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Designing a Sustainable Procurement System Model SNI ISO 20400: 2017 In SKK Migas

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ABSTRACT

This research aims to design a model of a sustainable procurement system in SKK Migas in supporting and strengthening the sustainable upstream oil and gas procurement sector. Oil and gas commodity is one of the natural resources that cannot be renewed in a short time and is very important in the world after water resources. However, recently, there have been many challenges faced in managing the national oil and gas industry, one of which is the condition of reserves oil and gas that continues to decline and new reserves that are more difficult to find technically and require larger costs. To survive facing the challenges and volatility in the oil and gas industry, as well as make an optimal contribution to the achievement of production and state revenue from the upstream oil and gas sector, cost control is needed for efficient operations including through the implementation of sustainable principles in the strategy of procurement management of goods and services refer to SNI ISO 20400: 2017. The result showed that the analysis of questionnaire data through SEM LISREL and design concepts using PDCA with the conclusion that the design of a sustainable procurement system model is valid.

Keywords: resources, industry, oil and gas, reserves, sustainable, models, SEM Lisrel, PDCA

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INTRODUCTION

Oil and gas is one of the sources of natural wealth contained in the bowels of the earth that was formed as a result of the natural process of hydrocarbon compounds which under certain conditions of pressure and atmospheric temperatures in millions of years ago (Ministry of Energy and Mineral Resources). Considering it takes millions of years to form, the oil and gas commodity is categorized as a non-renewable resource. To be able to utilize the source of oil and gas wealth, a mining activity process is needed in the form of exploration to ensure the element of hydrocarbon content contained in a particular reservoir and the exploitation process to lift oil and gas above the surface for further processing in industry in order to provide economic added value and can be utilized by humans .

[1] Revealed that oil and gas is one of the most important resources in the world with the second largest level of consumption after water resources. Therefore, excellence in controlling oil and gas resources will be closely related to national and political strategy and global power of a country, where one indicator is that a country that has and controls a large oil and gas reserve is a rich country in the world. Referring to the BP Statistical Review of World Energy (2019) data that the United States (US), Saudi Arabia, Russia, and the People's Republic of China (PRC) are the world's largest oil producing countries with total global crude oil production control of around 45%. However, besides acting as a source of national energy security and meeting the needs of global energy consumption, oil and gas commodities also have a negative perception of the impact of the use of fuel which is the biggest contributor in increasing CO2 emissions in the earth's atmosphere. In addition, the existence of oil spills from tankers has also caused damage to the earth's environment.

Global energy consumption is expected to increase along with the growth of the world's population, given the growth of the human population will cause an increase in the production and use of goods and services by industry [1]. Referring to OPEC data for 2019 quoted by cnbcindonesia.com, it is predicted that global world oil demand will increase by 1 million barrels / day in 2020 compared to 2019. Predictions of this increase strengthen and show that oil and gas commodities are still a major component in supporting human life. Oil and gas industry which is one of the most important business activities as a producer of state wealth, according to ~~Wright~~ [2] is a unique and complex sector marked by large capital investment, a high level of uncertainty / risk due to natural exploration, the use of high technology and very sensitive to changes in global stability. PWC (2019) in its release states that the oil and gas industry both in Indonesia and globally, has experienced significant volatility in the last few decades. Geopolitical and global economic considerations play an important role in encouraging the sensitivity of world oil prices.

Fluctuations in world oil prices that have also been affected by instability / political uncertainty in the region, especially the Middle East where volatile oil prices become one of the obstacles in economic growth in the Middle East, but based on the release of the IMF (2019) quoted by Voanews.com the trend will reverse in year 2020. Then, it is estimated that there will be a market balance against fluctuations in world oil prices [3]. This is based on research conducted by Delloite that US shale production will not continue to grow as in previous years, while OPEC and non-OPEC countries have made agreements to cut oil stocks by 1.2 million barrels per day. Demand for fossil fuels is expected to peak around the middle of the century, but there is no clear consensus about when the exact time happens. Some estimate project oil, gas and coal consumption to the highlands by 2030, while others do not see peaks until after 2050.

