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Supply Chain Risk Analysis with Boulder Stone Material on Beach Safety Construction In Matani Village, Minahasa Selatan Regency

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Abstract
The use of the supply chain method is believed to be one solution, so that it will bring benefits to both users and construction service providers. This study aims to analyze the supply chain of boulder stone material starting from the process of selecting a provider of coastal safety wall construction work on the coast of Matani Village, analyzing the criteria and sources of risk for coastal safety walls. And get the identity of the boulder stone supplier (Quarry). Structured interviews with the Selection Working Group (Pokja Kemerdekaan), Commitment Making Officials (PPK), as well as service providers and boulder stone suppliers to obtain a series of information that will be used in decision-making analysis. Observations in the field of work and supplier quarry to determine the optimal distance required. Literature review regarding the selection of government goods/services providers in accordance with Presidential Decree no. 16 of 2018.
Finally, a hierarchical level model was built for decision analysis using the Analytical Hierarchy Process (AHP) method. From the research, it can be concluded that the risk of the boulder stone supply chain is not included in the evaluation of the service provider's offer so that even if the provider does not provide a quarry (supplier) to support the supply chain, the boulder stone work can still be determined as the winner of the tender. Analysis of 29 (twenty nine) risk factors and 6 (six) sources of risk, it was found that the X-12 risk factor, namely managerial ability in the absence of quarry support (suppliers) in the boulder stone in the project management function, has a dominant element by 11% (eleven percent). Obtained 6 (six) identities of boulder suppliers. It is recommended that the boulder quarry support (supplier) be one that can be evaluated by the selection working group.

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I. Introduction

In the global world of competition for construction services, the number of contractors is increasing inversely with the number of construction projects. The supply chain method is believed to be able to improve the performance and function of the organization in construction work so that it can provide benefits not only for providers but also for service users. This condition can also trigger very tight competition among construction service providers in maintaining business continuity. On the other hand, these conditions make service users have a strong bargaining position in determining the right service provider to accommodate the required needs.

Purpose

The purpose of this study is to analyze the structure of the material supply chain in the project construction of a coastal safety wall consisting of, Analyzing the influence of boulder stone supply chain risk in evaluating the supply of service providers for coastal safety wall construction in Matani Village, South Minahasa Regency. Analyzing whether the boulder stone supply chain is the dominant criterion in evaluating the supply chain for coastal safety wall construction services. Obtaining the identity of the supplier of boulder stone (Quarry) for the construction of a coastal safety wall on the coast of Amurang who has a permit from the relevant agency, has specifications of boulder stone that are suitable and profitable for both service providers and users.

Benefit

The benefit of this research is to determine the factors – determinants of improving the efficiency of time, cost, quality and implementation of construction projects and the creation of integration in these projects.

Scope of problem

This thesis will discuss the supply chain in the construction of coastal guard buildings which will have different supply lines of goods, materials, and services according to the needs of the construction project. The scope of research on the construction project of the Matani Village Beach safety wall specifically for boulder stone material.

THEORY BASIS Supply chain risk

Supply Chain Risk

Supply chain risk is the possibility of unexpected events or probabilities, whether large or small, that adversely affects the supply chain resulting in disruption or failure at strategic, tactical and operational levels (Ho et al., 2015). Major risks are risks that are very unfavorable and rarely occur but have a negative impact on work, consisting of natural risks (eg extreme weather, earthquakes), and human-caused risks (terrorism, war and political instability). Minor risk is the risk that comes from activities within the company or relationships with partners in the company along the supply chain, which consists of infrastructure risk, supply risk, demand risk and manufacturing risk. Infrastructure risk consists of information technology, financial systems and transportation. Sources of supply chain risk can occur throughout the supply chain, but the sources can be classified into four groups, namely the Supply side, Supervision, Implementation process, and Demand (Mason-Jones & Towill, 2000). The problem of construction project delays is caused by supply chain uncertainty. Based on this model, (Gosling, et al., 2012) then defines supply chain risk that forms a cycle of uncertainty (uncertainty circle) as shown in Figure 1.

Figure 1. Supply chain uncertainty cycle

Boulder Stone

Boulder stone material is stone that has not been processed or stone that is still fresh from blasting. Boulder stones are usually used as the basis for large-scale dams. Figure 2. Boulder stones are between 1-2 meters in size, the size and shape of the boulder stones are irregular. The spacing for each drill hole ranges from 1.5 meters to 1.7 meters. For each type of stone location, the contours of the stone layers are different, some are hard and some are layered. For layered stones are usually more crushed and produce split stones. This type of stone is often called the boulder elephant stone. Elephant stone serves to stockpile land or locations adjacent to the beach.

