



Conference on ENTERprise Information Systems / International Conference on Project
MANagement / Conference on Health and Social Care Information Systems and Technologies,
CENTERIS / ProjMAN / HCist 2016, October 5-7, 2016

Attitudes to risk in petroleum projects

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Abstract

The paper identifies common personality traits and attitudes to risk management for people in the petroleum industry. The research was conducted with the aid of a survey and was addressed to people who have participated in the delivery of petroleum projects, with fifty responses obtained. The questions in the survey were based on Jung's personality theory and risk decisions identified from previous projects. Using Jung's personality classification, it has been concluded that people who deliver petroleum projects are judgers (Relationship with the world), more extrovert than introvert (Focus on attention), more intuitive than sensing (Seeking of information), and finally more thinkers than feelers (Decision makers). The results also show that the respondents are aware of different forms of risk in a project and prefer not to introduce any form of risk to a project.

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Peer-review under responsibility of the organizing committee of CENTERIS 2016

Keywords: People Personality; Petroleum Industry; Petroleum Projects; Risk Decisions; Risk Management.

1. Introduction

As one of the biggest commercial sectors in the world, the petroleum industry consists of activities including exploration, extraction, refining, transportation and marketing of crude and natural gas¹. These activities are divided into three major sectors, namely downstream, upstream and midstream¹. The industry is the main driving force behind other sectors such as transportation and aerospace. Even though the industry has been hit with falling crude oil prices, it is still expected to grow by at least 4% by 2019².

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Project success, the focus of every project³, is still actively researched by both academics and industry⁴. The global petroleum industry is a very competitive environment with large multinationals such as Exxon Mobil and state run oil companies such as Saudi Aramco. Due to heavy competition in the industry, companies invest heavily in research to improve performance and capabilities and as such results are not shared; this makes developing countries dependent on those multinational companies⁵. All projects are accompanied with a variety of risk. Tsiga et al.⁶ identify the critical success factors for petroleum projects and their research also highlights the importance of risk management in such projects.

There is currently little research that focuses on project management in the petroleum industry. This gap has led to the implementation of generic project management techniques that have been developed by professional bodies such as the Association for Project Management and the Project Management Institute. Understanding each individual industry helps in the development of sector specific frameworks and methodologies that can contribute to project success and avoid project failures such as the Deepwater Horizon accident^{7,8}.

There are a variety of factors that can help improve the success rate of petroleum projects⁶. Various researchers and schools of thought have emphasized the importance of the skill set of the project manager in delivering projects^{9,10} and others have emphasized not only the role of the project manager but also the competence of the person in that role¹¹. Despite significant debate in the project management literature, there has been no clear cut differentiation between “competence” and “skill” with the two words often used interchangeably. Katz¹² suggests that the human, conceptual and technical skills of project managers have to be developed, whilst Fisher¹³ and Montequina et al.¹⁴ take this a step further by identifying the ideal skills required of project managers. Researchers such as El-Sabaa¹⁵ suggest a framework to be used when selecting the right project manager.

This research paper focuses on the identification of the risk attitudes and personalities of people who currently deliver petroleum projects, indicating the type of attributes and personalities of people who undertake such decisions.

The decision scenarios of the survey were derived from well-documented decisions that had been taken in already completed projects¹⁶. Some of the decisions led to successful delivery and others led to failure, while the personality aspect of the study was derived from Carl G. Jung’s work on psychological theory¹⁷, as adopted by Montequina et al.¹⁴. Jung’s work looks at how people behave differently as a result of reasoning. The differences depict how individuals use their minds in selecting their preferences and how they individually digest information.

There have been various psychometrics questionnaires developed based on Carl G. Jung’s work, with the Myers-Briggs Type Indicator (MBTI)¹⁸ and Temperament Sorter II (KTS II)¹⁹ particularly noteworthy. Researchers have highlighted the importance of using such tools in project management^{20,21}.