For Indonesia, the upstream oil and gas industry is one of the most important sectors and is still the mainstay of the country's economy, both as a foreign exchange earner and a major supplier of domestic energy needs (LMUI Research Bureau, 2011) and a sector that can increase competitiveness [1]. Indonesia has a long history of almost 135 years in oil and gas production, which began with the discovery of the first oil in 1885 in North Sumatra, and became an international pioneer in the development of the Production Sharing Contract model

(PWC, 2019). Indonesia was even a member from 1961 to 2014 due to a decline in production, and rejoined in January 2016 but was subsequently suspended in November 2016.
The Special Task Force for Upstream Oil and Gas Business Activities (SKK Migas) (2018) revealed that oil and gas production in Indonesia in the last few years has been dominated by gas production compared to oil production, even for the foreseeable future given the increasing discovery of natural gas reserves in Indonesia, as currently being the main projects, namely Jangrik Field (ENI Muara Bakau BV), Merakes Field (ENI East Sepinggan BV), Masela Field (Inpex Masela Ltd.) and Jambung Tiung Biru Field (PT Pertamina EP Cepu) . Indonesia's national oil and gas reserves are around 3.2 billion standard barrel tanks (BSTB) (P1) and gas reserves & gas associations are 51 trillion standard cubic feet (Tcf) (P2), without including the amount of reserves in East Natuna of 46 Tcf) spread over the entire oil and gas working area from west to east Indonesia. Based on the results of geological and subsurface geophysical studies, Indonesia still holds potentials that are widely spread from west to east (SKK Migas, 2018). Many challenges are faced in managing the national oil and gas industry, one of which is the prospect of oil and gas reserves located in the eastern region, especially in the deep sea. This condition causes the new oil and gas reserves will be more difficult to find technically and require a large cost.
Based on SKK Migas records (2018), the achievement of national oil & condensate production in 2018 reached 772.3 thousand barrel oil per day (bopd) or decreased by 28.7 thousand bopd compared to the achievement of production in 2017 which reached 801 thousand bopd. Meanwhile, to achieve national gas production of 7,760 MMscfd or an increase of 140 MMscfd compared to the achievement of production in 2017 which reached 7,620 MMscfd. Indonesia's total oil, condensate and gas production in 2018 was 2,158 Mboepd or decreased by 4 Mboepd from 2017 or 2,162 Mboepd. SKK Migas together with the Cooperation Contract Contractor (KKKS) has made various efforts to increase oil and gas production and reserves by conducting exploration and sustainable production activities, so that every barrel of production that has been taken can be replaced with every new barrel found.
As a non-renewable natural resource, the oil and gas industry is also strongly influenced by conditions / situations that occur globally, where the background of oil and gas price fluctuations, new business trends, marginal oil field conditions force the upstream oil and gas industry to be able to find better solutions in overcoming these challenges [2]. In an effort to maintain and increase state revenues from the upstream oil and gas sector and still survive amidst these fluctuations, it is necessary to improve the quality of the management of the upstream oil and gas sector by applying the latest management principles that uphold the principles of professionalism, efficiency, effectiveness by basing best practices in Good Corporate Governance (GCG) for the growth of quality businesses that are sustainable / sustainable (SKK Migas, 2016).
In order to provide an optimal contribution to the achievement of production / lifting and state revenue from the upstream oil and gas sector, it is necessary to control operational costs continuously through more selective and efficient drilling activities. One of the measures taken to maintain the sustainability of upstream oil and gas operations in facing the challenges of low world oil prices is through various savings, including through joint procurement strategies, optimizing the use of assets, negotiating with providers of goods / services and re-evaluating the economics of projects [4].
[5] one of the characteristics of an organization's success in the 21st century is the ability to instill sustainability in all its activities, where sustainability will direct the organization to benefit and create value in the future. Referring to survey data conducted by Global Accenture, [5] many as 63 percent of CEOs (Chief Executive Officers) expected sustainability to change the industry within five years, and around 76 percent believed that embedding a sustainability strategy in the core business would encourage revenue growth and new opportunities. That sustainability practices can help improve company performance and achieve sustainable development goals [6].
The improved performance / quality of the management of the upstream oil and gas sector will provide the best benefits for stakeholders, both from the economic, social and environmental sustainability aspects. A balance of performance that is aligned with global scale sustainable development goals as formulated in the Sustainable Development Goals (SDGs), where the efforts taken include improving management of upstream oil and gas procurement and goods that sees the strategy the new procurement is an effort to overcome challenges in the oil and gas sector [2] . This is because the procurement function plays an important role because it has direct influence and access to the supply base [6]. This is also consistent with the data of the United Nations Environment Program [7] in the World Economic Forum [8] that the procurement function has a role in economic activity / purchasing power is very large, with an average amount of 12% of gross domestic product (GDP) in the Organization of Economic Cooperation and Development (OECD) countries, and up to 30% of GDP in many developing countries.
The existing oil and gas industry procurement system is a duplication taken from other industrial systems, so that challenges are needed for the development of traditional systems towards the latest innovative approaches including cooperation with suppliers, increasing efficiency and cost effectiveness, Whole Life Costing, and so on [2] [9]. Adopting the concept of the new procurement strategy has been applied in the British North Sea by showing that the development of smaller and more marginal oil and gas fields can be done cost effectively (Wright, 1996).
The design of the Sustainable Procurement system model is expected to strengthen and improve the effectiveness of supervision in the upstream oil and gas sector which is faster, prudent and adjusts to international best practices, so that it not only increases the competitiveness of the upstream oil and gas sector, but encourages the upstream oil and gas industry to survive in anticipating uncertainty. The upstream oil and gas industry must be present to provide maximum benefits for the people's prosperity in accordance with the mandate of the constitution (the 1945 Constitution). State revenue from the upstream oil and gas sector must be used fairly to increase the prosperity of all people including future generations by accommodating sustainability standards. Furthermore, this research will design the SNI ISO 20400: 2017 Sustainable Procurement System model and identify the dominant factors in the SNI ISO 20400: 2017 Sustainable

