analysis

Test item	factor 1	factor 2	factor 3
QG1	.891	.143	.284
QG2	.919	.114	.262
QG3	.895	.134	.325
QG4	.898	.176	.282
QG5	.658	.261	.374
CX1	.242	.877	.093
CX2	.141	.965	.110
CX3	.137	.966	.090
CX4	.078	.950	.110
GF1	.366	.161	.857
GF2	.348	.036	.756
GF3	.326	.150	.887
eigenvalue	6.648	2.801	1.037
Initial variance	55.398%	23.346%	8.642%
Explain variance (rotation)	34.511%	31.134%	21.741%
Cumulative explained variance	87.386%		
KMO	.874		
Bartlett's test chi-square value	5695.363		
Sig.	.000		

(Note: QG stands for emotional loyalty; CX for continuous loyalty; GF for normative loyalty)

First, SPSS26.0 was used to conduct validity analysis on the employee loyalty scale. Step 1: Assessing item suitability for factor analysis (Table 3). With a KMO value of 0.874 and a Bartlett's test of sphericity chi-square value of 5695.363 ($p=0.000$), the scale items were deemed suitable for exploratory factor analysis. Subsequently, principal component analysis (PCA) was performed, yielding three factors with eigenvalues of 6.648, 2.801, and 1.037—all exceeding 1. The cumulative variance explained by these factors accounted for 87.386%, with initial variance contributions of 55.398%, 23.346%, and 8.642% respectively. Notably, the first factor contributed over 50% of the variance, indicating its potential dominance in explaining common variance. To prevent invalid results caused by uneven factor loading distribution, rotation was applied to optimize

theoretical interpretation. The variance distribution changes among factors became evident: the first factor's contribution dropped from 55.398% to 34.511%, the second increased from 23.346% to 31.134%, and the third rose from 8.642% to 21.741%. Although the explanatory rates varied across factors, the rotated cumulative variance explained remained consistent at 87.386%-meeting the 70% threshold required for valid research. In addition, the factor load of 12 sub-items in the scale is more than 0.7. The above data indicate that the measurement items of employee loyalty scale are consistent with the measurement content, and the structure of the scale has good validity.

Secondly, the firm performance scale underwent validity analysis using the same methodology. Data analysis in Table 4 revealed a KOM value of 0.874 and a Bartlett's test of sphericity chi-square value of 3161.676 ($p=0.000$), indicating suitability for factor analysis. Factor analysis using principal component analysis yielded two factors with eigenvalues exceeding 1: 5.399 and 1.099. The initial variance explained by these factors was 67.483% and 13.736%, respectively. Through rotation, the variance contribution of the first factor decreased from 67.483% to 45.302%, while the second factor increased from 13.736% to 35.917%. The cumulative variance explained reached 81.219%, meeting the 70% research threshold. Additionally, all eight subscale items demonstrated factor loadings above 0.6. These results confirm strong alignment between the scale's measurement items and content, demonstrating robust validity in its structural design.

Table 4. Firm Performance Factor Analysis

Test item	factor 1	factor 2
CW1	.908	.336
CW2	.910	.328
CW3	.904	.342
CW4	.876	.305
FC1	.272	.642
FC2	.371	.829
FC3	.379	.791
FC4	.184	.847
eigenvalue	5.399	1.099
Initial variance	67.483%	13.736%
Explain variance (rotation)	45.302%	35.917%
Cumulative explained variance	81.219%	
KMO	.874	
Bartlett's test chi-square value	3161.676	
Sig.	.000	

(Note: CW stands for financial performance; FC stands for non-financial performance)

4.3. Employee Loyalty and Firm Performance Status

4.3.1. Employee Loyalty Status

The overall employee loyalty level of engineering cost consulting firms tends to be relatively high. In the survey of 352 samples, the average employee loyalty score reached 3.4, surpassing the general average. Regarding the three sub-dimensions of emotional loyalty, continuous loyalty, and normative loyalty (Table 5), emotional loyalty scored the highest at (3.72-0.859, 3.72+0.859) points. Both continuous loyalty and normative loyalty averaged 3.17 points, slightly exceeding the general average.

Table 5. Employee loyalty and sub-dimension scores

	N	least value	crest value	mean	standard deviations
Emotional Loyalty	352	1	5	3.72	.859
Continuous loyalty	352	1	5	3.17	.919
Normative loyalty	352	1	5	3.17	.828
Employee loyalty	352	1	5	3.40	.692

4.3.2. Current Firm performance

In terms of firm performance, engineering cost consulting firms generally outperform average levels, with a 352-sample average score of 3.49 (Table 6). Regarding the two sub-

dimensions of financial and non-financial performance, financial performance demonstrates the highest agreement rate at (3.83-0.874, 3.83+0.874) points, while non-financial performance scores (3.15-0.805, 3.15+0.805) points, slightly exceeding average levels.