2. Methodology

For this research, a questionnaire was developed and divided into four sections. The first section was designed to collect background and demographic information about the respondents. The information collected was: location, educational qualification, project experience, project management experience, number of projects participated in, percentage of successful projects, number of projects managed and percentage of managed projects that were deemed successful. The second section of the survey explored the decision scenarios which asked participants to indicate whether they agreed or disagreed with various risk statements. **Table 1** shows the statements shown to respondents in this section. The third section was designed to collect information about the behavioral preferences of the respondents. Thirteen statements were shown based on Carl G Jung’s work and similar to those adopted by Montequina et al.¹⁴. **Table 2** shows each statement and the Jungian preference it measures.

Table 1: Decision scenario statements.

Number	Statements
1	It is common for there to be tension between the need to get something right and the need to make progress. I would prefer to accept an imperfect solution and make progress, than to wait to improve the solution.
2	I find face-to-face meetings a more effective way of communicating than email.
3	Projects often start without an adequate amount of time spent on planning.
4	My customer introduces challenging new requirements after the project has kicked off and offers to pay for any costs incurred. In this situation I would happily accept the new

	requirements.
5	Often customers don't really know what they want, so rather than going to the expense of making models such as prototypes and asking them, I usually find the project team is better off making assumptions by itself.
6	In a very risky project, I expect to spend more of the risk budget in the latter part of the project.
7	For project managers, specialist domain knowledge is more important than understanding generic project management good practice.
8	My 2-year project is running 3 months late with a year to go. I have discovered that by overlapping two tasks I should save 4 months, but there is a 10% chance of rework being needed, which would delay the project by 12 months. I would consider this a risk worth taking, and would therefore overlap the two tasks.
9	All stakeholders should be able to see a project risk register.
10	There should be two versions of a risk register – one for internal use and one for external stakeholders.
11	Very little effort should be spent on a project until there is a contract in place.
12	I would rather develop a close relationship with a single preferred supplier for each element of a system, than have multiple suppliers competing for business.
13	As a proportion of the total project budget, how much would you be willing to pay to guarantee on time and good quality delivery?

In the decision scenarios, participants were asked to specify the extent to which they agree or disagree with each specific scenario while in the personality aspect of the survey the respondents were asked about their individual preferences based on their past experiences. These two sections were implemented using a 5-point Likert scale. Question 13 in **Table 1** is the only question that does not use the Likert scale option. The question implements a numerical open ended question aimed at determining the percentage of total budget they would be willing to invest in the project to ensure quality and on time delivery. This seeks to understand the level of performance in a project that is generally expected (relative to original cost, schedule and quality requirements).

Table 2: Personality statements and their individual Jungian preferences.

Number	Statement	Carl Jung's Preference
14	I have a low level view more than a high level view	Seeking information
15	I prefer to make decisions based on logical rather than emotional arguments	Decision making
16	I am more sociable than reserved	Focus of attention
17	I prefer a structured organization rather than a flexible organization	Relationship with the world
18	I am more of a pleasing than firm person	Decision making
19	I have a long-term view rather than short-term view	Seeking information
20	I prefer having control rather than flexibility	Relationship with the world
21	I am pragmatic more than creative	Seeking information
22	I prefer to make a consensus team decision more than objective decisions	Decision making
23	I prefer to freeze the scope rather than leave it open for additional requirements	Relationship with the world
24	I prefer to respect deadlines more that adapt them to new circumstances	Relationship with the world
25	I prefer to show fairness to empathy	Decision making
26	I am more of an introvert than extrovert	Focus of attention

The final section of the study consists of only two questions, aimed at collecting the contact information of the respondents. This section was optional and would be used to contact the respondents to participate in further study and also to notify them of any published results. The survey was conducted over a five-month period starting on the 2nd of November 2015 and ending on the 31st of March 2016.

3. Results

The respondents of the survey are mostly geographically located in Nigeria, United Kingdom and the United States of America. Participants are currently employed in the delivery of projects for various private and state-run oil companies such as BHP Billiton, British Petroleum, Halliburton and the Nigerian National Petroleum Corporation.