Procurement System in SKK Migas in supporting the latest management governance based on Good Corporate Governance (GCG) best practices.

RESEARCH METHODOLOGY

The study is carried out by utilizing both primary and secondary data. The primary data are gathered from questionnaire while the secondary data are taken from company's business process division. The study began by making a grid and distributing questionnaires to 311 management level respondents, identifying the equivalence of the Sustainable Procurement System clause and explaining in a description the relationship and character of SNI ISO 20400: 2017. From the result of the questionnaire, it was analyzed by using structural equation model (SEM) on LISREL Application. Then, the results are analayzed and combined with the result of secondary data to draw conclusion.

Flow diagram

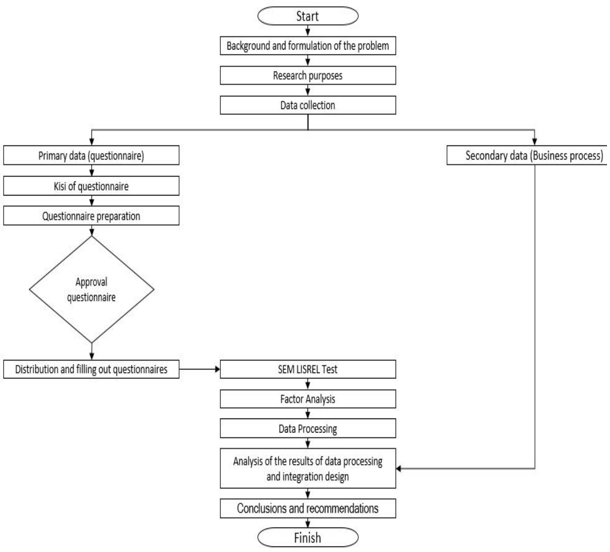

Figure 1. Research flow chart

1. Population and Sample

The population of the research conducted is decision makers on SKK Migas with a total of 311 employees with positions from manager level to management level. This sampling consideration is carried out because currently there is no implementation of SNI ISO 20400: 2017, so it takes the perspective of decision makers on the plan to design a sustainable procurement system of ISO 20400: 2017 in SKK Migas.

2. Sampling Method

In this section 217 samples were taken determined by the KREJCIE and MORGAN formulas where the sampling method was determined using stratified sampling.

3. Operational Variables

The following is a list of clauses in the Sustainable Procurement System where in this study there is only one dimension that is the focus of research on Sustainable Procurement:

dimension	Clause	Indicator
Sustainable Procurement	**SPS 4.(Understand the Basics)**	4.1 The Concept of Sustainable Procurement
		4.2 The principle of sustainable procurement
		4.3 The Subject of Sustainable Procurement
		4.4 Drivers of Sustainable Procurement
		4.5 Key Considerations for Sustainable Procurement
	SPS 5. (Integrating Sustainability into Procurement Organization Policies and Strategies)	5.1 Commit to Sustainable Procurement
		5.2 Clarifying Accountability
		5.3 Align Procurement with Organizational Objectives and Objectives
		5.4 Understanding Procurement Practices and Supply Chains
		5.6 Managing Implementation
	SPS 6. (Manage the Procurement Function in the face of Sustainability)	6.1 Procurement Governance
		6.2 Empowering the community
		6.3 Identifying and Binding Stakeholders
		6.4 Setting Priorities for Sustainable Procurement

dimension	Clause	Indicator
		6.5 Measuring and Improving Performance
		6.6 Establish a Complaint Mechanism
	SPS 7. (Integrating Sustainability into the Procurement Process)	7.1 Building on Ongoing Processes
		7.2 Planning
		7.3 Integrate Sustainability Requirements into Specifications
		7.4 Choose Suppliers
		7.5 Contract Management
		7.6 Review and Learn from Contracts

