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KNOWLEDGE MANAGEMENT TO INVESTIGATE THE FAILURE FACTORS IN MANAGING OF GAS AND OIL INDUSTRY TRANSMISSION LINES PROJECTS

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ABSTRACT

In this study the challenges of managing the civil projects in oil and gas industry over recent years that failed were investigated. For this purpose, the relevant cases and their effectiveness were categorized by analyzing research data obtained from the questionnaire results. The results obtained from the research showed that there is a positive and significant relationship between the project management knowledge and reduction in the challenges. Lack of attention to the project's feasibility study before starting the project, adverse risks at the beginning and end of the projects, proper knowledge of contracts, and the project team's skill are the items that will fail the project if they are not appropriately managed. Since the team's correct design and the key persons of the project and before that feasibility and the necessity of doing it in vital projects in the country are very important and in such a way, the two components studied in this research are derived from the risk management of projects. Considering the importance of this issue as a case study, these cases were investigated in gas pipeline projects in Fars province.

Keywords: project management knowledge; feasibility study; project team skill; project risk management; statistical analysis.

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1. INTRODUCTION

The present research investigates the challenges of the oil and gas industry's civil projects as

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a case study of the oil and gas industry's civil projects using project management knowledge. In the beginning, project management knowledge is determined, and they are prioritized based on their importance and effectiveness [1]. The relationships between the critical cases are determined according to PMBOK[1] standard, and it is possible to extract the proposed basic table from the obtained relationships. Sometimes the adverse financial and temporal risks lead the national and civil projects to a situation where it is impossible to point out the plan's profits in analyzing the exploitation conditions. The investment and not gaining profits during the schedule are considered one of the most critical cases. It was proposed to convert the harmful risks to positive risks, conduct a necessary stage-by-stage investigation into the project, employ the organizational knowledge, and learn lessons to reduce the project's challenges [2,3]. The Identification of the critical challenges appropriate to the dominant contracts, consideration of the economic, social, and cultural conditions and, placement of importance on the feasibility study of projects are considered to be some of the influential factors in reducing the potential challenges presented in the projects. Some elements that are, paying attention to the project team skill, preserving the team cohesion, dealing with the obstacles professionally, choosing the individuals who meet the required conditions and requirements will reduce the common challenges, and the right decision of the project team and manager at the top of the pyramid will lead the project towards success [4,5].

The present study has been advanced mostly through the Delphi method, designing the questionnaire, and experts' experience. The job description mainly addresses the information related to the process. The present research sought to investigate the challenges presented in the civil projects of oil and gas and to determine the effect of the project management knowledge and the relevant processes on the identified challenges; however, we have delimited the scope of the research due to the largeness of the projects of the investigation into the challenges and effect of project management knowledge.

The feasibility of critical projects is one of the necessary steps before starting the project. The risks associated with the project's project-designed teams' capabilities also increase the necessity of risk management in these projects [10,11].

Project management is a process employed to preserve the project path to achieve economic and justified balance among three factors: costs, time, and quality. These factors gain help from their unique tools and techniques to carry out do this. In fact, the exact and thorough execution of the formulated plan for the project is controlled in such a way as to be able to restore the project to the closest possible state to its initial and original route when leaving the plan [12].

Because the construction industry is project-oriented,effective PM is essential [2,10].

The project management institute, PMI, is undoubtedly one of the most credible centers which have made a lot of efforts in the collection of information and analysis of the best project management methods and documentation and distribution of the project management knowledge by involving more than 700,000 members (January 2014). PMI is recognized in all of the world and has a very high reputation [13].

The process of identification and documentation of the maps, responsibilities, required

[1] *Project Management Body of Knowledge*

skills, and relationships consists of project reporting and providing the management plan of staff. The Responsibility Assign Matrix (RAM) determines the individuals' responsibility for the project tasks [14].

The risk is uncertain in the future that can positively affect (opportunities) and adverse effects (threats) on the project. If the threats and opportunities are disregarded, many problems can be eliminated through low costs, and little attention will affect the project. The valuable opportunities that could change into profits will be lost. Risk management's goal is to take some actions to remove threats and attract opportunities [15,16].

The feasibility study is the initial foundation of the investigation into the execution of a project. The feasibility studies are considered one of the most essential stages of the investigation into a project. Deciding whether to execute it is one of the most crucial components in the countries' large projects. The present research into the engineering, costs, exploitation time, etc., aspects can be considered a confidential basis to advance the projects properly [17,18].

Project risk management is one of the fields of knowledge that has been defined in the process group of project management, planning, controlling, and monitoring. The fact that all projects require risk management is revealed through the attention to its considerable role. A brief look at the civil projects over five past years shows that the lack of proper knowledge of the project risks in different sections, namely contract-based, engineering, purchase, execution, land acquisition, beneficiaries, etc. units includes some adverse effects and costs. This stops and even closes some projects or prolongs them to the extent that the exploitation and financial losses cannot be compensated. The explanation of the items mentioned above encourages the project managers and beneficiaries to find out the risks before starting the projects and at the time of invitations to tender. The adverse effects of wagers can be reduced and removed by the management team through identifying, planning, controlling and monitoring the risks exactly [19,20].

