

**THE EFFECT OF EXTERNAL FACTORS TOWARDS THE LOGISTICS  
PERFORMANCE IN EFFICIENCY OF MATERIAL SUPPLY FOR THE PIPELINE  
CONSTRUCTION BASED PROJECT: A STUDY ON THE OIL AND GAS  
INDUSTRIES IN INDONESIA**

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**Abstract**

*The main problem of the pipeline construction project in oil and gas industries is the material supply inefficiency, where efficiency is part in measuring the logistics performance. Without good efficiency of logistics practices it can impede the overall performance. Therefore, the organizations in the oil and gas industries are seeking the appropriate method to improve logistics performance. The aim of this study is to investigate the relationship between external factors of material supply into the logistics performance “dependent variable” to achieve the material supply efficiency. Three factors as “independent variable” representing the external factors of supplying materials are listed respectively; infrastructure technology, transport policy and regulation, and transport availability. Sample that use for respondent of this study is the practitioner of pipeline construction project in oil and gas industries. A questionnaire is the instrument used to gather the data from the respondent to achieve the objectives of this study. At the level of study, the correlation between the independent variable and the dependent variable are tested by using regression analysis method and the correlation analysis method. The finding of this study is highly expected to give some contributions for gaining knowledge of current research, offer the recommendation of future research. The study obtained a positive impact dealing with material supply efficiency in pipeline construction project of oil and gas industries in Indonesia.*

**Keywords:** *External Factor; Supply Efficiency; Logistic Performance; Oil and Gas Industries; Indonesia*

## Introduction

Today's fast paced economic climate is highly influenced too many industries, particularly in Oil and Gas Industries are increasingly realizing that globalization is given the high impact to the competition of each performer in the industry even the competitors that working in that field sector is still limited. This awareness is supported by the uncertainty of the world economic issues, in line with the demands of Oil and Gas products as the most wanted products. According to BP Statistical review of world energy, the consumption of oil in the world is around 89 Million barrels per day, though it is 0,9 percent below from the historical average (Dudley, 2013). And it supported also by President of PT. PERTAMINA Indonesia, where the total consumption of oil in Indonesia is about 56 Million Kiloliters a year, and it is exceeding from the factory capacity production that is only 40 Million Kiloliters in a year (Agustiawan, 2013).

Relates on demand issues emerged, now almost Oil and Gas companies are exploring and develop their new facilities to increase their productions, such as plant included with the pipeline integrated systems. In realizing that, the company will focus on securing cost, quality improvement; manage the proper technology that may support to the projects and the other profitable strategy that can be supported in their competitive globalization environment. Hopefully with the improvement of supply chain and logistics activity's performance in the most efficient way from the others competitor, it would contribute to the maximization on their productions, without ignoring the issue of green environment and minimizes the obstacle and cost in doing their facilities construction projects.

In a field of business, as cited from Garbarski, Rutwoski & Wrzosek (2000) logistics are an integrated system of shaping and controlling the processes of physical flow of goods and informative considerations oriented at reaching the most favorable relations between the quality and level of providing services, and structure of related costs (Gazda & Malindzak, 2012). While, physical flow it will represent the goods being produced, stored, and shipped, including raw materials, work in progress, and finished goods mentioned by (Gary, Kempf, & Hessam, 2003). As a result, logistics is an important matter sectors in the company operations, because the relations of this study. The good logistics activities will impact to the major sources of competitive advantage among the player of Oil and Gas Company, and it would lead the contractor in maintaining their supply efficiency of material needed in developing the pipeline systems. However, the unique role of logistics is playing an important in giving guidance to the company to become a leader of Oil and Gas player that could maintain their cost and value in doing their projects. Hence, if the company could sustain their good logistics management, and put it as the core of their business, it would allow the company in getting the advantage of competition and certify the satisfactory results. The underlining point is, logistics as the core for each company business competition (Drucker, 1962).

In fact, logistics is a word that understood by a few people in common, because logistics is a word that most understood by people who work with this representative's discipline. Most people assume logistics are the work sector that closed related to the practice of calculation, technology and quantitative area, however logistics is a reflection of the daily activity and it was old discipline (Sutherland, 2008).

In Asia, particularly in the south east region, logistics is a new discipline and just enter into the region on this few following century. And the management of logistics "logistics management" is still a hot topic to be discussed and need improvement for its growth of knowledge, it aims to become the most powerful management approaches in doing a business

and of course in focus of Oil and Gas Company. Logistics management can be viewed as the detailed process of plan, implementation, efficient control, flow of cost effectiveness and material storage, without ignoring the related information within a supply chain to satisfy demand (Christopher, 1993). Good logistics management provides a major source of competitive advantage if it can control costs and enhance service differentiation. And the results of that management may contribute to the efficiency of logistics performances.