RESULTS AND DISCUSSION

3.1. Data processing

Data processing analysis was performed using SEM LISREL version 8.8 where the use of this data clause is a simplification from second-order to first-order factor analysis of the data that has been taken. The clauses in this model are actually rearranged by indicators, but due to model problems that are too complex, the indicators are merged into just one clause. The results of SEM analysis that focus on only one dimension in this study can be said to be quite good because the results of the validity testing for sustainable procurement have a AVE value of 0.91 with a valid conclusion and a reliability test result with a CR value of 0.98 with a reliable conclusion refer to table 1 below.

The problem of missing data has been overcome by the imputation method, whereas for normality problems it is possible that the assumption of normality cannot be fulfilled because the data used has an ordinal scale (so that the assumption of normality can be met with minimal data having interval scale). To overcome this problem of normality, the Central Limit Theorem is used, a theory which states that data of any scale will have a distribution similar to the normal distribution when the amount of data increases. The data used in this study amounted to about 270, so it can be said to be very large and the Central Limit Theorem can be applied.

Standardized Loading value is a value that symbolizes the relationship between clause variables and their latent variables. These values generally range from -1 to 1, with *negative value indicating a negative relationship and a positive value indicating a positive relationship*. A value close to the absolute number 1 indicates that the strength of the relationship is higher. Literally a Standardized Loading value greater than 0.7 or 0.5 can be considered good, while a value below the threshold can be said to be less good and the related clause variables can be set aside from the model because of their small effect on latent variables. If the clause variable with a small standardized loading value is maintained in the model, this will have an impact on the reliability and validity test results of the model, namely the Composite Reliability and Average Variance Extracted values will be smaller, so the test results will lead to unfavorable conclusions. In addition to the amount of standardized loading, the thing that needs attention is the t test value, because this value will determine if the related clause variable is statistically significant or not. The significant meaning in this case is that the clause variable has a systematic relationship with its latent variable. Clause variables with high standardized loading values are sometimes not necessarily significant, so this t-test value is always checked first before seeing the standardized loading value of the clause variable. The symbol (*) in the Significant column signifies a significant Standardized Loading value at the error level of 5%, ie the t-value is greater than 1.96.

Table 1. Standardized Loading (SL), Validity and Reliability Value of the Sustainable Procurement System SNI ISO 20400: 2017

Dimension	Clausul	Standardized Loading	T- Value	AVE	CR
Sustainable Procurement	SPS 4	0.89	16.80	0.91	0.98
	SPS 5	0.98	19.85		
	SPS 6	0.99	20.55		
	SPS 7	0.96	19.11		

SPS: Sustainable Procurement System

Validity testing is done to test if the indicator variables have been able to measure latent variables that really want to be measured properly. The value used in this test is the Average Variance Extracted (AVE) value. AVE values range from 0 to 1, with values approaching 1 indicating a higher level of validity. Based on literature good AVE value is if greater than 0.5 (> 0.5). If the level of validity is low, this indicates that not all indicator variables for a latent variable jointly measure one value of the same latent variable, so it is necessary to further check to find the different indicator variables (for example by factor analysis). Reliability testing is done to test the level of reliability of indicator variables. The level of reliability is a measure of the consistency of questionnaire / indicator questions in measuring the value of latent variables. Consistent here means that if the questionnaire questions asked to the same respondents repeatedly will produce the same answer. The value used in testing reliability is the value of Composite Reliability (CR). CR values range from 0 to 1, with values approaching 1 indicating that the level of reliability is getting better.