Project management helps the managers and employers succeed, reduce the harmful risks, and speed up projects' exploitation. Proper recognition of the management knowledge fields helps them to achieve the goals of the projects. The dependency of Iran's economy on the oil revenues, where optimal exploitation of extensive oil and gas reserves is of particular importance, was pointed out. At present, the main obstacle and executive limitation on developing the oil and gas industry is the lack of access to the required technical, managerial, and financial knowledge [2,9].

Based on assessing the vital factors of success in the portfolio of the oil and gas projects in Nigeria in research, they specified thirteen elements of success during a project, leading to success. Fulfillment of the plan, the project's determined budget, and its management strategy is among these factors [21].

Other researchers presented useful researches in this field, among which some were reviewed in this section, and the others will be mentioned in the references [1,3,7,8,11,14,16].

In recent years, (Boyun Guo & et al.) examined feasibility studies of gas-lift drilling in unconventional tight oil and gas reservoirs [4]. Seon Tae Kim & Bongseok Choi is researched Price risk management and capital structure of oil and gas project companies: Difference between upstream and downstream industries [22].

The differences between this research and previous researches are the field of gas pipeline projects, the number of questionnaires completed in the research, the identified components in the failure of these projects, and the results.

2. RESEARCH METHOD

This research was performed by using related library resources, papers and interviewing the experts. The information collection tools were based on preparing a questionnaire adapted from the experts' viewpoints and the existing challenges in the construction projects in the oil and gas industry. The questionnaire's distribution was accomplished in an electronic (online) manner on the contractor/ managers/ client websites and hard copy.

The experts/ managers/adepts performed the Recitation in the oil and gas industry. The results obtained from the questionnaires satisfied the hypotheses of the PMBOK areas by considering a limited statistical population (sample) and simple random sampling with the analysis and processing of the data.

The research questionnaire consisted of a section of individual descriptive information such as age, education, organizational position, etc., and another area of the main research questions corresponding to the research's subject and variables in 10 separate groups. The number of the presented questions in the research was 130, which were designed according to the Likert five-point scale, shown in Table 1.

Table 1: Valuation of the Likert five-point scale in this research

Very Low (Strongly Disagree)	Low (Disagree)	Moderate (Neither)	High (Agree)	Very High (Strongly Agree)
1	2	3	4	5

The size of the research sample was obtained equal to 202 individuals by using the Cochran equation (equation 1) for the finite population of 426 individuals at the error level of 0.05 and the estimation accuracy of 0.95 and considering the value of 0.5 for the success and failure ratio of the sample size but since it was expected that the response rate is less than 100%, thus the number of the distributed questionnaires was increased by 30% compared to the sample size and hence the questionnaires were distributed among 266 individuals in total and eventually 248 individuals were analyzed after checking out the questionnaires and eliminating the questionnaires with missing data.

The equation of the statistical population size with finite N

$$\boldsymbol{n} = \frac{\boldsymbol{Nz^2pq}}{\boldsymbol{Nd^2+z^2pq}}$$ (Eq. (1): Cochran equation)

n= Sample size

N= Statistical population volume (population size of city, province, etc.)

z= Normal value of standard unit variable

p= Proportion of population with a certain trait

q= Proportion of population without definite attribute (1-p)

d= Permissible error value or error percentage

Reliability testing of the questionnaire was performed by utilizing Cronbach's alpha coefficient (Eq. (2)), for which the results are given in Table 2. This method is one of the most essential ordinal scales, specifying the amount of overlapping and alignment of the questions and the respondents' accuracy and awareness.

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i=1}^{K}\sigma_i^2}{\sigma^2}\right)$$ (Eq. (2): Cronbach's alpha coefficient)

α : Reliability coefficient
K: Number of the questionnaire questions
σ^2_i: Variance of each question
σ^2: Variance of all questions

Table 2: Investigation of the reliability of the research variables questionnaire using Cronbach's alpha coefficient

Variable	Question numbers	Number of questions	Cronbach's alpha coefficient
Questionnaire of project scope management	1-13	13	0.967
Questionnaire of project time management	14-26	13	0.982
Questionnaire of project cost management	27-41	15	0.975
Questionnaire of project quality management	42-51	10	0.971
Questionnaire of project manpower management	52-61	10	0.980
Questionnaire of project communication management	62-70	9	0.967
Questionnaire of project risk management	71-88	18	0.983
Questionnaire of project procurement management	89-101	13	0.977
Questionnaire of project stakeholder management	102-110	9	0.972
Questionnaire of project integration management	111-130	20	0.989

Validity testing of the research was accomplished by utilizing the respectable supervisor and advisor and the experts in this field.