All respondents work in the petroleum sector. **Figure 1** depicts the geographical location of the respondents. In total, 50 participants completed the survey and their background information has been analyzed and shown in **Table 3**.

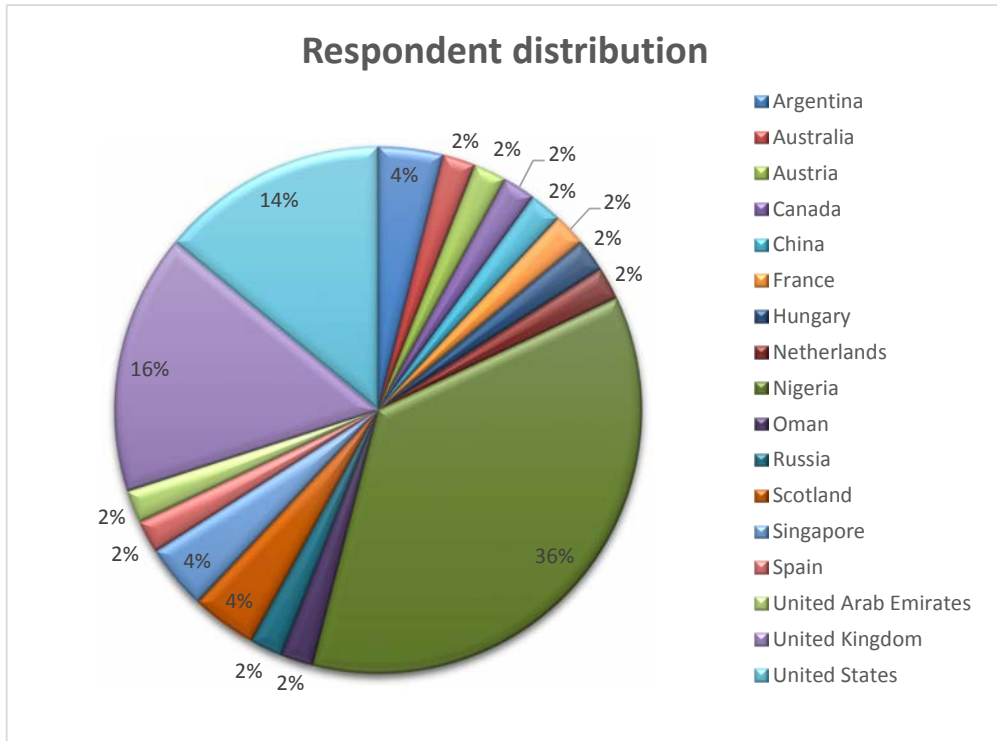


Figure 1: Geographical location of respondents

Table 3: Characteristics of respondents

Characteristics of Respondents			
Background Question	Characteristics	Petroleum Sector	
		Number	Percentage
Education	Bachelor's	19	38
	Master's	20	40
	Doctorate	7	14
	Other	4	8
Project Experience	0 to 2 years	4	8
	2 to 5 years	5	10
	5 to 10 years	10	20
	10 to 15 years	6	12
	More than 15 years	25	50
Project management experience	None	3	6
	Less than 2 years	8	16
	2 to 5 years	7	14
	5 to 10 years	12	24
	10 to 15 years	5	10
No of projects participated	More than 15 years	15	30
	Fewer than 5 projects	12	24
	5 to 10 projects	11	22

	10 to 15 projects	7	14
	More than 15 projects	20	20
% of successful project	0 to 20	3	6
	20 to 40	5	10
	40 to 60	8	16
	60 to 80	13	26
	80 to 100	21	42
Projects Managed	None	10	20
	Fewer than 5 projects	17	34
	5 to 10 projects	8	16
	10 to 15 projects	2	4
	More than 15 projects	13	26
% of managed successful projects	0 to 20	3	6
	20 to 40	5	10
	40 to 60	7	14
	60 to 80	14	28
	80 to 100	19	38
	Missing	2	4

The data collected from the respondents for section 2 and 3 that are based on the Likert scale have been analyzed for frequencies using **IBM SPSS Statistics version 22**. The total number of answers given for each Likert scale question is shown in **Table 4**.

