

## Investigation on awareness, attitude and knowledge of frontline employees in oil and gas pipeline supply chain

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### Abstract

This research article wear objective 1)To understand the awareness, attitude and knowledge of front-line employees in oil and gas pipeline transportation 2)To suggest the ideas to enhance front-line employees in term of their recognition and attention, front-line employees in oil and gas pipeline transportation, 105 by questionnaire. Results It was found that employees with different gender, age, length of service and educational level had great differences in their work consciousness, attitude and knowledge. Therefore, for front-line employees of oil and gas pipeline transportation in different situations, we should formulate more targeted awareness, attitude and knowledge optimization methods, so as to improve their overall working ability. to design a more perfect evaluation index system. Comprehensively evaluate employees' work awareness, attitude and knowledge, and according to the evaluation scores, understand the level of employees' good performance and poor performance. Then formulate more targeted improvement measures. This employee principle and method, which varies from person to person, actually adheres to the people-oriented development concept in modern enterprise management. employees with different gender, age, length of service and educational level have differences in their work consciousness, attitude and knowledge level. As far as work awareness and attitude indicators are concerned, the older the employees are, the longer the length of service, and the lower the educational level, the higher the average scores are. Professional knowledge, the higher the degree, the younger the age and the shorter the length of service, the better the employees can master; And the average score of skill level is opposite to that of professional theoretical knowledge. Due to the remarkable individual characteristics of employees, we must strictly follow the principle of individuality when making plans to improve employees' work consciousness, attitude and knowledge and skills.

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### Introduction

Nowadays, China's science, technology and productivity levels have been significantly improved. In addition, after China's accession to the WTO, Chinese enterprises have stepped into the international economic integration development system, and they have launched more severe competition with international enterprises. In fact, the competition between different enterprises focuses on management level and technology, and the deeper competition is the quality of employees and the ability of managers (Chupradist, 2017). From the perspective of economic development strategy, the improvement and stamina of enterprises' development strength lies in the development of human resources, and the foothold lies in talent competition, especially the competition of managers' talents. Harvard Business School has carried out a research including British, German and American enterprises. The results show that the common characteristics of long-lived enterprises are spending more money and energy to develop human resources, increasing human capital, and promoting the improvement of organizational structure.

Today's market competition is very fierce, and the pressure of survival and development faced by modern enterprises is persistent. To avoid being eliminated by the market, enterprises should be allowed to master the level of human resource benefits and effectively maintain the vitality of enterprise development. Under the background of the new era, people-oriented concept is paid more attention to in enterprise management, so more and more companies attach importance to employee management. How to improve employees' working ability and make greater contributions to the company requires first investigating the basic situation of employees. Front-line employees of oil and gas pipeline transportation play an important role in enterprises, and more efficient and scientific management is needed. Therefore, it is necessary to investigate their awareness, attitude and knowledge. This study mainly discusses whether there are differences between their work awareness, attitude and knowledge and their gender, age, length of service and educational level, so as to lay an important foundation for improving work efficiency in the future.

### Objectives of the study

- 1)To understand the awareness, attitude and knowledge of front-line employees in oil and gas pipeline transportation
- 2)To suggest the ideas to enhance front-line employees in term of their recognition and attention, enrich their theoretical knowledge and improve their skills.

### Literature review



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After collecting and sorting out the relevant literature, it is found that the existing research mainly focuses on the management of employees in oil and gas pipeline enterprises and the investigation of employees' abilities and attitudes. There is still a lack of investigation related to the awareness, attitude and knowledge of frontline employees in oil and gas pipeline enterprises.

1) Research on employee management of oil and gas pipeline enterprises. In the research of Wang et al. (2014), the main manifestations and adverse effects of the instability of employees in oil and gas pipeline enterprises are analyzed, the related reasons are analyzed and the countermeasures are put forward. It is necessary to establish a scientific and attractive salary and welfare system, so that employees can enjoy the fruits of enterprise development, promote the adjustment of human resource management mechanism, and do a good job in human resource planning. At the same time, we should pay more attention to employees' living security, promote democratic management of enterprises, and carry forward the spirit of inclusive corporate culture. Wang Zhe (2010) believes that the beneficial exploration and good results achieved by Jinzhou Oil&Gas Company of China Petroleum Pipeline Company in human resource development and management show that only by respecting talents, fully tapping their potential and deepening human resource development can enterprises lay a lasting foundation and realize sustainable development in the increasingly fierce competition. Xu Weiliang (2018) pointed out that oil and gas pipeline transportation enterprises should improve and innovate diversified incentive mechanism in their management, and gradually enhance their competitiveness in development.