3. RESULTS AND DISCUSSION

To get familiar with the respondents, their demographic variables such as age, education and discipline, organizational position, and work experience are presented in detail.

In the present investigation, it can be observed, according to Table III and diagram I, that 74 individuals (29.8%) of the respondents are women and 174 individuals (70.2%) are men of the total 248 respondents.

Table 3: Frequency distribution of the respondents according to gender

Gender	Frequency	Percentage
Woman	74	29.84
Man	174	70.16
Total	**248**	**100**

As it can also be seen in Table 4 and diagram 1-2, 46 individuals (18.5%) are in the age group of 25 years old and less, 122 individuals (49.2%) of the respondents are in the age group of 26-35 years old, 53 individuals (21.4%) are in the age group of 36-45 years old, 21 individuals (8.5%) are in the age group of 46-55 years old, and six individuals (2.4%) are in the age group of over 55 years old.

Table 4: Frequency distribution of the respondents according to age group

Age (Years)	Frequency	Percentage
25 years old and less	46	18.55
26-35 years old	122	49.19
36-45 years old	53	21.37
46-55 years old	21	8.47
Over 55 years old	6	2.42
Total	248	100

As Table 5 and diagram 1-3 implies, 13 individuals (5.2%) have associate's degree, 137 individuals (55.2%) have bachelor's degree, 78 individuals (31.5%) have master's degree, and 20 individuals (8.1%) have doctorate's degree among the 248 respondents in this research.

Table 5: Frequency distribution of the respondents according to education level

Education level	Frequency	Percentage
Diploma and lower	0	0
Associate	13	5.24
Bachelor	137	55.24
Master	78	31.45
Doctorate	20	8.06
Total	**248**	**100**

As Table 6 indicates, 40 individuals (16.1%) are in civil discipline, 47 individuals (19%) are in the industrial domain, 56 (22.6%) are in the project management/ construction field, 58 individuals (23.4%) are in oil discipline and its areas of interest (subdisciplines), and 47 individuals (19%) are in other fields among the 248 respondents in this research.

Table 6: Frequency distribution of the respondents according to the field of study

Field of study	Frequency	Percentage
Civil	40	16.13
Industrial	47	18.9
Project management/ Construction	56	22.58
Oil and its subdisciplines	58	23.39
Others	47	18.95
Total	**248**	**100**

As it can be observed in Table 7, 27 individuals (10.9%) are in the project manager position, 56 individuals (22.6%) are in the unit manager position, 35 individuals (14.1%) are in the engineering manager position, 48 individuals (19.4%) are in the supervisor position, and 82 individuals (23.1%) are in the expert position among the 248 respondents in this research.

Table 7: Frequency distribution of the respondents according to organizational position

Organizational position	Frequency	Percentage
Project manager	27	10.89
Unit manager	56	22.58
Engineering manager	35	14.11
Supervisor	48	19.35
Expert	82	33.06
Total	**248**	**100**

As it can be seen in Table 8, 46 individuals (18.5%) have a work experience of 10 years and less, 39 individuals (15.7%) have a work experience of 11 to 15 years, 93 individuals (37.5%) have a work experience of 16 to 20 years, 53 individuals (21.4%) have a work experience of 21 to 25 years, and 17 individuals (6.9%) have a work experience of 26 years and more among the 248 respondents in this research.

Data description indices are divided into three groups of central indices, dispersion indices, and distribution indices. The distribution manner of the research variables is studied based on the most critical prominent indices (mean and median), dispersion indices (variance and standard deviation), and distribution indices (skewness coefficient and kurtosis coefficient) [20,23]. Table 9 shows the central, dispersion, and distribution index of the research variables.

Table 8: Frequency distribution of the respondents according to work experience

Work experience	Frequency	Percentage
10 years and less	46	18.55
11 to 15 years	39	15.73
16 to 20 years	93	37.50
21 to 25 years	53	21.37
26 years and more	17	6.85
Total	**248**	**100**

Table 9: Central, dispersion and distribution indices of the research variables

Index		Variable				
		Project scope management	**Project time management**	**Project cost management**	**Project quality management**	**Project manpower management**
Central	**Mean**	**3.34**	**3.28**	**3.36**	**3.28**	**3.35**
	Median	**3.50**	**3.46**	**3.53**	**3.40**	**3.50**
Dispersion	**Standard deviation**	**0.90**	**0.98**	**0.95**	**0.93**	**0.99**
	Variance	**0.81**	**0.95**	**0.91**	**0.87**	**0.98**
Distribution	**Skewness**	**-0.49**	**-0.26**	**-0.42**	**-0.24**	**-0.43**
	Kurtosis	**-0.59**	**-0.81**	**-0.64**	**-0.64**	**-0.71**
Sample size		**248**	**248**	**248**	**248**	**248**
Index		**Variable**				
		Project communication management	**Project risk management**	**Project procurement management**	**Project stakeholder management**	**Project integration management**
Central	Mean	**3.31**	**3.29**	**3.30**	**3.35**	**3.36**
	Median	**3.44**	**3.44**	**3.50**	**3.50**	**3.55**
Dispersion	Standard deviation	**0.97**	**0.97**	**0.97**	**0.95**	**1.06**
	Variance	**0.94**	**0.94**	**0.94**	**0.90**	**1.11**
Distribution	Skewness	**-0.24**	**-0.38**	**-0.43**	**-0.44**	**-0.34**
	Kurtosis	**-0.77**	**-0.65**	**-0.68**	**-0.60**	**-0.91**
Sample size		**248**	**248**	**248**	**248**	**248**