Furthermore, the model goodness test, the model goodness test can be seen in the table below:

Table 3. Results of testing the goodness of the Sustainable Procurement System model

Indicator	Criteria Value	Threshold	Conclusion
Chi-Square (p-value)	0.00	> 0.05	Model Not Fit
RMSEA	0.32	< 0.08	Model Not Fit
SRMR	0.02	< 0.05	Model Fit
NFI	0.96	> 0.90	Model Fit
CFI	0.96	> 0.90	Model Fit

Is known :
Chi-Sq : Chi-Square Test
RMSEA : Root Mean Square Error of Approximation
NFI : Normed Fit Index
CFI : Comparative Fit Index
SRMR : Standardized Root Mean Square Residual

It can be seen in Table 4 that it can be concluded that the model is fit, although for the Chi-Square indicator the test produces a marginal fit conclusion (this can be due to the Chi-Square testing being very sensitive to data, especially big data). Chi-Square is not the only Goodness-of-Fit value used and is not the primary value to measure the superiority of the SEM model. The Chi-Square indicator does have many disadvantages, most of the compiled data is not normal, so to get the SEM model advantage other values such as RMSEA, NFI, GFI, or CFI are used.In addition to the amount of the standardized loading value, the thing that needs attention is the t test value, because this value will determine if the related indicator variable is statistically significant or not. Significant in this regard is that the indicator variable has a systematic relationship with its latent variable.

Judging from the Structural Model clause 8 and the indicator of the SMM produces a messy output (default), but as long as the output of SEM LISREL version 8.8 produces a graph that means the model can be estimated. Indicator variables with high standardized loading values are sometimes not necessarily significant, so the t test value is always checked first before seeing the standardized loading value of the indicator variables. The symbol (*) in the Significant column indicates a significant standardized loading value at the error level of 5%, i.e. the calculated value is greater than 1.96.

Table 5. Standardized Loading (SL) Value of SNI ISO 20400: 2017 Sustainable Procurement System

Clause	SL	T-Count	Significant
SPS.4	0.89	16.80	
SPS.5	0.98	19.85	*
SPS.6	0.99	20.55	*
SPS.7	0.96	19.11	*

Can be seen in the table clause 6 on the Sustainable Procurement System which has the highest significant value of 0.99 where clause 6 according to SNI ISO 20400: 2017 is regulating the procurement function to face sustainability. From the results of the dissemination of the Sustainable Procurement System questionnaire with SEM LISREL analysis the dominant factors in the Sustainable Procurement System are in clause 6. These results (SL) can be seen in the structural model of a sustainable procurement system with SEM LISREL version 8.8 which has been simplified below:

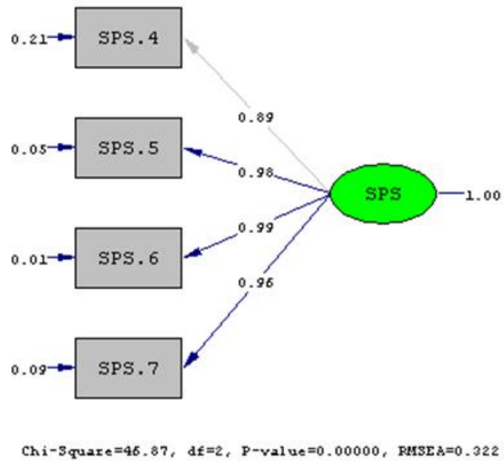

Figure 7. Structural Model of the Sustainable Procurement System Clause

After knowing the results of the Standardized Loading (SL) values are significant and get a structural model of the Sustainable Procurement System with SEM LISREL version 8.8. Furthermore, the factor analysis can be seen based on the rotate component matrix table. The variables contained in the two factors can be seen in the following table:

Table 6. Factor analysis of sustainable procurement systems

Factor 1	SP61	SP113	SP116	SP190	SP142	SP119	SP73	SP186	SP172	SP249
	SP147	SP67	SP102	SP68	SP168	SP208	SP123	SP146	SP204	SP137
	SP139	SP74	SP148	SP240	SP124	SP66	SP210	SP242	SP122	SP118
	SP187	SP189	SP209	SP171	SP167	SP255	SP241	SP188	SP206	SP160
	SP198	SP207	SP162	SP58	SP154	SP95	SP169	SP182	SP159	SP205
	SP239	SP238	SP86	SP230	SP178	SP128	SP144	SP258	SP250	SP93
	SP88	SP89	SP173	SP132	SP133	SP203	SP150	SP246	SP96	SP175
	SP101	SP161	SP100	SP134	SP170	SP259	SP90	SP129	SP166	SP143
	SP183	SP153	SP225	SP127	SP112	SP228	SP227	SP126	SP63	SP77
	SP54	SP53	SP111	SP55	SP231	SP232	SP229	SP149	SP65	SP233
	SP64	SP247	SP152	SP224	SP141	SP51	SP217	SP103	SP92	SP50
Factor 2	SP39	SP11	SP195	SP108	SP85	SP164	SP98	SP16	SP14	SP184
	SP19	SP212	SP15	SP17	SP13	SP27	SP10	SP12	SP09	SP22
	SP216	SP21	SP84	SP18	SP07	SP23	SP120	SP05	SP219	SP214
	SP62	SP06	SP256	SP220	SP104	SP252	SP08	SP151	SP01	SP254
	SP223	SP193	SP04	SP02	SP52					