2) Investigation and research on employees' abilities and attitudes. Wu Tingting (2020) has designed modules such as employee information management, evaluation index management, data collection, etc. in combination with the framework system that needs to be solved urgently in ability evaluation, which provides platform support for enterprise human resources departments to evaluate employees' professional ability. Shirley (2020) studies whether employees' job autonomy can alleviate job burnout as a starting point, explores the mechanism of how job autonomy affects job burnout, and verifies the moderating effect of core self-evaluation from the individual point of view. Duan Fangyan (2012) starts with the relationship between employees' work stress and work attitude, briefly analyzes the relationship between them and puts forward suggestions and countermeasures for stress management, which is helpful to the human resource management of enterprises.

## Research Methodology

This is the quantitative research. Using the questionnaire survey method, the questionnaire consists of two parts.

The first part is the basic information of employees, including gender, age, length of service and education level.

The second part is a questionnaire about the work consciousness, attitude and knowledge of employees with different gender, age, length of service and education level.

The measurement index of job awareness is occupational labor awareness. The foundation of engaging in a job is to form a correct understanding of the job first, otherwise



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there is no way to talk about work attitude and knowledge assessment.

The measurement index of work attitude is: the degree of emphasis on the position. It is used to evaluate whether employees attach importance to their work, including work attendance, creativity, enthusiasm and discipline. Work attitude is an important medium for employees' work ability to change into final work performance, which has a direct impact on employees' work performance. Under the same incentive conditions, management system and methods, because there are differences among individual employees, their work attitudes will be quite different.

Knowledge measurement indicators are professional knowledge, skills and technical mastery. Used to evaluate the ability and quality level of employees, it can usually be understood as: common sense, specialty and related knowledge; Skills, techniques and techniques; Work experience and physical strength. Because the content of working knowledge is complex and difficult to define, it is usually measured by knowledge and skills.

The above three types of problems are subdivided into 16, including 5 work awareness, 6 work attitude and 5 work knowledge.

Using Likert's five-grade evaluation method, one point will be assigned to those who strongly disagree with it, and five points will be assigned to those who strongly agree with it. The higher the score, the better the investigation of employees' work consciousness, attitude and knowledge will be. Calculate the average score of each survey item and compare them.

In this study, several indicators of employees' work awareness, attitude and knowledge were included, and the employees' work situation was comprehensively evaluated. SPSS software was used to process and analyze the data, and the results were compared. It is feasible in the selection of indicators and the treatment of results.

### Population and Sample

Population was selected from front-line employee in oil and gas pipeline transportation which is unknown population.

Sample selects from population which are front-line employee in oil and gas pipeline transportation, it's principle from Cochran (1977) sampling technique was utilized to calculate the sample size due to unknown population.

If the population size is unknown but a lot, the population proportion is known

$$n = \frac{p(1-p)z^2}{e^2}$$

$$n = \frac{(0.1)(1-0.1)(2.58)^2}{(0.05)^2} \\ = 240$$

$n$  = sample size

$p$  = the population proportion ( $p = 0.1$ )

$e$  = acceptable sampling error ( $e = 0.05$ )

The sample size are 240 by using random sampling method. A total of 240 questionnaires



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were distributed, 108 were responded and 105 were valid, and the effective rate of questionnaires was 43.75 %.

## Results

Table 1 shows the statistical results of the basic data in 105 valid questionnaires, as shown in the following table:

Table 1 Statistical results of basic information

survey items	total number of people	Proportion
gender Male/female	98/7	93.3/6.7
age Under 25 years old	26	24.8
20 to 40 years old	61	58.1
Over 41 years old	18	17.1
length of service Less than 5 years	39	37.1
5 to 10 years	50	47.6
More than 10 years	16	15.2
degree of education High school and below	64	61.0
College degree or above	41	39.0

According to the statistical results of basic information in Table 2, it is found that the proportion of male employees in the front line of oil and gas pipeline transportation is obviously larger, and the number of people aged between 25 and 40 accounts for the most; The length of service is mainly distributed in 5 to 10 years; There are more people with high school education or below.

### Survey results of employees' awareness, attitude and knowledge

Table 2-4 shows the survey results of employees' awareness of their jobs, attitudes and professional knowledge and skills, among which Table 3 investigates employees' awareness, including 5 questions. Table 4 investigates the attitude of employees, including 6 questions; Table 5 Survey of employees' working knowledge, with 5 questions. Then carry out T or F test on the acquired data.