According to Table 9 and the analysis of the central, dispersion, and distribution indices of the research variables, four main variables of the project management are as follows, and the other items are described according to the information in the table and the following patterns:

The Project integration management variable; has a mean of 3.36, a median of 3.55, a standard deviation of 1.06, and a variance of 1.11. This variable's skewness coefficient is equal to -0.34, which shows that this variable has a skew to the left and the absolute value of this coefficient is less than unity. Thus, it does not have much difference with the normal

distribution from the symmetry aspect. This variable's kurtosis coefficient is equal to -0.91, which shows that the project integration management variable's distribution is more dispersed and shorter than the normal distribution and considering that the kurtosis coefficient's absolute value is less than unity. Thus, the distribution kurtosis does not have much difference from the normal distribution.

Now, the inferential statistics and the normality of the variables is investigated. To perform the statistical methods, calculate an appropriate test statistic, and logically infer the research hypotheses, the most crucial action before any other proceeding is selecting an appropriate statistical method for the research. In this order, awareness about the distribution of data has an essential priority. Therefore, Kolmogorov-Smirnov's credible test is employed to investigate the normality of the research data. This test assesses the normality of the data based on the following assumptions [20, 23].

H_0: The data have a normal distribution.

H_1: The data do not have a normal distribution.

The judgment procedure, according to the table of Kolmogorov-Smirnov test, is such that if the significance level (sig) for all variables is greater than the test level (0.05), then the data distribution is expected [20, 23]. The results of this test are given in Table 10.

Table 10: Results of Kolmogorov-Smirnov test for the research variables

Variable		Project scope management	Project time management	Project cost management	Project quality management	Project manpower management
Sample size		**248**	**248**	**248**	**248**	**248**
Normal distribution parameters	Mean	**3.34**	**3.28**	**3.36**	**3.28**	**3.35**
	Standard deviation	**0.90**	**0.98**	**0.95**	**0.93**	**0.99**
Kolmogorov-Smirnov test statistic		**0.58**	**0.58**	**0.58**	**0.57**	**0.61**
Test significance level		**0.77**	**0.83**	**0.85**	**0.91**	**0.52**
Test result		**Normal**	**Normal**	**Normal**	**Normal**	**Normal**
Variable		Project communication management	Project risk management	Project procurement management	Project stakeholder management	Project integration management
Sample size		**248**	**248**	**248**	**248**	**248**
Normal distribution parameters	Mean	**3.31**	**3.29**	**3.30**	**3.35**	**3.36**
	Standard deviation	**0.97**	**0.97**	**0.97**	**0.95**	**1.06**
Kolmogorov-Smirnov test statistic		**0.58**	**0.57**	**0.60**	**0.61**	**0.59**
Test significance level		**0.84**	**0.98**	**0.64**	**0.54**	**0.72**
Test result		**Normal**	**Normal**	**Normal**	**Normal**	**Normal**

Analysis of Table 10. The results of the Kolmogorov-Smirnov test for the four main variables of the project management are described below according to the research data, and the other variables are described according to the information given in the table and the following patterns:

✓ The Project integration management variable has a normal distribution according to the Kolmogorov-Smirnov test result. This test's significance level is equal to 0.072, and this value is more significant than 0.05.

Before testing the hypotheses, the research variables should be explained and interpreted first to specify the variables' status in the studied sample. According to the normality of the data distribution, the one-sample t-test with a 3 and a confidence interval (error of 5%) is used [20]. The hypotheses presented for the test are as follows:

H_0 (Proposition negation): The variable exists in a moderate and weak status in the statistical population.

$H_0 = \mu \leq 3$

H_1 (Proposition): The variable exists in health status in the statistical population.

$H_1 = \mu > 3$

The procedure of judgment about the status of the variables is such that if the significance level (sig) is more significant than 0.05, then the null hypothesis is accepted. The studied variable does not have a substantial difference from the test value of 3; the studied factor exists in the statistical population's moderate status. Also, suppose the sig value is less than 0.05 and the lower and upper limits are both negative. In that case, the studied variable has a significant difference from the test value of 3, and the mean of the studied variable is less than the test value of 3. Therefore, the null hypothesis is accepted, and the studied variable exists at a weak level in the statistical population. Still, if the sig value is less than 0.05 and the lower and upper limits are both energetic, then the studied variable has a significant difference from the test value, and the mean of the studied variable is greater than the test value of 3. Thus, the statistical null-hypothesis is rejected, and the studied factor exists in health status in the statistical population [20,23]. The results of the means test of a statistical population are presented in Table 11.