Realize the importance of logistics management, in nowadays most of Oil and Gas companies in many countries are beginning to improve their logistical systems by investing significant capital in the logistics sector, which is the facility as their infrastructure and its equipment. Even though, it will not be easy to realize, because the most investment is need government intervention in giving their roles. For example, the government needs to give guidelines and procedure to give the ease in the material supply and transportation, about the percentage of material contain usage and taxes on imported goods. The vital roles of logistics management in managing company's competitive advantage make the company must practice and develop its logistics management as properly and continuously. According to the previous researcher, good logistics system can increase a country's competitiveness and ability in attracting foreign investments relative to its neighbors (Cilliers & Nagel, 1994). But in Indonesia, there are some barriers to the practices and expansion of that logistics management in the company.

In the world of logistics for Oil and Gas, it is closed related to the pipeline systems, pipeline constructions and also the pipeline capability. In fact, there are factors that bordering the development of pipeline construction, and it is divided into two categories, which is outside and inside factors applicable. Much deeper, from the outside factor, there are three major factors that bordering the contractor and the company to develop their construction that operates their plant using pipeline, which will be the focus of this study. There is transport policy and regulation, transport availability, and technology infrastructure, in minimizing the problems emerge on the inefficiency logistics performance growth of construction project in Indonesia.

The first section of the problem is the availability of transport that would help the contractor in doing and conduct their work of pipeline developers. Some of the vehicles like multi excel truck as an example, in Indonesia, they must import or rent from the other country to bring the engine or turbine that support to the integrated pipeline systems. Of course it would be high impact in charges to that project conducted, and will minimize the supply efficiency in term of cost and time. Besides that, the government also will intervene in the circle of the projects in term of regulation and policy maker. Referring to the size of pipe that used in developing the pipeline, sometimes it will be out of a standard, which is mean, as the practitioner, must go through to the available regulations and policy, about the transportation procedure and also the administration procedure.

The other factors that contribute as the problem in developing the pipeline project are the infrastructure technology. Infrastructure technology can be divided into two categories, which are the integrated technology, information systems and the physical infrastructure. Without an integrated information system, absolutely will no efficient activities among the project; however the physical infrastructure also has two categories, which is macro and micro infrastructure (Sanders, 2012). In this study will especially focus on the macro infrastructure, there is road, seaport, airport and the integrated systems among those. It surely plays vital in the pipeline development of a construction project. Conclude that, the lack of modern infrastructure technology, transport policy and regulation, and the transport availability. Those will be presented as possible problems with the logistics development in Indonesia, especially

in the region that still in need of developing. In this context, of course the region that still needs some intervention and support from the capital city of the country in developing and create their systems related to the logistics management to support the material supply efficiency of logistics management in oil and gas construction industries.

To date, limited empirical research on the state of material supply efficiency in logistic management study and development in Indonesia is still inadequate in the literature and could be improved continuously.

### Literature Review

In conjunction with pipeline systems, there are some of influential models that can be used as reference in enhancing the observation of logistics performance that related to transport, technology and regulation demand. It's caused by the very crucial function on pipeline transportation, in term of safety capability. Pipeline systems are recognized as the safest and most economical way to distribute vast quantities of oil from production fields to refineries and leads to consumers (Trench, 2003). And the logistics performance in supplying the material of this pipeline development is becoming the focused to be learned.

Logistics performance will emerge from the project activities and it will start with the research, conducts, as mentioned by Garland Chow (1994). Logistics research may be defined as the systematic and objective search for, and analysis of, information relevant to the identification and solution of any problem in the field of logistics (Garland Chow, 1994). This research will identify the variables that be affected and influence to the others variable with systematic and proper way. Still refer to the Figure 2.2; usually the construction project is about the organizations that called as contractors. So that, it will figure out how the research will focus on organizational based on looking the definitions of logistics performance.