Table 2 Survey results of employee awareness

survey items	I quite agree with the work of oil and gas pipeline	I agree that the motive force of	I agree that job completion matches	I agree that oil and gas pipeline transportation	I agree that oil and gas pipeline transportation



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	transportation	work comes from interests and hobbies.	job ability.	is a cycle of continuous learning and application.	has strong industry characteristics.
gender					
man	3.16±0.12	3.15±0.29	3.51±0.11	3.29±0.59	3.13±0.12
woman	2.94±0.31	3.13±0.25	3.56±0.13	3.21±0.53	3.11±0.10
age					
Under 25 years old	2.95±0.13	2.99±1.83	3.19±0.39	3.31±0.53	3.05±0.56
20 to 40 years old	3.46±0.16	2.87±1.81	3.18±0.34	3.25±0.49	3.01±0.95
Over 41 years old	3.58±0.21	2.74±1.80	3.21±0.32	3.18±0.43	2.95±1.02
length of service					
Less than 5 years	2.76±0.15	2.63±0.72	3.18±0.11	3.18±0.53	3.12±0.16
5 to 10 years	2.94±0.13	2.61±0.70	3.20±0.13	3.15±0.51	3.10±0.18
More than 10 years	3.04±0.16	2.57±0.62	3.23±0.15	3.09±0.38	3.05±0.25
degree of education					
High school and below	2.87±0.47	2.81±0.42	3.15±0.29	2.98±1.52	2.94±0.24
College degree or above	2.46±0.44	3.05±0.49	3.10±0.21	3.16±1.05	3.06±0.33

Table 3 Results of work attitude survey

survey items	I value oil and gas pipeline transportation very much.	I am willing to challenge the difficult	I actively participate in the training activities	I am willing to spend money to improve	I have nothing to do, I don't ask for leave, and	I take the initiative to put forward new ideas

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		problems in my work.	held by the company.	myself.	my attendance rate is very high.	related to work.
gender						
man	3.24±0.24	3.11±0.36	3.11±0.29	2.95±0.13	2.87±1.02	2.98±0.36
woman	3.01±0.21	3.01±0.15	3.12±0.25	2.99±0.16	2.81±1.05	2.78±0.25
age						
Under 25 years old	2.45±0.32	3.24±0.35	3.25±0.31	2.98±0.25	2.86±0.95	3.02±0.21
20 to 40 years old	2.57±0.29	3.12±0.41	3.20±0.25	2.91±0.23	2.96±1.02	2.91±0.32
Over 41 years old	2.96±0.25	3.06±0.42	3.14±0.18	2.87±0.15	3.01±1.32	2.75±0.16
length of service						
Less than 5 years	2.68±0.13	3.26±0.24	3.15±0.40	2.99±0.13	2.84±0.65	2.96±0.35
5 to 10 years	2.84±0.09	3.21±0.26	3.06±0.35	2.90±0.06	2.96±0.72	2.88±0.26
More than 10 years	3.02±0.14	3.15±0.19	3.00±0.27	2.81±0.02	3.06±0.75	2.75±0.13
degree of education						
High school and below	3.06±0.42	3.02±0.84	3.15±0.33	2.95±0.13	3.10±0.13	2.75±0.19
College degree or above	2.46±0.40	3.14±0.72	3.17±0.35	2.84±0.08	2.91±0.55	2.87±0.18

Table 4 Results of work knowledge survey

survey items	I have mastered the safety knowledge required for my work.	I have mastered the theoretical expertise required for my work.	I have mastered the technology needed for oil and gas pipeline transportation.	I have accumulated rich work experience.	I have mastered the skills required for my job.
gender					
man	2.79±0.36	3.15±0.26	3.19±0.18	3.15±0.32	2.98±0.14

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woman	2.81±0.38	3.02±0.23	3.05±0.14	3.13±0.33	3.16±0.16
age					
Under 25 years old	3.12±0.36	3.46±0.31	3.02±0.19	2.95±0.29	3.02±0.15
20 to 40 years old	3.14±0.38	3.15±0.29	3.09±0.16	3.15±0.34	3.16±0.18
Over 41 years old	3.17±0.41	3.23±0.27	3.22±0.18	3.26±0.36	3.29±0.16
length of service					
Less than 5 years	3.18±0.22	3.20±0.20	3.16±0.17	2.98±0.25	2.95±0.36
5 to 10 years	3.20±0.16	3.17±0.23	3.21±0.16	3.06±0.33	3.02±0.31
More than 10 years	3.21±0.14	3.19±0.22	3.30±0.12	3.16±0.38	3.16±0.34
degree of education					
High school and below	3.10±0.31	2.54±0.36	2.89±0.25	3.02±0.36	3.05±1.12
College degree or above	3.34±0.38	3.04±0.38	2.91±0.24	3.21±0.42	3.08±1.14

According to the statistical results in Tables 2 to 4, it can be seen that:

1) employees' recognition of oil and gas pipeline transportation. Gender, the average score of men is higher than that of women; In fact, the older the age, the higher the average score of recognition; The higher the length of service, the higher the average score; The lower the education level, the higher the recognition level. Employees of different genders, ages, seniority, and educational levels have little difference in their working motivation from their interests and hobbies. They have strong industry characteristics for oil and gas pipeline transportation, and there are also differences in the results of continuous learning and application, but the differences are not significant. This is mainly because of the particularity of oil and gas pipeline transportation, and the number of male employees is absolutely dominant. The older they are, the stronger their job stability is, and the important basis to ensure this stability is their high degree of job recognition. The longer the employees, one of the driving forces for them to keep working is to recognize their work. The less educated employees, the harder it is for them to get this job, and their recognition of the job will be higher.