Table 11: Results of a means test of a statistical population

Variable	Mean	Standard deviation	t value	Sig	Lower limit	Upper limit	Variable status
Project scope management	3.34	0.90	5.89	0.00**	0.22	0.45	**Appropriate**
Project time management	3.28	0.98	4.59	0.00**	0.16	0.41	**Appropriate**
Project cost management	3.36	0.95	5.88	0.00**	0.24	0.48	**Appropriate**
Project quality management	3.28	0.93	4.78	0.00**	0.17	0.40	**Appropriate**
Project manpower management	3.35	0.99	5.63	0.00**	0.23	0.48	**Appropriate**
Project communication management	3.31	0.97	4.96	0.00**	0.18	0.43	**Appropriate**
Project risk management	3.29	0.97	4.70	0.00**	0.17	0.41	**Appropriate**
Variable	Mean	Standard deviation	t value	Sig	Lower limit	Upper limit	Variable status
Project procurement management	3.30	0.97	4.83	0.00**	0.18	0.42	**Appropriate**
Project stakeholder management	3.35	0.95	5.89	0.00**	0.24	0.47	**Appropriate**
Project integration management	3.36	1.06	5.32	0.00**	0.22	0.49	**Appropriate**

**= Confidence level of 99% (P<0.01)

According to the results given in Table 11, the test sig is less than 0.05 for all variables, which proves the significant difference between the mean of these variables and the test value of 3, but according to the table, the upper and lower limits of all the variables except the variable of lack of integrity, security, and privacy are positive; thus, their mean is greater than 3. Therefore, the null hypothesis is accepted, and it is deduced that with a confidence level of 99%, this variable exists in the statistical population in a weak status. The investigation of the hypothesis is performed in this stage after accomplishing the previous steps confidently.

Hypothesis explanation 1: It seems that the lack of adequate skill of the project management team due to the lack of proper recognition of this knowledge has posed a challenge concerning the application of this knowledge in managing the construction of projects and all items affecting the project, including time, costs, resources, integration, beneficiaries, etc.; it has also made it impossible to realize the relevant goals.

Hypothesis analysis: This hypothesis investigates the effect of project team skills on project integration and management.

"The adequate skill of the project management team has a significant effect on the project integration management in civil projects of oil and gas projects "

H0= The project management team's adequate skill does not significantly affect the project integration management in civil projects of oil and gas projects.

H1= The project management team's adequate skill has a significant effect on the project integration management in civil projects of oil and gas projects.

The value of Durbin: Watson statistic to investigate the independence of errors in the Table 12 was reported to be (1.997), and the assumption of independence of errors holds because this value is in the interval (1.5 to 2.5). Also, it can be seen through the comparison of the error frequency distribution graph and regular distribution graph presented in the Fig. 1 that the distribution of errors is almost every day and the average shown on the right-hand side of the chart is equal to (7/24)-17 that is a minimal number and near 0. Therefore, regarding the domination of the regression assumptions, the regression test can investigate the extent of effectiveness of the variable of the project management team's adequate skill on project integration management. The results obtained from the regression have been reported in Table 12.

Table 12: Regression model of adequate skill of project management team and project integration management

Variable	Non-standard coefficients (B)	Standard error	Standard coefficients (β)	t statistic	Level of significance (Sig)	Result in the model
Constant value	0.903	0.173	--	5.233	0.00	--
Adequate skill	0.731	0.049	0.687	14.819	0.00	Effective
Durbin–Watson statistic	1.997	The errors are not correlative in the model				
Adjusted coefficient of determination	0.469	46.9% of the changes in the project integration management is accounted for by the adequate skill of the project management team				

Variable	Non-standard coefficients (B)	Standard error	Standard coefficients (β)	t statistic	Level of significance (Sig)	Result in the model
Fisher s F level of significance	0.00	The linear relationship of the model is accepted				
Conclusion	The adequate skill of the project management team has a direct positive effect on project integration management					

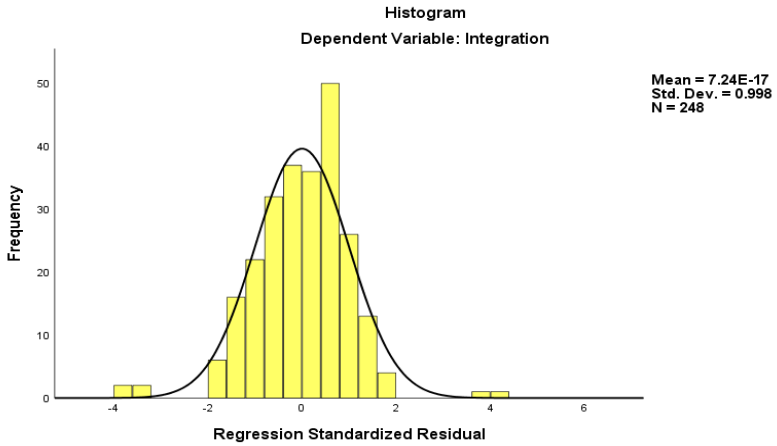

Figure 1. Frequency distribution of regression errors for the variable of the adequate skill of the project management team and project integration management

