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An Innovative Framework To Measure The Maturity Level of Core Soft Skills and Competencies (SSCM) Needed by Project Managers in Oil and Gas Industry

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ABSTRACT

The aim of this paper is to introduce an innovative framework that links a project manager's (PM) soft skills to the rate of success of a given project. This framework would enable companies to measure the level of soft skills and competencies possessed by a candidate PM. The approach been adopted in this research work is to identify the core soft skills that would lead to the success of a project. The methodology comprised designing a survey questionnaire to determine important soft skills required by a project manager for the success of project. The data collected through the survey was then statistically analyzed using SPSS and Minitab in order to tune the proposed framework that would enable the selection of project managers in a more robust, well-informed manner. This work concentrated on oil and gas projects as its application domain.

Keywords

Maturity Level, Project Management, Project Manager Competencies, Project Framework.

1. INTRODUCTION

Project management can be defined as the application of knowledge, skills, tools and techniques to accomplish the project within limited time and resources. A project manager is responsible for leading a project from start to completion. Hence, a project manager is expected to have special skills that would enable him/her to successfully run and manage a project. In the past, less attention was given to the soft skills a person possesses (Robles, 2012). However, now it becomes more apparent that soft skills play a vital role in the project success. Therefore, identifying key soft skills needed by PM and measuring their effect on project success is of a great importance. Oil and gas projects are complex in the nature of their tasks and may worth hundreds of thousands to millions of dollars. Therefore, the selection of a project manager with the right skills is a crucial task (Osman and Al-Hinai, 2018). One cannot emphasize enough that choosing the right project manager will lead to an increase in projects success rate. Therefore, a new innovative framework called, Soft Skills & Competencies Maturity (SSCM) is developed in this research work. As a result, the anticipated benefits of using the proposed SSCM framework within the oil and gas organizations would enable the selection of project manager(s) in a more robust, well-informed manner that can lead to an increase in the project success rate.

2. LITERATURE REVIEW

According to the British Standard Institute (2000), project management is the planning, monitoring and control of all of the project activities and the motivation of all of the individuals involved in it to accomplish the project objectives on time, according to the specified budget, scope and quality. In general, managing a project involves four phases (Munns and Bjeirmi, 1996). First, the initiation phase that includes developing the business case document and the feasibility study. Second, the planning phase where the work requirements are defined clearly, the needed resources to achieve the project objectives are determined and allocated as well as the execution of the work is well planned. Third, the execution and controlling phase. In this phase, the predetermined plans are executed and the progress of the work is monitored to adjust any deviations from the original baseline plans. The fourth and final phase is the closing phase where the Project Closure Report is created and accordingly the project is handed over or commissioned to the

customer. In order to perform the mentioned phases successfully, a skillful project manager is needed which would be responsible for achieving the project objectives and driving it to success.

There are several factors that could affect the performance of a project as well as its success rate. However, there exists number of common characteristics in successful projects. These characteristics can be used to measure the success of a project. Gorog and Smith (1998) suggested that there are two levels of a project success. The first level of success is at the project level which can be expressed in terms of using main factors such as duration, budget, performance or quality to determine the success of a project. While, the second level is at the organizational level. After accomplishing a certain project, organizational success can be assessed by measuring how the project is fulfilling the strategic objectives of the organization, the client and the end user. Another assumption is the Iron Triangle (Atkinson, 1999); which uses time, cost, and quality as main characteristics to measure success of a project. Researchers in general tend to differentiate between project management success and project success. In this paper it is assumed that project managers possess and are able to use their soft skills for achieving successful project completion.

According to Fisher et al. (2011), to have an efficient management, the manager should possess the following skills: understanding behavioral characteristics, leadership, influencer, authentic behavior, conflict management, communication, negotiation, teamwork and social awareness. While, Ahadzie et.al et al. (2008) suggested task-related performance behaviors are less important than contextual performance behaviors. Giving that the effect of contextual behaviors on the society, environment and organization is much greater. Furthermore, human behaviors can give an observation for soft skills (Osman and Al-Hinai, 2018).