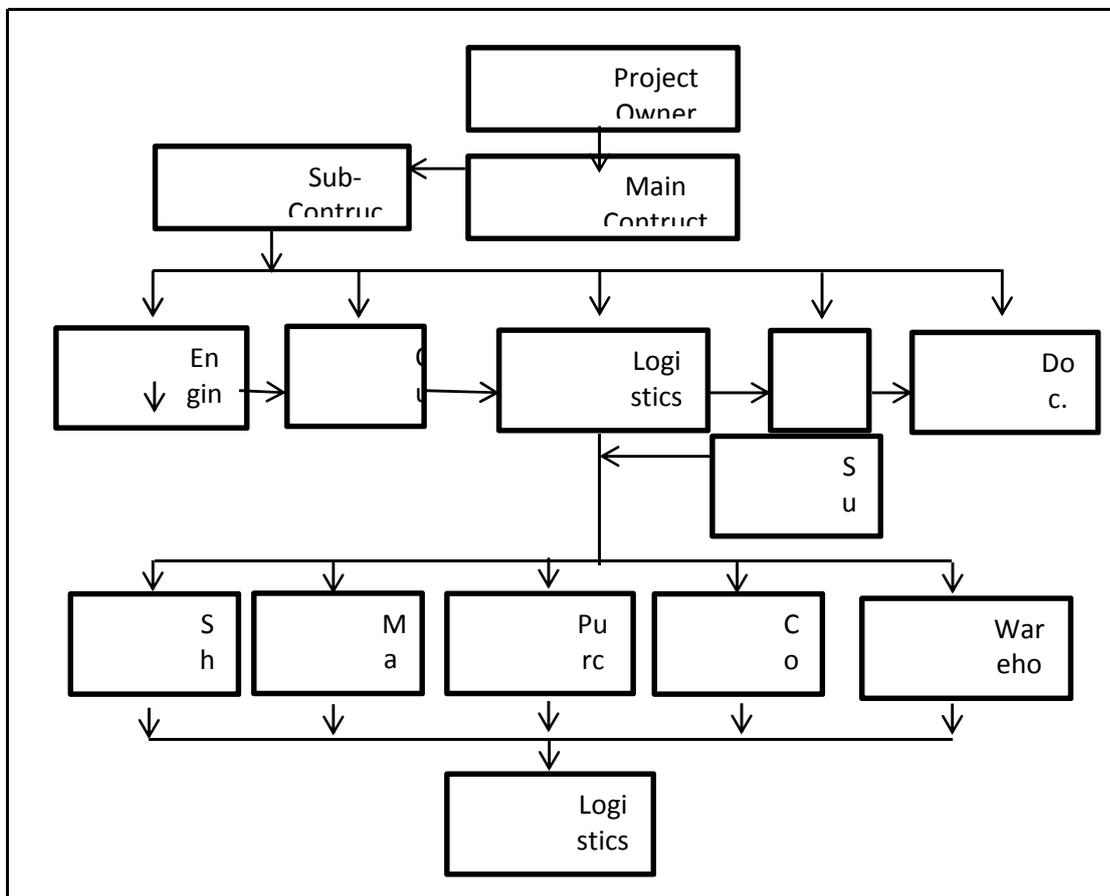


Figure 1:  
*Performer In Construction Project*

The concept in measuring logistics performance of efficient material supply in pipeline development process is discussed about the technique to get the results of logistics performance itself, as figured out in the table 1.

Table 1:

*Conceptual Articles Defines that Technology Competency and Knowledge Management Process is Having Some Implications to the Firm Performance in Pipeline Industries.*

<b>Journal/Article/Book</b>	<b>Summary</b>
(Wegelius-Lehtonen, 2001)	Focus in term of cost and lead time in examines the performance within the construction project.
(Douglas M. Lambert, Sebastian J. Garcia-Dastugue, Keely L. Croxton, 2008)	Review the managers' contributions in involvement to the eight cross-functional processes: Customer Relationship, Supplier relationship, customer service, demand management, order fulfillment, manufacturing flow management, product development and commercialization, and returns management.
(Bria S. Fugate, 2010)	Focus, is on the differentiation other than just traditional measurement "Effectiveness and Efficiency" performance in measure the logistics performance.
(Susana Perez- Lopez, 2011)	Defines that technology competency and knowledge management process has some implications for the market performance.

There consists of three articles that have some different concept in finding the meaning of performance. Refer on (Wegelius-Lehtonen, 2001), it was studying about how to measure the performance that affected within the project based construction in pipeline industries. Broadly talking about the cost and lead time in doing the projects, cost means to measure how the cost is used and effecting to the project during completion, from the time starting with the time of the project is completed. Second, is the lead time used in measuring the retirement of the project.

While (Douglas M. Lambert, Sebastian J. Garcia-Dastugue, Keely L. Croxton, 2008) also makes the concept in finding their definitions of performance based on the manager's contributions involvement. And with this kind of concept the authors believe that managers have had the highest authority in managing and determine the performance. In line with, (Bria S. Fugate, 2010) in concentrate to the other elements "differentiation" other product or services in measuring the logistics performance compared to only using the standard measurement "effectiveness and efficiency" that should be manageable to measure the logistics performance, there are, effectiveness, efficiency, and differentiation. (Susana Perez- Lopez, 2011). It also defines if the IT competency and knowledge of the management process is should be impacting to the market performance.