It can be seen in the Table 12 that the value Fisher (Sig) (Sig ANOVA) is equal to (0.00) that is less than 0.05, and this shows that there is a linear relationship between the adequate skill of project management team and project integration management. Considering the table, the regression model's significance level is equal to the value (0.00) that is less than the value (0.05). This shows that the variable of the project management team's adequate skill affects the project integration management. The value of the adjusted coefficient of determination is equal to (0.469). It expresses that the project management team (46.9%) explains the changes in project integration management. The extent of effectiveness of the right gift of the project management team on the project integration management is equal to (0.687) concerning the standard path (β), and this shows that the increase of one unit in the adequate skill of project management team, project integration management will increase by (0.687) company in the same direction; therefore, the 10th research hypothesis is confirmed with %99 of confidence, and the adequate skill of project management team has a significant effect on the project integration management in the civil projects of oil and gas industry.

Hypothesis explanation 2: The inattention to the feasibility studies on the civil projects and lack of dominance over the project management knowledge and construction has presented a challenge to the projects.

Hypothesis analysis: This hypothesis investigates the effect of feasibility studies and dominance over the project management knowledge on project management and integration.

“Feasibility study management of the civil projects and dominance over project management knowledge has a significant effect on the project integration management in the

civil projects of the oil and gas industry."

H_0- Feasibility study management of the civil projects and dominance over project management knowledge does not have a significant effect on the project integration management in the civil projects of the oil and gas industry

H_1- feasibility study management of the civil projects and dominance over project management knowledge has a significant effect on the project integration management in the civil projects of the oil and gas industry

The value of Durbin: Watson statistic to investigate the independence of errors in the Table 13 was reported to be (1.920), and the assumption of independence of errors holds because this value is in the interval (1.5 to 2.5). It can also be seen by comparing the error frequency distribution graph and the regular distribution graph presented in the Fig. 2 that the distribution of errors is almost expected. The average shown on the right-hand side of the chart is equal to (1.72)-15 that is a minimal number, and near 0. Therefore, regarding the regression assumptions' domination, the regression test can investigate the extent of effectiveness of the variable of feasibility study management of civil projects and dominance over project management knowledge on project integration management. The results obtained from the regression have been reported in Table 13.

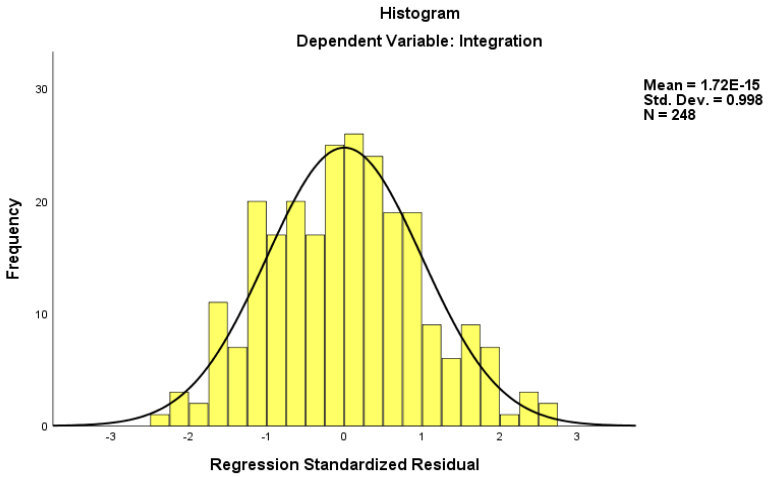

Figure 2. Frequency distribution of regression errors for the variable of feasibility study management of civil projects and dominance over project management knowledge and project integration management

Table 13: Regression model of feasibility study management of civil projects and dominance over project management knowledge and project integration management

Variable	Non-standard coefficients (B)	Standard error	Standard (β)	t statistic	Significance (Sig)	Result in the model
Constant value	0.416	0.132	--	3.138	0.00	--
Feasibility study management	0.881	0.038	0.828	23.147	0.00	Effective
Durbin–Watson statistic	1.920	The errors are not correlative in the model				

Adjusted coefficient of determination	0.684	68.4% of the changes in project integration management is accounted for by the feasibility study of civil projects and dominance over project management knowledge
F-fisher level of significance	0.00	The linear relationship of the model is accepted
Conclusion	Feasibility study management of civil projects and dominance over the project management knowledge has a direct positive effect on project integration management	