Table 4: Cumulative frequencies.

Question	Median	Mode	Scale (1)	Scale (2)	Scale (3)	Scale (4)	Scale (5)
1	3	1	14	7	10	12	7
2	5	5	1	2	4	17	26
3	4	5	4	5	12	14	15
4	4	4	1	4	15	19	11
5	2	2	13	14	10	7	6
6	4	4	4	9	9	19	9
7	3	2	9	12	11	11	7
8	2	2	11	18	3	12	6
9	4	4	5	3	7	20	15
10	3	4	12	12	8	13	5
11	2	2	7	22	8	6	7
12	2.5	1	13	12	6	10	9
14	2	1	16	14	13	6	1
15	5	5	1	3	0	14	32
16	4	4	6	6	9	21	8
17	4	4	5	12	7	19	7
18	3	3	13	9	15	10	3
19	5	5	0	0	10	14	26
20	4	4	4	4	13	19	10
21	3	3	3	13	14	13	7
22	4	4	6	12	3	18	11
23	4	4	5	7	10	18	10
24	4	4	1	14	5	18	12
25	4	4	1	3	8	23	15
26	3	3	9	9	14	10	8

From the analysis of the data in **Table 4**, the outcome of the decision scenarios and personality profiles of the respondents can be drawn from the statistical information. The 5-point scale was transformed to a 3-point scale by grouping 'strongly agree' and 'agree' together under 'agree' and 'strongly disagree' and 'disagree' together under 'disagree' with the results shown in **Table 5** and **Table 6**. In the case of the personality profile, the results obtained

can also be compared with Jung's work. It is interesting note that for Question 26 in **Table 2** there is no agreed consensus for the stated question, with respondents just as likely to see themselves as introverts or extroverts.

Table 5: Decision scenarios results

No	Question	Disagree	Neutral	Agree	Preferred
1	It is common for there to be tension between the need to get something right and the need to make progress. I would prefer to accept an imperfect solution and make progress, than to wait to improve the solution.	21	10	19	Wait for an Improved solution
2	I find face-to-face meetings a more effective way of communicating than email.	3	4	43	Face to Face meetings
3	Projects often start without an adequate amount of time spent on planning.	9	12	29	Plan more
4	My customer introduces challenging new requirements after the project has kicked off and offers to pay for any costs incurred. In this situation I would happily accept the new requirements.	5	15	30	Accept new requirements with conditions
5	Often customers don't really know what they want, so rather than going to the expense of making models such as prototypes and asking them, I usually find the project team is better off making assumptions by itself.	27	10	13	Don't make assumptions
6	In a very risky project, I expect to spend more of the risk budget in the latter part of the project.	13	9	28	Spend more later
7	For project managers, specialist domain knowledge is more important than understanding generic project management good practice.	21	11	18	Understanding generic project management
8	My 2-year project is running 3 months late with a year to go. I have discovered that by overlapping two tasks I should save 4 months, but there is a 10% chance of rework being needed, which would delay the project by 12 months. I would consider this a risk worth taking, and would therefore overlap the two tasks.	29	3	18	Do not proceed
9	All stakeholders should be able to see a project risk register.	8	7	35	All see risk register
10	There should be two versions of a risk register – one for internal use and one for external stakeholders.	24	8	18	One risk register
11	Very little effort should be spent on a project until there is a contract in place.	29	8	13	More effort before contract
12	I would rather develop a close relationship with a single preferred supplier for each element of a system, than have multiple suppliers competing for business.	25	6	19	Multiple suppliers