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2) Employee's emphasis on oil and gas pipeline transportation. Employees who are male, over 41 years old, have worked for more than 10 years, and are in high school or below pay more attention to their work. Male, younger, less seniority and higher education employees are more willing to challenge the difficult problems in their work, participate in training activities, and take the initiative to put forward new ideas. Employees of different genders, ages, seniority and education levels have low scores in spending money to improve themselves. Especially for middle-aged men, they need to take the important responsibility of taking care of their families, and they pay more attention to this job. Employees with higher academic qualifications, because they have more choices and space, have a relatively low average score of paying attention to this job compared with employees with lower academic qualifications who have fewer career opportunities.

3) Knowledge of oil and gas pipeline transportation. First of all, professional theoretical knowledge. There is little difference in average score of theoretical knowledge between men and women; Employees who are younger, have less seniority, and have higher academic qualifications have higher scores. It is because many of them have received professional theoretical knowledge and obtained certain academic qualifications. Then, skills and techniques. The older the employees, the longer their service, the higher their average score. Because work skills and technology are closely related to practical ability and experience. After years of practical experience, these employees naturally master more skilled professional skills and techniques. The average scores of skills and techniques of employees with different education levels are quite different. There is little difference in the mastery of safety knowledge among different employees, and there is little difference in working experience among employees of different genders and educational background. The older the employees are, the more experienced they are.

## Conclusions Discussions and suggestions

### Conclusion

By means of questionnaire, the work consciousness, attitude and knowledge of frontline employees in oil and gas pipeline transportation were investigated. In the survey, it is found that employees with different gender, age, length of service and educational level have differences in their work consciousness, attitude and knowledge level. As far as work awareness and attitude indicators are concerned, the older the employees are, the longer the length of service, and the lower the educational level, the higher the average scores are. Professional knowledge, the higher the degree, the younger the age and the shorter the length of service, the better the employees can master; And the average score of skill level is opposite to that of professional theoretical knowledge. Due to the remarkable individual characteristics of employees, we must strictly follow the principle of individuality when making plans to improve employees' work consciousness, attitude and knowledge and skills.

### Suggestions



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Enterprises will choose to dismiss or retrain employees with low job recognition, poor work attitude and enthusiasm, and low level of skills and knowledge. If it is due to the low degree of job recognition caused by external conditions or environment, efforts should be made to improve the working conditions and environment, or choose to change organizational policies and methods. The following are some methods that can help employees enhance their recognition and attention, enrich their theoretical knowledge and improve their skills.

First, make an employee assistance plan. Combined with some habitual shortcomings of employees at work, make a help plan to solve them. The implementation of the plan requires the cooperation of the company's senior management, department heads and employees.

Second, the employee advice plan. The basis of the application of the plan is to first identify employees with poor work consciousness and attitude, record relevant information, such as reasons and abilities, and further analyze these information. Then, employees should be made aware of the harm caused by these problems and be familiar with organizational performance standards. If these employees are still unwilling to take the initiative to improve and find ways to improve their performance level, the supervisor is responsible for face-to-face communication with them, helping employees find out the reasons and giving suggestions for improvement. If the expected goal is still not reached, the senior management and the problem employee will have an interview, and the rectification period will be given. If the work attitude is still not corrected, you can choose to dismiss the employee.

Third, play a positive and reinforcing role. If employees have a high degree of recognition and attention to their work, they can meet the job requirements. The organization should give incentives such as praise and affirmation as soon as possible (Supatn, 2016; Panyindee, 2022). This method should be closely combined with the work situation and build a standard system of work behavior; Then define the specific goals you want to achieve. Goal setting should be challenging. When employees achieve their goals, they should implement positive reinforcement as soon as possible.

Fourthly, considering the actual working characteristics of frontline employees in oil and gas pipeline transportation, combined with the original evaluation content of employees' comprehensive ability, it is necessary to design a more perfect evaluation index system. Comprehensively evaluate employees' work awareness, attitude and knowledge, and according to the evaluation scores, understand the level of employees' good performance and poor performance. Then formulate more targeted improvement measures. This employee principle and method, which varies from person to person, actually adheres to the people-oriented development concept in modern enterprise management.

## New Knowledge form Research

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