It can be seen in the Table 13 that the value Fisher (Sig) (Sig ANOVA) is equal to (0.00) that is less than 0.05, and this shows that there is a linear relationship between feasibility study management of civil projects and dominance over project management knowledge and project integration management. Considering the table, the regression model's significance level is equal to the value (0.00) that is less than the value (0.05). This shows that the variable feasibility study management of civil projects and dominance over project management knowledge affects the project integration management. The value of the adjusted coefficient of determination is equal to (0.684). It expresses that the project management team (68.4%) explains the changes in project integration management. The extent of effectiveness of the variable of feasibility study management of civil projects and dominance over project management knowledge on the project integration management is equal to (0.828) concerning the standard path (β), and this shows that the increase of one unit in the adequate skill of project management team, project integration management will increase by (0.828) company in the same direction; therefore, the 11th research hypothesis is confirmed with %99 of confidence and feasibility study management of civil projects and dominance over project management knowledge have a significant effect on the civil projects of oil and gas industry.

Hypothesis explanation 3: It seems that the lack of identification and prioritization of the project's positive and negative risks and the method of managing the risks always adds to the challenges the projects face.

Hypothesis analysis: This hypothesis identifies and prioritizes the positive and negative risks affecting the project's integration and management.

"Identification and prioritization of the positive and negative risks have a significant effect on project integration management in civil projects of the oil and gas industry."

H0= Identification and prioritization of the positive and negative risks do not significantly affect project integration management in the oil and gas industry's civil projects.

H0= Identification and prioritization of the positive and negative risks significantly affect project integration management in the oil and gas industry's civil projects.

The value of Durbin: Watson statistic to investigate the independence of errors in the Table 14 was reported to be (1.920), and the assumption of independence of errors holds because this value is in the interval (1.5 to 2.5). Also, it can be seen through the comparison of the error frequency distribution graph and normal distribution graph presented in the Fig. 3 that the distribution of errors is almost normal, and the average presented on the right-hand side of the graph is equal to (3.30)-15 that is a minimal number and near 0. Therefore, regarding the regression assumptions' domination, the regression test can investigate the

extent of effectiveness of the variable of Identification and prioritization of the project integration management's positive and negative risks. The results obtained from the regression have been reported in Table 14.

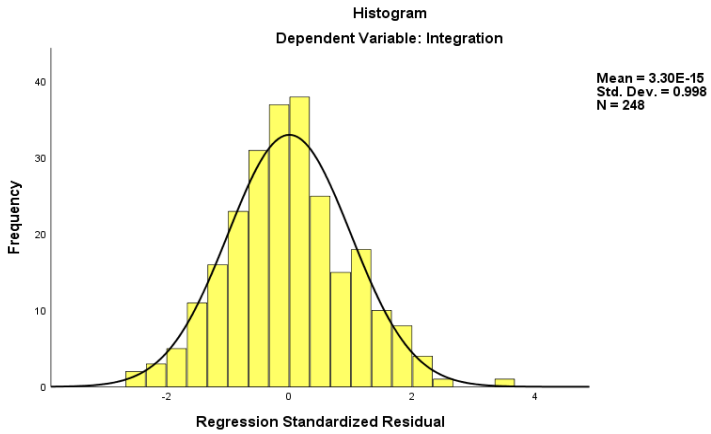

Figure 3. Frequency distribution of regression errors for the variable of Identification and prioritization of positive and negative risks of project and project integration management

Table 14: Regression model of Identification and prioritization of the positive and negative risks of project and project integration management

Variable	Non-standard coefficients (B)	Standard error	Standard coefficients (β)	t statistic	Level of significance (Sig)	Result in the model
Constant value	0.115	0.134	--	0.862	0.390	--
Risk Identification	0.983	0.039	0.849	25.168	0.00	effective
Durbin–Watson statistic	1.940	The errors are not correlative in the model				
Adjusted coefficient of determination	0.719	71.9% of the changes in the project integration management is accounted for by the Identification and prioritization of the positive and negative risks				
Fisher's F level of significance	0.00	The linear relationship of the model is accepted				
Conclusion	Identification and prioritization of the project's positive and negative risks directly affect project integration management					

It can be seen in Table 14 that the value Fisher (Sig) (Sig ANOVA) is equal to (0.00) that is less than 0.05, and this shows that there is a linear relationship between Identification and prioritization of the positive and negative risks of project and project integration management. Considering the table, the regression model's significance level is equal to the value (0.00) that is less than the value (0.05). This shows that Identifying and prioritizing the positive and negative risks of a project affects project integration management. The value of the adjusted coefficient of determination is equal to (0.719). It expresses that the variable of Identification and prioritization of the project's positive and negative risks (71.9%) explains

the changes in the project integration management. The extent of effectiveness of the variable of Identification and prioritization of the positive and negative risks of the project on the project integration management is equal to (0.849) concerning the standard path (β), and this shows that the increase of one unit in the Identification and prioritization of the positive and negative risks of the project, project integration management will increase by (0.849) unit in the same direction; therefore, the 11th research hypothesis is confirmed with %99 of confidence and Identification, and prioritization of the positive and negative risks have a significant effect on project integration management in civil projects of oil and gas industry (Fig. 4).