After concept in measuring performance, that will talk about the model of development in measuring the logistics performance, based on the literature review from the previous scholars. The first model of measurement is classified into two classes, they are "hard" and "soft" (Garland Chow, 1994), where hard is stated for the measurement that focus on income

or accounting figure and soft is stated for the measurement that focus on customer satisfaction ratings. The theory is supported with the other authors who measured the logistics performance traditionally, that is “hard” measures in term of services (order cycle time and fill rates) cost, and return on assets or investment (Morash, Edward A., Cornelia L. M Droge, and Shawnee K. Vickery, 1996) (Brewer, Peter C. and Thomas W. Spech, 2000) and soft measures, such as managers’ perceptions of customer satisfaction and loyalty (Holmberg, 2000).

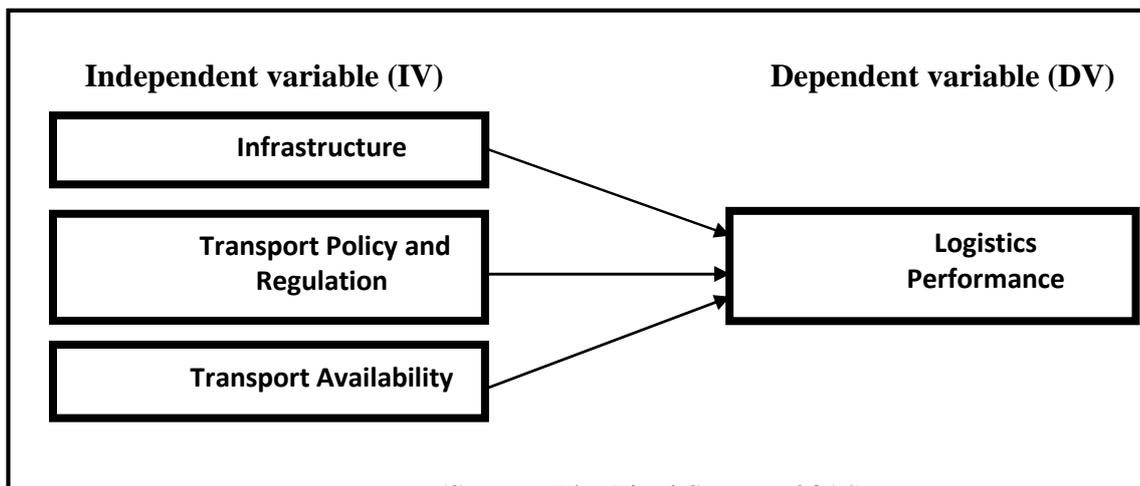
**Theoretical Frameworks**

A theoretical framework in this study was developed based on the problem statement in the introduction and literature review. In here will illustrate the relationship between independent variable and dependent variable. Where, there are three independent variables, namely transport policy, transport availability and Infrastructure technology were chosen as the independent variables to be tested against logistics performance (the dependent variable) in term of material supply efficiency. For transport policy, material supply efficiency is examined through the regulation, where it divided into three categories, which is Air transport regulation, sea transport regulation and also land transport regulation. It will tested based on the practitioner comprehension about regulation varieties, acceptability and also its capability in solving any problem emerge.

While transport availability is also will examine through the level of transport variety, and the level of unit substitution, when the proper units are unavailable in the local market, in this content is in Indonesia. It is also will examine on the creativity of the practitioners in outwit the alternative of the vehicle can be used to conduct the pipeline development project in oil and gas industries. The other independent variable is the infrastructure technology, where it will test through the level of infrastructure capability. For examples are road, seaport, and airport that closely related to the success of logistics performance, in term of material supply efficiency to the oil and gas pipeline construction based project.

**Table 2:**

*Research Framework*



(Source: The Final Survey, 2014)

**Research Methodology**

This study will be on the descriptive based research, where the key factor in using descriptive research is can provide the accurate and valid variables which relevant to the research question. The quantitative research method design will use to examine the relationship between variables

emerge. The study was conducted in the natural environment with the minimum level of researcher interference.

