Analysis of Factors Influencing The Switching Behaviour of Offshore to Onshore Workers on Push-Pull-Mooring Theory During the Covid-19 Pandemic: A Proposed Study

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Abstract. Covid-19 pandemic outbreak has disrupted many aspects of industries including oil and gas offshore platforms operation. Oil and gas production platforms are heavily depended in fly in fly out employees. Living in a very limited space, demanding work, and living far away from family creates physical and emotional fatigues that can enhance accident. The Covid-19 pandemic puts additional strain to these workers in longer working schedules. All these factors may jeopardize the business continuity of oil and gas production facilities. Employee satisfaction is an important variable for business continuity. This paper proposes push pull mooring technique to analyze the employee switching behavior of offshore oil and gas production facilities in the pandemic time.

Keywords: Offshore Platforms, Covid-19, Business Continuity, Push Pull Mooring, Switching Behavior.

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1 Introduction

Offshore oil and gas production facilities are heavily relied on the fly-in fly-out (FIFO) workforces (including ship-in ship-out). The consequences to this type of work includes long commutes, limited personal and working space, distance and time away from family, and intensive and demanding work that can effect on the mental health and well-being of the workforce (stress, depression, anxiety, and suicide), productivity, and probable increase on working-related accident. Commonly, the FIFO workers are rotated every 6 – 21 working days with 10 – 12 hour shifts but the implementation of the working days depends on the company policy requirements in regards of the job function, more remote location, and subjected to government regulation. In Indonesia, the regular 2-2 schedules (i.e., 2 weeks offshore alternating with 3 weeks shore break) with shorter shore break is the common practice. While, there is also practice of 2-3 or 2-4 schedules, for example as in the UK and Norwegian.

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Categorically, the FIFO work force of oil and gas offshore installation can be divided as regular employee and specialist employee. The differences between those two are in the work schedule and workplace. The schedule of regular employees is usually arranged many months in advance for a designated installation/facilities only. The specialists are usually a specialist personnel working on an adhoc basis that are required to travel to different installations where and when required to meet operational needs. These employees are expected to work in irregular and/or unpredictable schedules. Both type of employees faces different risks and challenges.

Risks-related to work on offshore installations can be categorized into two main types: operational risk (e.g., risk of explosion, fire, structural failure, shut-down, reduced productivity) resulting from human error and impaired performance) and risk to the physical and psychological well-being of individual offshore workers (e.g. injury, illness, sleep depravity and disturbance, anxiety attack).

Adverse consequences such as decreasing productivity, decreasing product quality, as well as accidents, injuries and even catastrophes can be resulted from action errors and rule violations. Organizational factors, working environment and human factors are among the antecedents of errors and violations. The Piper Alpha oil platform disaster with 167 casualties is one of the examples that relates between action errors and the underlying organizational and human factors. This disaster was caused by the poor communication at shift hand over and leadership failures in 13 emergency responses.

The Covid-19 pandemic has created unprecedented situation in offshore oil and gas operation in Indonesia. The major effect is the prolongation of the employee shift schedule. The combination of longer onsite days couples can cause physical and mental fatigues of the FIFO workers. It is not only creating risk to the day-to-day operation but also creates unsettling condition that can cause the FIFO workers to find other employment elsewhere. In this paper, the Push Pull Mooring (PPM) method is used to analysis relevant work-place factors during the pandemic that might cause the intention of switching employment behaviour of the FIFO workers.

2 Literature Review

2.1 Push Pull Mooring

The Push-Pull-Mooring (PPM) concept is generally used to identify factors that influence the switching behavior of customers. The factors are categorized into push, pull, and mooring factors [1]. The PPM concepts is adopted in this research to identify factors in the switching behavior of employees.

The push factors are any negative conditions or situations in current employment that motivate people to leave the position [1]. The pull factors are positive factors belongs to the other employers that more beneficial or interesting [2]. The pull factors create attractive forces for people to move in [3]. While the mooring factors are factors that force the employee to stay eventhough the push and pull factors are strong such as emotional stability and good relationships with the current employer [1].

2.2 Structural Equation Modelling

Structural Equation Modelling (SEM) is a statistical analysis that integrates the confirmatory factors, path analysis, and structural model [4]. It is a multivariate technique enabling casual relationships between factors in a path diagram. Through SEM, the linear dependency of the studied variables (indicators) and latent variables can be modeled simultaneously. Latent variables are variables that cannot be measured directly, thus require some other variables to support.

The concept of SEM when following the construct is to combine between variables and see the relationship between the two. In the merger, visualization is usually done with a diagram then connected by a line (inner). The concept of visualization in the SEM structure can be seen in Fig. 1.