In this research, considering the impact of 3 mentioned cases on the success/failure of projects in 8 projects, the implementation of Fars province gas pipelines and the allocated budget of the projects and the cost and the actual duration of the projects were the results on the basis that the highest percentage of failure and failure in the national projects studied were as follows (Table 15):

Table 15: The highest percentage of failure and failure in the national projects

Item	Failure factors of projects (Negatives of below items)	Failure %	Description
1	Identify the risks	89%	Force majeure condition
2	Feasibility study	72%	
3	Adequate skill of teamwork	57%	Key personnel
4	Land study	33%	Farmers, Landowners
5	Procurement Supply	25%	Pipe making Obligations
6	Sub-contractors	19%	Payment Machines

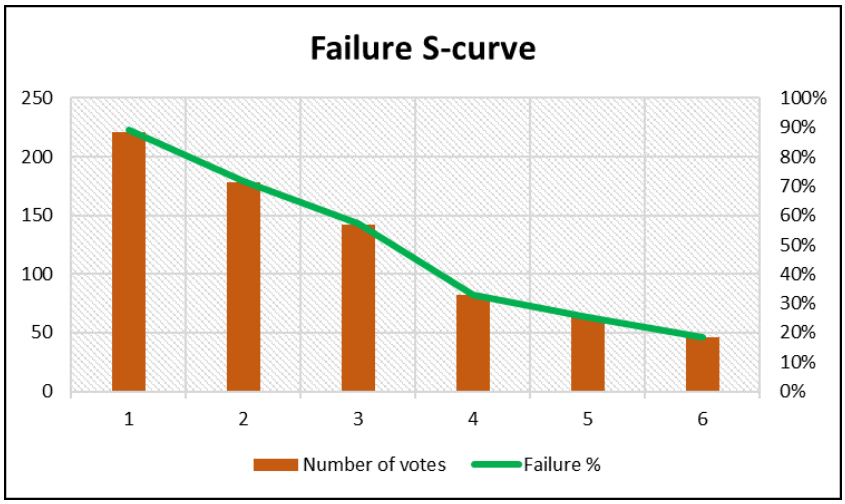

Figure 4. Failure S-curve

It should be noted that each of the above components can be a sub-category of risk management in projects. Still, considering the importance of these cases, they were examined separately. According to the above lessons, some suggestions were made to the industry. Before starting the projects and considering the importance of exploiting these items by the priorities defined from the feasibility study to the end of the project, the mentioned items were considered.

6. CONCLUSION

The present research sought to investigate many of the country's important industries' main challenges. The challenges that upset the whole framework of a project's contracts considering the project's transient nature and inattention to these challenges, will finally fail the project. The results obtained from the research showed that project management knowledge has a considerable role in reducing and removing the challenges facing civil projects with 10 fields and 5 stages. The proper establishment of project management knowledge through the learned lessons and experiences obtained from the specialists and those involved in the project can further develop the oil and gas industry projects. Paying attention to the opportunities and threats in the project management team's project, skill, and specialty, and the need for the feasibility studies and then initiation of the project is considered the items whose significance has been pointed out in the research results upon the success of the project. Positioning the project management system and controlling it during the project's period is accompanied by reducing the challenges and making the right decision in this regard. The present study assessed the extent of the opt reducing management’s effectiveness on the posed challenges while investigating into all fields of knowledge and obtained a significant relationship in this regard. Therefore, it was suggested that the relevant and knowledge fields due to a greater extent in the contracts concluded among the parties and devoted a separate section to the project management to increase the projects' success. The failures may decrease by taking these actions.

In the end, compared with similar research in these recent years, this study has many strengths and one weakness, which are mentioned below:

Strengths

- ✓ Investigation of knowledge areas and several important components derived from it in the failure of gas pipeline projects
- ✓ Specifying the percentages affecting case projects and paying more attention to senior managers for future decision making
- ✓ Utilizing the knowledge and experiences of a considerable number of stakeholders in these types of projects
- ✓ All questions are based on the conditions governing the country and the real problems that have been raised in the project
- ✓ The result of the proposed action plan for future projects to reduce failure and success was led by the industry submission

Weakness

- ✓ The number of questions of the comprehensive and several other domains too much, and respondents were initially reluctant to complete the questionnaire that given the importance of the issue to raise questions in all areas of knowledge

Future Research Suggestions

- ✓ Investigating the effects of the announced proposals in this field and measuring the rate of reduction of failures related to these projects
- ✓ Reviewing the fields of knowledge in their fields of work in projects and challenging stakeholders to solve these cases
- ✓ Investigation of mentioned factors by multi-criteria decision-making method
- ✓ Investigation of failure of oil projects, especially transmission lines

Conflicts of interest: There is no conflict of interest

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