The purpose of this study is to investigate the relationship between transport policy, transport availability, and technology infrastructure toward logistics performance in term of its material supply efficiency. The purpose to get the response from the practitioners in the field, this research will conduct by questionnaires, and the data resource is from the primary data, although there are two types of data resources, which is primary and secondary data. But it will refer to (Hox & Boeje, 2005), where primary data is the data collected for a particular problem, and using research tools analysis data to solve research problems. Beside from that, usually primary data have two types of methods that can be used, which is questionnaire and interview. But in fact, the common way that used by the other scholars, is the questionnaire, then, in this research, the primary data by using questionnaire will collect by logistics practitioners from top management, supervisor, lead, and also the employees that work in the logistics department of Construction Companies. In accordance with, the questionnaire is trusted can cover all of the employees who working in the company.

i. Research Population and Sampling Data

In doing this study, the researcher needs to make sure the existing population first before spread the questionnaire. Where, research population is a large collection of individual that is research want to analysis (Uma & Roger, 2009). In driving this study successfully achieving the research objective, a survey will carry out to the employees and practitioners that working in the logistics department of the pipeline Construction Company in Indonesia.

Sampling data means the data that will get from the sampling group. Whereas, sampling group is represent the part of the population chosen. In this study, researcher is taking the sample of employees who have been working in the pipeline construction company in Indonesia as mentioned before. And the simple random sampling method is being used; because that will be easier for the researcher in investigating all populations. Refer to the previous scholars that said, every member of the population has the same chance to be chosen as sampling group (Paula & Justo, 2001). Likewise, in determining the sample size; researcher will be based on the matrix table introduced by (Krejcie & Morgan, 1970). With 150 practitioners are known, the sample size for this study is 108 respondents. In order to get the high rate and get the accurate record, the researcher will distribute 10% extra questionnaire from the sample size required as much as 11 extra questionnaire. That is gain the quantity of questionnaire will distribute to the respondent with total 119 questionnaires. It is required to avoid the probability percentage of no feedback questionnaire.

**Table 3:** The Survey

No	The Respondents in Survey	Total
1	Logistics Practitioners	150
2	Respondents as Sample Size	108
3	10% Extra Questionnaire	11
4	Total Questionnaire Distributed	119

(Source: The Final Survey, 2014)

ii. Operational Definitions and Measurement

Operational definition of dependent and independent variable is based on a research framework while research questionnaire is establish based on the operational measurement. The questions were measured based on five points like in Table 4, using a style: 1=strongly disagree, 2=disagree, 3=neutral, 4= agree, 5=strongly agree. All items in this study were referred from previous researchers such as Coombs (2009), Heneman and Schwab (1985), Rogg et al. (2001), Eisenberger et al. (2002), Landau and Hammer’s (1986) and Paré, Tremblay & Lalonde (2001). In other word, each of the adapted question asked how strongly the respondents agreed or disagreed with the statement given on a five-point scale in this study, whereby 1 = strongly disagree, and 5 = strongly agree.

**Table 4:**

*Five-Point Scale Format*

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

A questionnaire will divide into three sections “A, B and C” which would represent each category. In section A will represent demographic data of respondents who conduct the questionnaire, and in this section will include 7 questions must filled up before continuing to the next sections. In section B, the questions is will represents around the external factors that influencing to the logistics performance in the pipeline Construction Company. It will focus on transport policy, transport availability, and technology infrastructure. It represents 23 questions will be asked. While the last section which is section C is about logistics performance itself. In this section, 16 questions will design to evaluate the level of performance in the pipeline Construction Company.

The most important of research methodology is in this data analysis. With those analyses, researcher will get the useful information in knowing the facts, create the explanations, and try out the hypotheses, which relates to the study conducted. And the overall process of data analysis is lean to get the answer about the research questions. To make sure the analysis is can be validated, in this level; researchers will use the descriptive statistics. Regression and correlation analysis are the main analysis will use during analysis methods, because it can demonstrate the data information in the chart as audio-visual, and it would be more understandable whether for the researcher and the next reader. The analysis will conduct using SPSS Program version 19.0 for Windows. As finding in completing this study, the researcher will be involving the pilot test to get the results of statistical means, standard deviation, percentage, correlation, and coefficient and regression analysis.

Section	Item	No of Questions
A	<b>Demographic</b>	7
	- Gender	

	- Marital status	
	- Age	
	- Level of Education	
	- Length of Service	
	- Position in Department	
<b>B</b>	<b>External Factors of Transportation</b>	
	- Awareness of External Factors in projects	4
	- Transport Policy & Regulation	7
	- Transport Availability	8
	- Infrastructure Technology	4
<b>C</b>	<b>Logistics performance</b>	16

**Figure 2:** *Layout of Questionnaire*

(Source: The Final Survey, 2014)

iii. Survey Indicators

The indicators that represent the relationship between those variable are shown in the table 4. It hopefully can gather the data from the respondents.