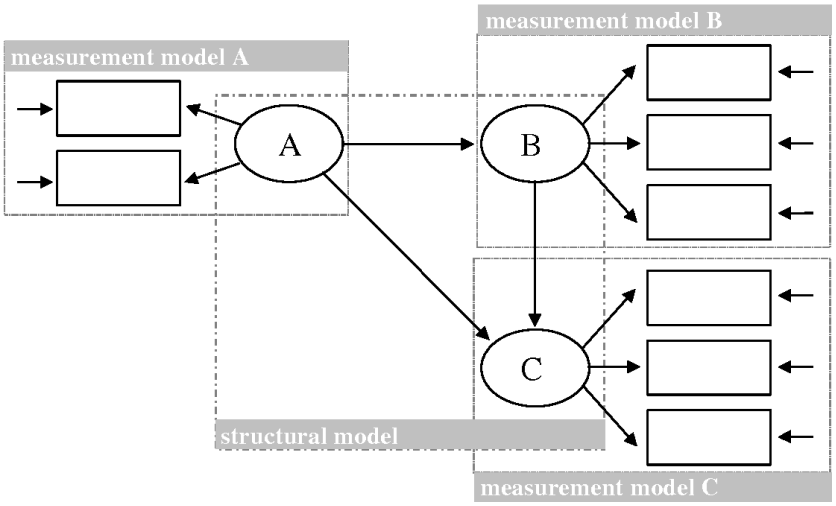

Fig. 1. Example of SEM model. [5]

3 Research Methodology

This section explains the complete stages of the study to be carried out which becomes a reference in conducting research so that it runs according to the objectives. The stages sequence of the research are shown in below figure.