Table 6. Firm Performance and Sub-Dimension Scores

	N	least value	crest value	mean	standard deviations
Financial performance	352	1	5	3.83	.874
Non-financial performance	352	1	5	3.15	.805
Firm Performance	352	1	5	3.49	.764

4.4. Comparison of Loyalty and Firm Performance Differences Among Employees with Different Demographic Characteristics

To examine whether there are significant differences in employee loyalty and firm performance across different

demographic groups, this study employed independent samples t-tests to analyze gender differences in employee loyalty and firm performance, and one-way ANOVA to test variations in age, marital status, education level, years of service, company size, and company establishment duration. The results showed no significant differences in average scores between genders for employee loyalty and firm performance, with all p-values exceeding the 0.05

significance level in t-test results. However, six factors-age, marital status, education level, years of service, company size, and company establishment duration-were statistically

significant in both employee loyalty and firm performance. Detailed analysis results are presented in Table 7.

Table 7. Analysis of Loyalty and Firm Performance Differences Among Employees with Different Demographic Characteristics

	class	Number of cases	Employee loyalty	Firm Performance
Sex	Man	169	3.37±0.677	3.47±0.740
	Woman	183	3.43±0.705	3.52±0.787
	t-value		-0.879	-0.583
	P		0.380	0.560
Age	25 and under	36	2.30±0.137	2.40±1.111
	26 to 30	74	3.41±0.051	3.57±0.434
	31 to 40	116	3.48±0.060	3.57±0.727
	41 and older	126	3.63±0.044	3.69±0.551
	F-value		50.889	36.651
	P		<0.001	<0.001
Education	High school/Secondary vocational school	12	3.79±0.471	4.06±0.550
	Junior college	96	3.47±0.577	3.63±0.605
	Undergraduate college	239	3.35±0.741	3.40±0.811
	Postgraduate	5	3.23±0.285	3.95±0.629
	F-value		2.110	5.183
	P		0.099	0.002
Marital status	Unmarried	63	2.81±0.897	2.96±1.088
	Married	286	3.53±0.565	3.60±0.619
	Divorced	3	3.53±0.394	4.04±0.315
	F-value		32.841	20.948
	P		<0.001	<0.001
Working life	Less than 2 years	49	2.62±0.929	2.74±1.124
	2-5 years	97	3.56±0.483	3.64±0.441
	6-10 years	101	3.60±0.454	3.71±0.483
	More than 10 years (not including 10 years)	105	3.42±0.674	3.50±0.809
	F-value		31.978	23.300
	P		<0.001	<0.001
Enterprise size	20 or fewer	27	3.18±0.579	3.19±0.535
	21–50 people	144	3.57±0.455	3.68±0.398
	51 or more	181	3.30±0.824	3.39±0.958
	F-value		8.070	8.432
	P		<0.001	<0.001
Company establishment year	Less than 1 year	11	3.02±1.043	2.94±0.793
	1-5 years	41	2.64±0.946	2.63±1.071
	6-10 years	119	3.35±0.588	3.39±0.609
	More than 10 years (not including 10 years)	181	3.63±0.503	3.79±0.570
	F-value		30.522	37.867
	P		<0.001	<0.001

4.5. Analysis of the Correlation Between Employee Loyalty and Firm Performance

The Pearson's correlation analysis was conducted to examine the relationship between employee loyalty and firm performance, with the results presented in Table 8. The correlation matrix reveals a significant positive correlation

between employee loyalty and firm performance, evidenced by a coefficient of 0.780** (two-tailed, $P < 0.01$). This supports the initial hypothesis proposed in this study. All sub-dimensions of employee loyalty and firm performance demonstrated significant correlations at the $P < 0.01$ level, indicating strong inter-variable relationships and establishing a solid foundation for subsequent regression analysis.

Table 8. Correlation analysis of variables

	Emotional Loyalty	Continuous loyal	Normative loyalty	Employee loyalty	Financial performance	Non-financial performance	Firm Performance
Emotional Loyalty	1						
Continuous loyal	.356**	1					
Normative loyalty	.674**	.283**	1				
Employee loyalty	.877**	.712**	.773**	1			
Financial performance	.863**	.328**	.670**	.792**	1		
Non-financial performance	.631**	.272**	.579**	.620**	.655**	1	
Firm Performance	.826**	.331**	.688**	.780**	.917**	.902**	1

Note: **. Significant at the 0.01 (two-sided) level

4.6. Regression Analysis of Employee Loyalty and Firm Performance

Correlation analysis can only reveal the degree and direction of relationships between variables, but cannot effectively determine the predictive effect of independent variables on dependent variables. Therefore, regression analysis in SPSS26.0 can be used to statistically predict causal relationships between variables in different groups. Regression analysis is primarily used to examine statistical relationships between phenomena, focusing on quantifying

patterns of quantitative changes between variables. In regression analysis, R^2 and adjusted R^2 are used to measure model explanatory power-values closer to 1 indicate higher explanatory capacity. The significance level (Sig.) should also be considered: if Sig. <0.05 , the overall regression model is statistically significant; conversely, it suggests no significant linear relationship exists between explanatory and dependent variables.