SP: Sustainable Procurement

From the results of the factor analysis the Sustainable Procurement System is carried out with a maximum limit of two factors. Can be known by the number of initial statements 260 produces 2 factors consisting of 150 statements. Design by making a PDCA model of a Sustainable Procurement System based on SNI ISO 20400: 2017. The following is the PDCA model of a sustainable procurement system.

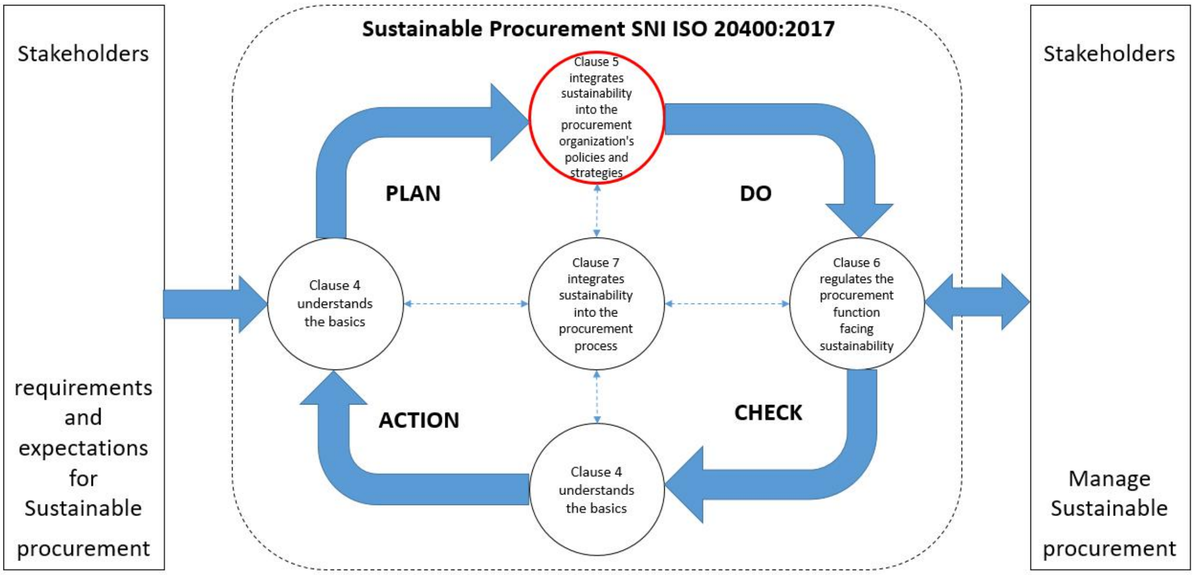

Figure 8. Design Model of PDCA Sustainable Procurement System

Planning (Plan) means to do the planning process that refers to the management system. Planning is done to identify objectives and processes by finding and choosing solutions or a step of continuous improvement to solve existing problems. Implementation (Do) means to carry out the implementation or implementation and monitor the process of planning activities that have been previously determined.

Check (means) means to monitor, evaluate and check the goals and objectives of the implementation of the plan. The technique used to conduct an evaluation is by observation and survey to find out the weaknesses that exist in the process, then report the results and prepare a plan for improvement. The dominant factor clause 6 (regulating the procurement function facing sustainability) and the results of the factor analysis consisting of several statements contained in clause 6 (regulating the procurement function facing sustainability) becomes part of the check process.

Follow-up (Action) means to follow up the results of the total evaluation by setting standardization changes such as considering the scope, revising the process, developing plans and taking measurements and controlling a process on a regular basis.

CONCLUSION

Significant level of the results of the SNI ISO 20400: 2017 questionnaire Sustainable Procurement System that has the highest value (SL) in clause 6 of 0.99 where clause 6 according to SNI ISO 20400: 2017 is regulating the procurement function facing sustainability. So that the dominant factor of the Sustainable Procurement System with SEM LISREL analysis is in Clause 6. The design of PDCA SNI ISO 20400: 2017 can be done by the company by implementing all statements based on SNI ISO 20400: 2017 clause which amounts to 260 statements.

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