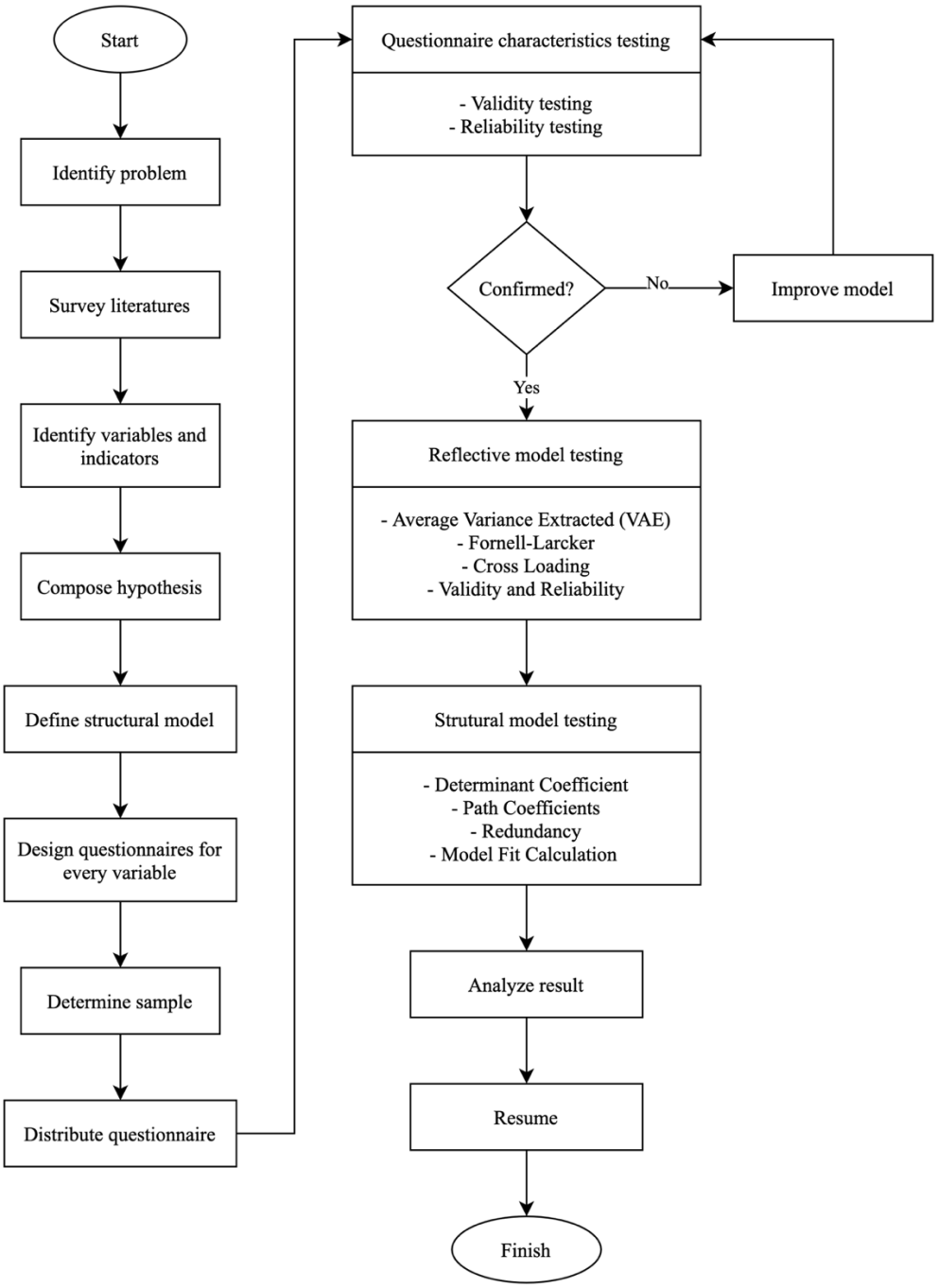

Fig. 2. Research flowchart.

1. Identify Problem

   Identifying the problems that cause worker migration or turn over, moving from current offshore company to any onshore companies.

2. Literature Survey

   Searching for references of previous researchers and looking for appropriate methods to be aligned to the observed problem. The references used as reference for the researchers to compose a theoretical basis for the proposed model.

3. Identify Variable and Indicators

   Next step is to identify the variables related to the PPM concept from previous related literatures and continued by identifying their respective indicators.

4. Create Structural Model

   Primarily based on the literature survey, a structure model related to observed problem is designed by following the PPM concept.

5. Define Research Hypothesis

   The preparation of the hypothesis is based on the structural model that has been made. The designed hypothesis is a temporary decision related to the research being carried out which will be proven later through the research process.

6. Design Questionnaire

   Translating the indicators that have been designed from each variable into a question for later distribution to the respondents.

7. Questionnaire Assessment

   The questionnaire created should be based on reliable literature related to offshore working environment.

8. Sample and Distribute Questionnaires

   The determination of the sample in this study covers at least 70 respondents. This is based on a study by [6] which mentioned that there should be minimum 10 respondents for each variable. If we consider the PLS-SEM theory, sample that is less than 100 is said can produce a good result too compared to more than that [7] but when it is possible, bigger number of respondents is preferable.

9. Test the Questionnaire

   This test is required to determine the feasibility of the questionnaire whether the questionnaire is appropriate to be used in data collection stage or not, and to test whether the conceptual model that has been created is in line with the reflective concept. If yes then we continue to proceed to questionnaires testing to confirm its the validity and reliability.

10. Test the Formative Model

    This test used to ensure the validity of the data and the accuracy of the measurements. The measurement research uses a reflective model so that the test uses the calculation of Outer

Loading, Fornel-Larcker, Average Variance Extracted (AVE), Cross-Loading, Cronbach Alpha's, and Composite Reliability.

11. Test the Structural Model

    This test is to ensure that the model that has been formed has a good value and can be presented with actual conditions. This test uses the assessment of the coefficient of determination, path coefficients, redundancy, and measurement of model fit.

12. Analyze Experiment Result

    The results of data processing are in the numbers that need to be resumed, translated into insightful sentences.

13. Resume Research

    This last step is to resume the overall research, to check back the result and the purpose of the problem therefore we can interpretate the experiments into recommendation and solution then provide suggestion for improvement in the future.

3.1 Research Design

The following is the explanation research design in brief, including determine hypothesis, mechanism planning of data sample and colletion, and design questions in the questionnaire.

3.1.1 Hypothesis

The hypothesis is determined based on previous studies and adjusted to the research variables which are formulated into the proposed model structure. The following Table 1 shows hypotheses that used in the study:

Table 1. Research hypothesis.

Code	Hypothesis
H1	Working hours have a positive impact on the employee switching behaviour.
H2	Interpersonal relation has a positive impact on the employee switching behaviour.
H3	Work-personal life conflict has a positive impact on the employee switching behaviour.
H4	Frequency of working from home scheme has a positive impact on the employee switching behaviour.
H5	Safety consideration has a positive impact on the employee switching behaviour.
H6	Switching cost has a negative impact on the employee switching behaviour.
H7	Turn over intention has a negative impact on the employee switching behaviour.

Then based on the above hypotheses, the relationship of all these hypotheses can be visualized into diagram below in Fig. 3, which each varible can be described as shown in Table 2.