First of all, the employee loyalty is taken as the independent variable and the firm performance is taken as the dependent variable to conduct the regression analysis between the two. The specific data results are shown in Table 9.

Table 9. Regression analysis of employee loyalty on Firm performance

	variable	model 1a			model 2a		
		Beat	t-value	Sig value	Beat	t-value	Sig value
Controlled variable	Sex	.032	.782	.032	.006	.194	.846
	Age	.313	4.308	.313	.008	.136	.892
	Education	-.227	-5.404	-.227	-.105	-3.146	.002
	Marital status	.040	.672	.040	-.010	-.213	.831
	Working life	-.216	-3.061	-.216	-.078	-1.411	.159
	Scale	-.351	-7.090	-.351	-.114	-2.770	.006
	Company establishment year	.601	10.297	.601	.324	6.686	.000
Independent variable	Employee loyalty				.642	15.425	.000
Model calculate	R^2	.422			.659		
	F-value	35.952***			237.916***		
	Adjust R^2	.411			.651		
	VIF crest value	3.137			3.529		
<p>Note: *** indicates $p<0.001$, ** indicates $p<0.01$, and * indicates $p<0.05$</p> <p>Model 1a: Predictors: (constant), years since establishment, gender, education level, firm size, marital status, years of service, age</p> <p>Model 2a: Predictors: (constant), years since establishment, gender, education level, company size, marital status, years of service, age, employee loyalty</p> <p>Dependent variable: firm performance</p> <p>Regression coefficients are all standardized regression coefficients</p>							

The numerical values in Model 1a of Table 9 represent regression analysis results obtained by incorporating seven baseline variables (gender, age, education level, marital status, years of service, company size, and company establishment years) as control variables, with firm performance as the dependent variable. As shown in Model 1a, the maximum VIF value for the seven control variables is 3.137. According to multicollinearity criteria ($VIF > 10$ indicates collinearity issues), this value <10 confirms no multicollinearity among control variables. The model demonstrates an R^2 of 0.422, F-value of 35.952, and p-value <0.001 , indicating significant variables affecting employee loyalty. Data analysis reveals that only gender ($\beta=0.032$, $p<0.05$) and marital status ($\beta=0.040$, $p<0.05$) positively influence firm performance, suggesting these factors exert measurable effects on firm effectiveness.

Building upon Model 1a, Model 2a was developed by incorporating employee loyalty as an independent variable into the regression analysis. The results from Model 2 reveal that the R^2 value increased from 0.422 in Model 1 to 0.659 after adding employee loyalty, with an F-value of 237.916 that is statistically significant at the $p<0.001$ level. The adjusted R^2 stands at 0.651, indicating that employee loyalty collectively explains 65.1% of the variance in firm performance. Furthermore, the regression coefficient β of 0.642 for employee loyalty on firm performance, which is also statistically significant at $p<0.001$, demonstrates that employee loyalty positively contributes to firm performance. This finding further validates the overall research hypothesis of this study.

Then, the relationship between the dimensions of employee loyalty and firm performance was further analyzed by

regression. The final analysis results are shown in Table 10. Model 1b in the table shows the analysis results of the

relationship between the three dimensions of employee loyalty and firm performance.

Table 10. Regression analysis of employee loyalty dimensions on Firm performance

model		Unstandardized coefficient		Standardization coefficient	t	Sig value	Linear correlation statistics		
		B	Standard Error	Beta			tolerance	VIF	
model 1b	(constant)	.739	.202		3.658	.000			
	sex	.038	.043	.025	.876	.381	.985	1.015	
	age	-.033	.042	-.043	-.794	.428	.263	3.799	
	Education	-.109	.040	-.081	-2.711	.007	.884	1.132	
	marital status	.041	.079	.021	.513	.608	.456	2.193	
	working life	-.029	.037	-.039	-.786	.432	.317	3.152	
	scale	-.074	.044	-.061	-1.659	.098	.576	1.737	
	Company establishment year	.184	.043	.193	4.301	.000	.387	2.584	
	Emotional Loyalty	.510	.038	.574	13.299	.000	.419	2.387	
	Stay loyal	.025	.026	.031	.997	.319	.827	1.208	
	Standardize loyalty	.214	.038	.232	5.702	.000	.471	2.123	
	R ²	.734							
	F price	94.145***							
Adjust R ²	.726								
<p>Note: *** indicates p<0.001, ** indicates p<0.01, and * indicates p<0.05</p> <p>Model 1b: Predictors: (constant), years of operation of your company, gender, education level, company size, marital status, years of service in your company, age, continuous loyalty, normative loyalty, affective loyalty</p> <p>Dependent variable: firm performance</p>									