Table 6: Personality section results

No	Question	Disagree	Neutral	Agree	Preference	Jung's Type
14	I have a low level view more than a high level view?	30	13	7	High Level View	Intuitive
15	I prefer to make decisions based on logical rather than emotional arguments?	4	0	46	Logical decisions	Thinkers
16	I am more sociable than reserved?	12	9	29	Sociable	Extrovert
17	I prefer a structured organization rather than a flexible organization?	17	7	26	Structured organization	Judging
18	I am more of a pleasing than firm person?	22	15	13	Firm	Thinkers
19	I have a long-term view rather than short-term view?	0	10	40	Long term view	Intuitive
20	I prefer having control rather than flexibility?	8	13	29	Control preferred	Judging
21	I am pragmatic more than creative?	16	14	20	Pragmatic	Sensing
22	I prefer to make a consensus team decision more than objective decisions?	18	3	29	Team decision	Feeling

23	I prefer to freeze the scope rather than leave it open for additional requirements?	12	10	28	Freeze scope	Judging
24	I prefer to respect deadlines more than adapt them to new circumstances?	15	5	30	Respect deadlines	Judging
25	I prefer to show fairness to empathy?	4	8	38	Fairness	Thinkers
26	I am more of an introvert than extrovert?	18	14	18	Inconclusive	Inconclusive

4. Conclusion

According to the results of the decisions scenarios as shown in **Table 5**, one can conclude that the respondents prefer to have an improved solution before proceeding, prefer face to face meetings, prefer more planning at the onset of a project, accept new requirements with conditions, prefer to communicate with customers than to make assumptions, and believe that for very risky projects they would spend more on risk on the later stages of a project. They believe generic project management knowledge is important, do not gamble to save time or cost, prefer having multiple suppliers, think that there should be one risk register and that all stakeholders should be able to see it, and that it is reasonable to spend effort in a project before the contract is in place. The data obtained from the decision scenarios shows that the respondents are very aware of risk in petroleum projects and in general prefer not to take any form of risk. The belief that in risky projects more of the risk budget is spent late on perhaps reflects an experience that risks tend to manifest themselves later in these projects. With thorough risk assessment and proactive risk management earlier in the project, however, this shouldn't generally be the case.

The results of the open ended Question 13 in the decision scenarios revealed that 66 % of the respondents gave a figure below 20% while another 14 % gave a figure between 20% and 50%. The remaining 20% gave a figure above 50%. This question was trying to ascertain what respondents thought a typical level of cost and schedule performance in the project might be, and therefore how much they would be willing to spend on a hypothetical 'insurance policy' that guaranteed delivery on time and budget. It seems likely that respondents that gave a figure above 50% interpreted this question differently to those who gave figures below 20%.

In the aspect of the personality profile of the respondents as shown in **Table 6**, the generic personality of the respondents are people with a strategic and long term view, who are fair and firm, prefer making logical and team decisions, are pragmatic and sociable, prefer structured organizations, respect deadlines and prefer to freeze scope and have control. No conclusion was derived from Question 26 because of the equal number of people who had introvert and extrovert personalities.

A personality profile of the respondents can be inferred from Jung's work and the results of **Table 6**. We can conclude that people who participate in petroleum projects are more judges (Relationship with the world), extrovert than introvert (Focus on attention), more intuitive than sensing (Seeking of information), and finally more thinkers than feelers (Decision makers). In some quadrants of the Carl Jung's work it is interesting to note that some of the respondents possess a balance of both traits. The results of this survey gives an insight on the attitudes of project managers towards risk as 80% of the respondents have managed petroleum projects and 94% have project management experience. This could be an area of further behavioral study for petroleum projects and for comparison with other sectors to determine the shared characteristics and differences.

The results of this study have both practical and theoretical implications. With respect to theoretical implications, the study helps our understanding of risk management attitudes in the petroleum industry and could be the basis for further research. For the practical implications, the study provides a step towards developing guidance to help improve risk management behavior of project participants, tailored to the needs of the individual.

Acknowledgements

The authors would like to show their appreciation to all those who helped during this study. Special thanks goes to the Petroleum Technology Development Fund (PTDF) for the financial support provided during the course of this survey.

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