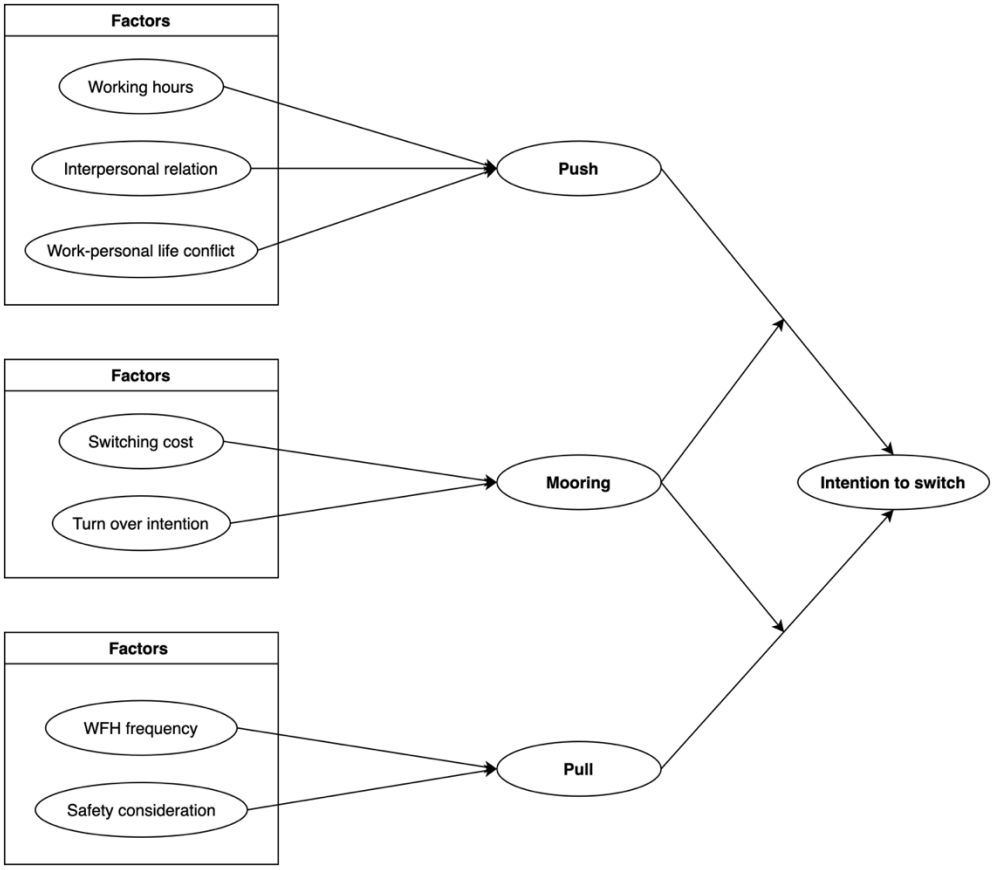

Fig. 3. Structural model.

Table 2. Research hypothesis.

No.	Variable	Definition
1	Working hours	Literally total working hours within a shift.
2	Interpersonal relation	The importance of effective interpersonal relation among co-workers in the offshore site [8].
3	Work-personal life conflict	Associated to work and life balance of offshore employees [8].
4	Frequency of working from home scheme	The possibility of working type.
5	Safety consideration	Comfort with the working environment.

6	Switching cost	In general, it would spend a lot of money, time, and effort to switch to a new company. [9]
7	Turn over intention	When individuals perceive that the working environment meets their needs, there is a negative intention to quit [10].
8	Switching Behaviour	Worker's choices from offshore company to the onshore-based [9]. This is usually associated with employee's dissatisfaction with the current offshore company, along with their perceptions of the relative advantage of substitutes [11].

3.1.2 Data Collection and Sampling Design

In conducting data collection, we distribute questionnaires to the target respondents. Questions design in the questionnaire are set based on Likert scale of 1 to 5. The minimum Likert value of 1 represents a strongly disagree opinion to the highest value of 5 represents strongly agree opinion. Determination of respondents in this study using Roscoe theory which implied that for the research performs multivariate analysis, the number of sample must be at least 10 times the number of the defined variables [12]. Since we have 7 variables here therefore the minimum number of are 70 respondents.

The sample collected in the study was conducted using a non-probability sampling method with a purposive sampling technique as stated by [13]. This sampling technique is described as sampling technique that does not provide equal opportunities for each element or member of the population to be selected as a sample while the purposive sampling technique based on the researcher's considerations on which sample is the most representative. Here we define that the appropriate and representative sources of information are the employees in the offshore-based companies in Indonesia, whether it is state-owned or private.

3.1.3 Design Questionnaire

The questionnaires used to collect data directly from the respondents. It contains questions that describe the model variables. Variables are determined to assess state-owned and private offshore companies through their employees. These variables have been determined and converted into relevant indicators in the form of questions that reflect the SEM structures.

4 Conclusion

This preliminary research conducted as a base to measure and analyse the employment switching behaviour of offshore oil and gas production platform workers due to the additional working strains during the Covid-19 pandemic. The intention to leave the current employment could jeorpadise the business continuity of the oil and gas production facilities. Thus, the result

of this study can be used by the management to design a proper working conditions that minimize the intention to leave or the switching behaviour of the employees.

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