There are three measures in this study were adapted from Brian S. Fugate, John T. Mentzer and Theodore P. Stank (2010) and 13 measures will adopt from Fu chin chin, Jung-Han Bae and Gwi Ok Kim (2010) in constructing the questionnaire about logistics performances. For the external factors influencing the logistics performance, researcher will adapt to the Talib et al (2011) with the total of 18 measurement points. For Demographic information will adapt from Arasd (2012).

**Table 5:**

*Independent Variables Measurement*

<b>Variable</b>	<b>No of Items</b>	<b>Scales</b>	<b>Sources</b>	<b>Item of Questions</b>
Awareness of external factors in construction projects	3	Five Point Scale (1-5)	Talib et al. (2011)	<ol style="list-style-type: none"> <li>1. Familiarity with external factors influence to the material supply.</li> <li>2. The Company has trained most of its employees about external factors of logistics</li> </ol>

				<ol style="list-style-type: none"> <li>3. Familiarity with continuous quality improvement and innovation program.</li> <li>4. Familiarity with the special shipment caused by the size and dimension.</li> </ol>
Transport Policy / Regulation	5			<ol style="list-style-type: none"> <li>1. Familiarity with transport policy and regulation in Indonesia.</li> <li>2. Transport policy and regulation are well understood.</li> <li>3. The transport policy and regulation are acceptable.</li> <li>4. Regulation is covering all sectors in pipeline transportation.</li> <li>5. Improvement of transport policy and regulation.</li> <li>6. Material stuck because of custom problem.</li> <li>7. The tax rate is high due to custom clearance.</li> </ol>
Transport Availability	6			<ol style="list-style-type: none"> <li>1. Most practitioners are understood about transport available in Indonesia.</li> <li>2. Complete enough the variations of a vehicle.</li> <li>3. Alternative vehicle are varieties for handling special size and dimension of materials.</li> <li>4. Sufficient vendors have special vehicle.</li> <li>5. Another alternative for inapplicable transportation.</li> <li>6. Frequently in using the special vehicle used for heavy lifting.</li> <li>7. Procurement of special vehicle is time consuming.</li> <li>8. Procuring the special vehicles is affecting to the high cost.</li> <li>9. Level of delay in getting the vehicle because of it <u>originated</u>.</li> </ol>
Infrastructure Technology	4			<ol style="list-style-type: none"> <li>1. Familiarity with infrastructure technology available.</li> </ol>

				<ol style="list-style-type: none"> <li>2. The development of infrastructure technology is well enough.</li> <li>3. An integrated physical infrastructure is available, in term of (seaport, airport, railway, and road)</li> <li>4. Integrated technology is used to communicate with customs.</li> </ol>
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**Table 6:**

*Dependent Variables Measurement*

<b>Variable</b>	<b>No of Items</b>	<b>Scales</b>	<b>Sources</b>	<b>Item of Questions</b>
Logistics Performance	3	Five Point Scale (1-5)	Fugate, Mentzer and Stank (2010)	<ol style="list-style-type: none"> <li>1. Our overall Logistics performance is well above industry average.</li> <li>2. In general, our logistics performance is excellent.</li> <li>3. We are outstanding at performing our logistics activities.</li> </ol>
	13		FU,C,C. Bae,J,H Kim,G,O (2010)	<ol style="list-style-type: none"> <li>1. Helping the customer to solve cargo transportation dispute.</li> <li>2. Making efforts to help in emergencies.</li> <li>3. Given pre-alert notices of delivery problems.</li> <li>4. Providing emergency services.</li> <li>5. Responding to customer requests in a flexible manner.</li> <li>6. Minimum level of complaints.</li> <li>7. Adjusting operations in a flexible manner to meet unforeseen customer needs.</li> <li>8. Handling could change the efficiency.</li> <li>9. Recommending alternative actions when an unforeseen problem emerges.</li> <li>10. Insurance company claim for compensation is applicable.</li> <li>11. Advising customers of potential problems in meeting their needs.</li> <li>12. Helping customers in value analysis, cost reductions, and problem solving.</li> <li>13. Providing performance reports periodically.</li> </ol>

(Source: The Final Survey, 2014)

## Findings

Spread questionnaire is the way in developing the findings in this research. In table 7, it is figuring out the fact of questionnaire answer from the 119 respondents asked. From the total 119 respondents as a sample for pilot survey, around 92.43 respondents are answered and give the feedback to the researcher; it means the survey is applicable and reliable to continue into the next step of testing.