3. RESEARCH METHODOLOGY

This study investigates how soft skills would affect project success based on understandings deduced from related research literature. Hence, the soft skills for project success have been identified from the reported literature which are: effective communication, integrity, team working and collaboration, negotiation, motivation, cognitive skills, leadership, conflict management. Theses soft skills are known as factors of global variables as they vary in importance according to the phase of the project, project phase is the mediating variable.

In the development of the SSCM framework, the targeted population are the project managers who are working in oil and gas industry in Oman. However, it should be emphasized that not all participants should have a formal position with the title of Project Manager. This research work argues that individuals who have main responsibility toward project completion success are qualified to participate in filling the survey questionnaire.

A survey questionnaire has been conducted to gather the opinion of project managers regarding soft skills needed for project success. In designing the questionnaire, an approach similar to the widely implemented approaches by project management researches is followed as in Deng et al. (2014), Hwang et al. (2015), and Ning (2014). Further to that, the created survey was reviewed prior distribution in brainstorming sessions held with people from both academia and practitioners from Omani oil and gas companies. The survey is based on a scoring percentage methodology. Participants were asked to give percentage scores for the degree of relevance between soft skills and project success. Moreover, ranking type questions have been used in most of the questions with an ordering from one to eight, in which one has highest priority and importance (more insight about the survey is given in Section 4). The questionnaire was uploaded into the world wide web using survey monkey website and then it was electronically distributed and collected accordingly. The total number of respondent who filled the whole survey after passing the qualifying part are 33 participants. The time taken to collect these 33 responses was from the 28th of November 2018 to the 13th of February 2019.

After collecting the survey results from all respondents, the descriptive statistics, correlation, linear regression analysis were then conducted to analyze the survey respondents' answers. To achieve this, statistical analysis were done by using IBM SPSS Version 20, and Minitab 18 software.

4. RESULTS AND DISCUSSION

In order to understand the profile of the respondents, questions on gender, age, degree of education, position, experience, field of work i.e. down, up, or mid-stream, as well as number and the scale of the of projects participated

in have been included. Among the 33 respondents, only one female participated in the survey. The results show that respondents of 31 to 35 years old represents 35.8% of the sample size. Almost half of the participants have a bachelor degree. Majority of the participants have an experience more than fifteen years. Out of the 33 respondents, there are 20 who are working in up-stream, 7 in mid-stream while 6 are in down-stream.

In order to find the reliability of the collected data from the survey used to measure a particular variable, the Cronbach's alpha (Tavakol and Dennick, 2011); a statistical approach; was conducted. Table 1, shows the possible conclusion of internal consistency in reference to a Cronbach's alpha score interval. These Cronbach's alpha intervals measure the consistency between the set of proposed questions in every group in order to decide if there are enough finding to proceed or not.

Table 1*:* Cronbach's Alpha Intervals

Cronbach's Alpha	Internal Consistency	Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent	$0.7 > \alpha \geq 0.6$	Questionable
$0.9 > \alpha \geq 0.8$	Good	$0.6 > \alpha \geq 0.5$	Poor
$0.8 > \alpha \geq 0.7$	Acceptable	$0.5 > \alpha$	Unacceptable

Table 2 summarizes Cronbach's alpha findings for the soft skills and the project failure variables. The number of questions in the table is referring to the number of questions in the survey related to a particular variable.

Table 2: Summary of Cronbach's Alpha for Project Failure variables and Soft skills variables

Variable	Cronbach's Alpha	Number of Questions	Comment
Project Failure	0.686	8	Questionable
Effective Communication	0.860	7	Good
Integrity	0.817	7	Good
Team working	0.643	7	Questionable
Negotiation	0.690	7	Questionable
Achieving Motivation	0.735	7	Acceptable
Cognitive Skills	0.781	7	Acceptable
Leadership	0.874	7	Good
Conflict Management	0.601	7	Questionable

As Table 2 shows, all the variables except for one have scored a Cronbach's alpha that is close to or above 0.7. This indicates that there are enough findings to proceed with the analysis. Never the less, these interval scoring may be further improved by increasing the sample size.