In Model 1b of Table 10, seven baseline variables-gender, age, education level, marital status, years of service, company size, and years since establishment-were included as control variables, with emotional loyalty, sustained loyalty, and normative loyalty as independent variables and firm performance as the dependent variable. Data analysis from Model 1b revealed an R² value of 0.734, F=94.145, which was statistically significant at the p<0.001 level. The maximum VIF value was 3.799, significantly below 10, while the tolerance was 0.263, notably above 0.1, indicating no significant multicollinearity issues.

Data analysis across specific dimensions reveals that the three dimensions of employee loyalty collectively explain 72.6% of the variance in firm performance (adjusted R² = 0.726 between predictors and criterion variables). This indicates that enhancing employee loyalty in engineering cost consulting firms significantly contributes to firm performance improvement. Among the three dimensions, emotional loyalty demonstrates the strongest impact, with a standardized regression coefficient (β) of 0.574 (p<0.001). Normative loyalty follows closely with a coefficient of 0.232 (p<0.001), confirming its positive correlation with performance. Conversely, persistent loyalty shows no significant effect (β=0.031, p=0.319, >0.05). These findings suggest that organizations should prioritize emotional and normative loyalty development to effectively boost performance through loyalty enhancement.

5. Conclusion

This study conducts an exploratory empirical investigation into the relationship between employee loyalty and firm performance in engineering cost consulting firms. Addressing the practical needs of such enterprises in Guangdong Province, the research adopts a theoretical framework of "employee loyalty-firm performance" while integrating industry-specific characteristics and validated measurement tools. By

extending its analytical perspective to the unique context of knowledge-based enterprises, the study not only addresses gaps in existing theoretical models within this field but also provides replicable analytical paradigms for future research.

Research indicates that in the engineering cost consulting sector, there remains a significant positive correlation between employee loyalty and firm performance, further validating the positive mediating effect of employee loyalty on firm performance. Although the correlation coefficients differ slightly due to variations in analytical subjects (Peng Qingfei, 2016), these findings align with previous studies, confirming the validity of the positive correlation between employee loyalty and firm performance in this field. The research conclusions regarding mediating pathways also demonstrate consistency with other studies. For instance, Ke Ying's (2013) analysis revealed a significant positive impact of employee loyalty on firm performance (β=0.834), while Jia Yingying's (2020) study, based on 360 valid questionnaires, found that loyalty significantly enhances core employee performance (β=0.318, p<0.05).

However, the study also revealed that engineering cost consulting firms generally score low in both employee loyalty and firm performance, indicating significant room for improvement in these areas. This aligns with existing research findings. For instance, Zhao Wei (2007) found that the average scores of loyalty and performance metrics among 173 knowledge workers were above average, which he attributed to the high turnover rate of knowledge workers. Han Xiao's research corroborates this conclusion. In 2020, Han Xiao analyzed the employee turnover rate at X Engineering Cost Consulting Company and discovered that the company's turnover rate has remained consistently above 20% since 2016, which inevitably affects employee loyalty. Wen Xuemei (2023) noted that the average score of performance metrics for full-process engineering consulting projects was around 4 out of 5. Kuang Honglin (2021) also evaluated the performance of engineering cost consulting firms using

multiple dimensions, with Z Company scoring at an average level in financial metrics, suggesting room for improvement in financial performance.

This study closely integrates academic research with industry practice, based on in-depth research into technical practitioners in the cost consulting industry, making the research conclusions more aligned with the actual needs of enterprises. The implications of the above research conclusions are that for engineering cost consulting enterprises, to improve overall performance, they should focus on cultivating employee loyalty. This conclusion provides data support for the performance optimization path of engineering cost consulting enterprises. This research model, which guides practice with theory and practices feed back into theory, offers scientific and practical solutions for enterprise performance management, providing a reference with certain application value for knowledge-based enterprises to formulate scientific human resource management strategies. However, at the same time, the samples and data used in the empirical analysis are mainly cross-sectional data from three prefecture-level cities in Guangdong Province, China, and the generalization of the research conclusions requires further verification. Future research could consider expanding the sample size, subdividing fields, and further exploring possible mediating variables and moderating variables, such as firm support, firm commitment, and sense of belonging, to continuously deepen the understanding of the relationship between employee loyalty and firm performance in the engineering cost consulting industry and its pathways of influence.

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