**Table 7:** *Feedback from Respondents*

No	Pilot Survey	Persons	Percentage
	The Total Respondents asked	119	100 %
1	The Respondent Answer	110	92.43 %
2	The Respondent not Answer	9	7.57 %
	Total	119	100 %

(Source: The Final Survey 2014)

Table 8 shows the demographic profiles of the respondents involved in the survey. Most of the respondents are male as practitioner in the fields of pipeline construction projects. The average levels of respondents are between 25-30 (22.69%) and 31-36 (23.53%) years old. Majority of respondents are married. The highest level of education is Bachelor's Degree (56.31%) respondents; its equal to the position level of respondent in their work as much as (60%) is in supervisor level, with less than 10 years experiences. This demographic can be summarized, that most of logistics practitioners in Indonesia is in the young and still in the started level of carrier. However, most of them are, active in pipeline construction project.

**Table 8:** Demographic of pipeline logistics practitioners

Subject	Frequency	Percentage
<b>Gender</b>		
Male	75	63.03
Female	44	36.97
<b>Marital Status</b>		
Single	53	44.54

Married	66	55.46
<hr/>		
<b>Age</b>		
<hr/>		
17-24	27	22.69
25-30	28	23.53
31-36	12	10.08
37-42	17	14.29
43-48	14	11.76
48 Above	21	17.65
<hr/>		
<b>Level of Education</b>		
<hr/>		
Senior High School	14	11.76
Bachelor's Degree	67	56.31
Master's Degree	33	27.73
PHD Degree	5	4.20
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<b>Position Level</b>		
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Manager / Above	29	24.37
Supervisor	31	26.05
Chief Officer	17	14.29
Staff	42	35.29
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<b>Experiences</b>		
<hr/>		
< 5 Years	47	39.49
5 – 10 Years	33	27.73
11-20 Years	20	16.81
>20 Years	19	15.97
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<b>Experienced in Pipeline Construction Projects</b>		
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Yes	109	91.60

(Source: The Final Survey, 2014)

Table 9 was developed and describes the percentage and responses from the respondent related to the questionnaire distributed. There is also shown the mean and standard deviation of logistics performance indicators established at the final survey. The overall of the respondents is agreed and answered in moderate extent and high extent columns. The higher means and standard deviation were recorded that indicate to the better results of the overall survey.

No		N	1	2	3	4	5	Mean	$\alpha$
1	Familiarity with external factors in supplying material for construction projects	119	1.1	1.1	6.9	43.7	47.1	4.34	.760
2	The company has trained most of employees in avoiding the negative effect of external factors	119	1.1	4.6	13.8	56.3	24.1	3.98	.821
3	Familiarity with continuous quality improvement and innovation program	119	1.1	4.6	12.6	48.3	33.3	4.08	.866
4	Familiarity with the special shipment regarding by the size and weight	119	1.1	6.9	10.3	40.2	41.4	4.14	.942
5	Familiarity with transport policy and regulation in Indonesia	119	2.3	13.8	51.7	27.6	4.6	3.98	.902
6	Transport policy and regulation regarding heavy lift transportation can be well understood	119	1.1	2.3	66.7	11.5	18.4	3.99	.707
7	Transport policy and regulation are acceptable and in the minimum level of ambiguity	119	1.1	11.5	42.5	33.3	11.5	3.95	1.011
8	Transport policy and regulation are covering all sectors in the	119	5.7	29.9	39.1	16.1	9.2	3.78	1.146

	transportation of pipeline materials								
9	Need improvement of transportation policy and regulation in term of efficiency	119	1.1	10.3	43.7	34.5	10.3	4.00	.988
10	Many materials are in stuck caused of custom matters	119	2.3	12.6	40.2	39.1	5.7	4.08	.979
11	The tax rate is high due to custom clearance	119	1.1	6.9	40.2	10.3	41.4	4.14	.942
12	Familiarity with fleet available	119	1.1	6.9	41.4	40.2	10.3	4.14	.942
13	The variations of alternative fleets are enough for handling special size and dimension materials	119	5.7	16.1	39.1	29.9	9.2	3.78	1.146
14	Enough vendors have fleets for heavy lift	119	1.1	24.1	56.3	13.8	4.6	3.98	.821
15	Use of alternative fleets if unavailable	119	5.7	16.1	39.1	29.2	9.2	3.78	1.146
16	Frequently in using the special fleets used for heavy lift	119	1.1	2.3	18.4	66.7	11.5	3.99	.707
17	Procurement of fleets is time consuming	119	1.1	10.3	40.2	41.4	6.9	4.14	.942
18	Fleets procurement is affecting the cost	119	2.3	13.8	27.6	51.7	4.6	3.98	.902
19	Majority fleets are from outside the country	119	0	16.1	39.1	36.8	8.0	4.05	.928
20	Familiarity with infrastructure technology available in Indonesia	119	11.5	11.5	42.5	33.3	11.5	3.95	1.011
21	The development of transportation infrastructure is well enough to demand	119	1.7	32.5	27.3	21.1	12.6	4.57	.729
22	Integrated physical transportation infrastructure is available. (Seaport, Airport, Railway, and Road)	119	2.3	33.3	25.4	17.7	5.4	5.76	.823
23	Integrated technology is used to	119	2.4	17.5	23.4	18.9	7.6	4.75	.756