The descriptive statistics that have been performed on the variables of this study is shown in Table 3. The results show that the minimum degree of relationship between soft skills and project success of the responses is 24%, while the maximum is hundred percent relationship. The analysis further shows that the mean value of soft skills does not have a significant difference.

Table 3: Descriptive Statistics – Responses on Independent and Dependent Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Relationship between soft skills and project success	33	24	100	73.18	17.907	-0.452	0.409	0.518	0.798
Integrity	33	1.71	6.57	3.8745	1.02504	0.494	0.409	0.428	0.798

Teamwork	33	2.29	6.86	3.7446	1.07307	0.994	0.409	1.002	0.798
Negotiation	33	2.43	6.43	4.7965	.99041	-0.699	0.409	0.118	0.798
Motivation	33	2.29	7.43	4.9913	1.33771	-0.360	0.409	-0.323	0.798
Cognitive	33	2.29	7.43	5.3333	1.15488	-0.533	0.409	-0.026	0.798
Leadership	33	2.43	7.29	4.4978	1.29467	0.725	0.409	-0.378	0.798
Conflict Management	33	2.43	8.00	5.4502	1.25363	-0.249	0.409	-0.131	0.798
Communication	33	1.43	6.71	3.2814	1.57284	0.697	0.409	-0.696	0.798

Furthermore, Pearson Correlation (Kendall, 1955) values have been calculated according to each phase of the project i.e. initiation, planning, execution and control, and closing phase as well as for running cost, time and scope. All the values are significant with respect to project success.

Linear regression analysis (Seber and Lee, 2003) was also performed on eight facets of project managers' soft leadership skills (Effective Communication, Integrity, Teamworking & collaboration, Negotiation, Motivation, Cognitive skills, Leadership, Conflict management) with a view to measure their individual contribution. Results of the analysis by looking at p-value and R-Square value are indicating that soft skills positively affect the project success. Moreover, a normality test for data have been conducted with a positive result. The general term for the linear regression model is:

$$y = a + bx \quad (1)$$

where, y is the dependent variable, which is in this project success and x, is the independent variable that represents the different soft skills. Since there are more than one x, so the equation will be like:

$$Y = b0 + b1X1 + B2X2 + \dots + BnXn \quad (2)$$

Equations 3 to 8 show the summary for the coefficients and the models of the different phases and for cost, time and scope:

1. Regression Equation for Initiation Phase

Success = 18.7 + 5.15 Effective Communication + 2.53 integrity + 2.14 Achievement Motivation + 2.98 Cognitive skills (3)

2. Regression Equation for Planning Phase

Success = 33.4 + 3.22 Effective Communication + 2.62 Integrity + 3.08 Cognitive skills (5)

3. Regression Equation for Execution and Control Phase

Success = 34.2 + 1.85 Effective Communication + 3.58 Conflict management + 2.85 Integrity (6)

4. Regression Equation for Closing Phase

Success = 47.7 + 1.59 Cognitive skills + 1.71 Leadership + 0.97 Achievement Motivation + 0.74 Negotiation + 0.75 Team working & collaboration (7)

5. Regression Equation for Running Cost

Success = 45.8 + 2.48 Effective Communication + 1.25 Conflict management + 1.70 Leadership + 1.87 Integrity (8)

6. Regression Equation for Time

Success = 28.9 + 1.97 Effective Communication + 3.87 Integrity + 2.54 Negotiation + 1.59 Cognitive skills (9)

7. Regression Equation for scope

Success = 42.8 + 4.11 Achievement Motivation + 1.77 Leadership + 0.58 Effective Communication + 0.15 Conflict management (10)

5. COMPETENCY FRAMEWORK

Based on the above analysis, an innovative framework to measure the level of maturity in the level of different soft skills and competences (SSCM) that a project manager possesses is proposed. The set of questions of the proposed SSCM framework have been extracted from different previously conducted questionnaire. In order to use the proposed SSCM, then for each soft skill, the PM should be evaluated on his ability to demonstrate a set of qualities belonging to that particular soft skill. Scores are be given according to the scoring scheme listed in Table 4. After calculating the scores for all of the eight soft skills of the PM, the score of each skill should be substituted equations (3) to (10). The obtained figures using these equations will indicate the expected rate of success for a certain project phase or project factor if the PM in question is given the responsibility of that phase or factor. The comprehensive SSCM framework for measuring competences level based on qualities of soft skills is presented in Table 5 to Table 7.