	communicate with Customs Department								
24	Logistics performance is well above average	119	1.3	16.7	32.5	21.2	5.4	3.94	.717
25	In general, our logistics performance is excellent	119	2.1	13.2	27.6	14.3	4.3	3.24	.746
26	We are outstanding at performing our logistics activities	119	1.8	12.5	28.7	15.6	3.5	3.98	.765
27	Help in solving the cargo transportation dispute	119	2.4	21.3	33.4	23.4	4.3	4.14	.978
28	Attempt to help in emergencies	119	7.5	23.6	35.4	25.3	14.2	4.79	.942
29	Given pre-alert notices of delivery problems	119	5.4	20.7	23.4	22.1	13.2	4.56	.765
30	Provide emergency service	119	4.3	22.1	31.2	24.3	12.3	3.45	.754
31	Responding to request in a flexible manner	119	1.6	18.9	22.4	21.3	3.2	3.75	.864
32	Minimum level of transportation complaint	119	1.7	17.6	22.2	18.3	4.6	3.24	.734
33	Adjusting operations in a flexible manner to meet unforeseen needs	119	1.1	2.3	47.1	43.7	1.1	4.34	.760
34	Handling could change the efficiency	119	4.6	12.6	48.3	33.3	1.1	3.98	.821
35	Recommending alternative actions when an unforeseen problem emerges	119	1.1	1.3	41.4	40.6	6.9	4.14	.942
36	The insurance claim is applicable	119	2.1	27.4	37.2	35.3	5.4	4.85	.765
37	Advising customers of potential problems in meeting their needs	119	1.4	12.3	26.7	25.4	6.4	3.95	.766
38	Affecting to the value analysis, cost reductions, and problem solving	119	1.2	25.3	28.7	27.6	4.3	3.57	.743
39	Providing reports periodically	119	2.3	27.5	32.4	30.2	3.2	4.14	.942

**Table 9:** The mean and Standard Deviation Established During Pilot Survey

(Source: The Final Survey, 2014)

### Discussion

From the result of demographic survey, most of them is in the first step level of their carrier, in here the experience and knowledge of logistics performance is play important to give the

result of what study objectives. The relation between logistics performance and external factors that focused as the independent variable is affected by experience. With no experience of respondents, the results will be not reliable. In this case of study, the observation conducted was focused to get the result for gaining knowledge on how the logistics practitioners in Indonesia is familiar with the external factors. Means that, they must have some knowledge and experience in giving the answer on how those external factors is involved to the logistics performance of pipeline construction projects. In table 9 from previous findings, show the extent level of agree or not agree answer of the relationship between external factors “Policy and Regulation, infrastructure technology, and fleets availability” with the logistics performance. Most of them are agreed with the moderate and high extent level that logistics performance can be affected by those factors. Indicators number one (1) until) four (4) is describe about the practitioners familiarity with factors affect to the material supply efficiency performance in logitics matters. And show that, most of respondents are familiar with those factors. And the rest point of indicators is explain about the external factors involved to improve the efficiency of logistics performance it self. In transport policy matters can be summarized that, the policy and regulations in Indonesia is still have some ambiguity for the practitioners and it can give the bad effect to the supply efficiency, because the rule is not clearly explaind and trained well to the practitioners. After that when we look to the Fleets availability, practiotioners are agree, the availability of fleets are still limited, and can give the maximize cost effect to the project conducted. About Infrastructure technology it self, in Indonesia, still needs more improvements to support the construction activity, moreover the construction that conducted in the remote area. This study can be work with the long run observation because of the time limit and the experience of respondents. The results will be describe as equal as the experience and knowledge form each respondents and off course the improvement level of the government intervention. As suggestion for future study, it is proposed that following matters should be continuously study for better and efficient material supply for pipeline construction project in Indonesia.

- i. Further investigation to the others external factors that could give high impact to the logistics performance of material supply efficiency.
- ii. To expand knowledge experience on logistics performance among the construction industry.
- iii. Establish the better and appropriate policy for the logistics matter.
- iv. Long run observation of those external factors to get the accurate level of relationship with logistics performance.

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