Table 4: SSCM Framework Scoring Method

4	Candidate possess (6 to 7) of the essential qualities
3	Candidate possess (4 to 5) of the essential qualities
2	Candidate possess (3) of the essential qualities
1	Candidate possess (1 to 2) of the essential qualities
0	All Essential qualities are missing

Table 5: SSCM Framework for Measuring Competence Level in Communication, Conflict Management, and Leadership skills

Ability to Demonstrate the Quality					
Communication Skills Qualities	**(Y/N)**	**Conflict Management Qualities**	**(Y/N)**	**Leadership Qualities**	**(Y/N)**
Ability to Understanding the Needs of Others		Ability to Demonstrate Positive Personal Impact & Confidence		Understands how Personality Impacts Performance	
Ability to Clearly Communicating Messages		Understand Different Conflict Handling Modes		Challenges the Status Quo	
Ability to Adapt Communication Style		Ability to Use a Range of Conflict Handling Styles		Ability to Inspire Others	
Ability to Use A Range of Communication Methods		Understanding Organizational Politics		Ability to Create a vision	
Ability to Build an Influential Network		Understanding a Range of Perspectives		Motivates Others to Continually Improve	
Awareness of Personal Impact		Ability to Achieve a Desired Outcome for the Majority		Exerts Positive Influence	
Assertively Dealing with Conflict		Encouraging Positive Conflict and Debate.		Manages Ambiguity & Change	

Table 6: SSCM Framework for Measuring Competence Level in Negotiation, Team working, and Integrity skills

Ability to Demonstrate the Quality					
Negotiation Skills Qualities	**(Y/N)**	**Teamwork Qualities**	**(Y/N)**	**Integrity Qualities**	**(Y/N)**
Ability to Prepare in a structured way		Having a common Purpose		Keep Promises Even if it Takes Extra Effort.	
Able to explore the arena		Crystal Clear Roles		Tells the Truth Using Simple Language, Without Distorting Facts or Manipulating People.	
Know your opponent		Accepted Leadership		Doesn't Try to Hide Information	
Ability to Find a common ground		Effective Processes		Keeping Commitments and Delivers the Results Promised	
Having confidence		Trustworthy Relationships		Accountable for the Project Status and Results	
Being persuasive		Excellent Communication		Take Responsibility for the End Results	
Seeking clarity		Feeding Back to Each Other		Track Record for Delivering Results Over a number of Projects.	

Table 7: SSCM Framework for Measuring Competence Level in Motivation and Cognitive skills

Ability to Demonstrate the Quality			
Motivation skills Qualities	**(Y/N)**	**Cognitive skills Qualities**	**(Y/N)**
Ability to Increase Team Commitment		Improved Decision Making	
Seeing the Value of Feedback for Both People & their Performance		Improved Innovation Skills.	
Ability to Set a realistic Goal		Enhanced Problem Solving	
Understand and Measure Project Performance		Better Audience Engagement	
Demonstrating Balance Over Time to Both Praise and Motivate		Understanding Others' Perspectives	
Conducting Challenging Performance Conversations		Information Gathering within a large & Diverse Network.	
Giving Feedback about Observed Behavior		Share Learnings with Others.	

CONCLUSIONS

In this research work, a novel SSCM framework to measure the maturity level of soft skill and competences of project managers and how they affect the project success rate is introduced. To achieve this, a survey questionnaire has been distributed among project managers in oil and gas companies in Oman. The analysis conducted in this paper using statistical means have demonstrated that there are relationships between soft skills competencies of a project manager and project success rate. However, the level of relationship between each soft skill and project success varies among the different project four phases as well as the different project success factors. The SSCM framework can be used during recruiting and hiring of project managers. It can also be used to assess the strengths and weaknesses of managers and hence determine areas that need further development and improvement. Moreover, it can also be used for promotion and career advancement. Authors are optimistic that this study would provide organizations and individuals alike with key soft leadership skills to successfully execute projects.

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BIOGRAPHY

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