This elephant stone is usually used to make concrete breaking waves, beach reclamation materials, materials to make small docks or the most commonly used material for building foundations.

Figure 2. Boulder stone at the research site

Metode Analytical Hierarchy Process

Definition of AHP Method

Analytical Hierarchy Process is a decision support method developed by Thomas L. Saaty. This decision support model will describe a complex multi-factor or multi-criteria problem into a hierarchy. According to Saaty (1993), hierarchy is defined as a representation of a complex problem in a multilevel structure where the first level is the goal, followed by the level of factors, criteria, sub-criteria, and so on until the last level of alternatives.

The Analytical Hierarchy Process is used as a problem solving method compared to other methods for the following reasons:

1. A hierarchical structure, as a consequence of the selected criteria, to the deepest sub-criteria.
2. Taking into account the validity up to the inconsistency tolerance limit as the criteria and alternatives chosen by the decision maker. Take into account the durability of the decision-making sensitivity analysis output.

II. Research Methods

Research Flowchart

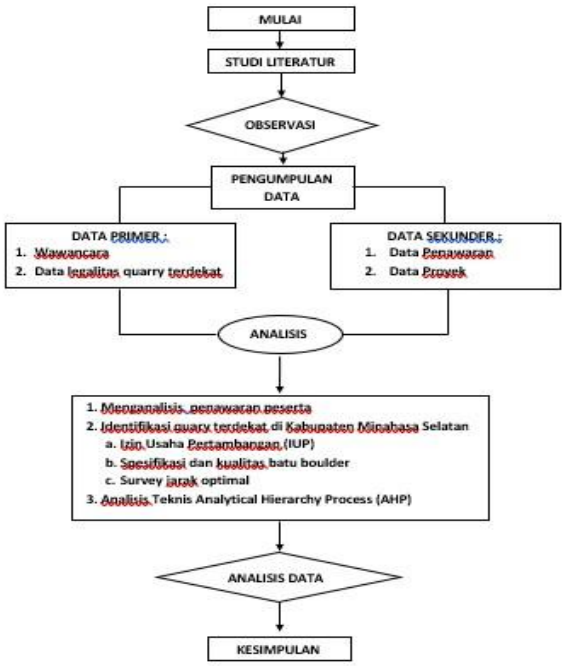


Figure 3. Flowchart

Research sites

Administrative Overview South Minahasa Regency is one of the regencies in North Sulawesi Province with Amurang as the capital. The distance from Amurang to Manado, the capital of North Sulawesi Province, is ± 64 km. Geographically, South Minahasa Regency is located between 0º.47´ - 1º.24´ North Latitude and

124º,18´ - 124º 45´ East Longitude. While administratively it is located in the south of Minahasa Regency, with regional boundaries as follows:
North : Bordering Minahasa Regency

East : Bordering Minahasa Regency southeast

South: Bordering Bolaang Mongondow Regency and East Bolaang Mongondow Regency

West : Bordering the Sulawesi Sea

South Minahasa Regency has a coastal area with a coastline length of ± 168.22 km and a coastline length that already has a coastal protection building ±17.40 km, so that the length of the coastline that has the potential for coastal protection construction work that requires a large supply of boulder stones. This research was carried out on the work of the Matani Village Coast Guard Wall.
The method used in this research includes the formation of research material ideas, literature review and study, data collection, preparation and application of analysis to incoming bids, as well as identification of boulder supply chain quarry which legally and mining permits can be a supplier of boulder stone as well as specifications. The technical boulder stone produced can be used in coastal safety walls and the results of decision making with the following steps:
1. Formation of research material ideas
2. Data and Information Availability Test
3. Data/Information Collection
4. Literature Review
5. Information Processing

The information collected and summarized is then processed as follows: The information obtained is then selected on the problem. Information that is not compatible with the problem is removed/reduced. Information Display The part of the information that has similarities is sorted and categorized according to the subject matter. Information analysis is based on the similarities obtained, and the effect on each information is also analyzed. This is useful for building a hierarchical level model. After all data/information is collected and processed, the decision analysis uses the Analytical Hierarchy Process (AHP) method.

III. Discussion

The Matani Village Coast Guard Work is located in Matani Village, South Minahasa Regency with a planned HPS value of Rp. 13,246.400.000,- (Thirteen Billion Two Hundred Forty Six Million Four Hundred Thousand Rupiah) belonging to the work unit of the Regional Disaster Management Agency of the Regency. South Minahasa Fiscal Year 2019. This package is in demand by registering as many as 17 service providers but only 6 service providers including PT. AKA's office address is Manado, North Sulawesi, PT. KNM's office is Manado, North Sulawesi, PT. BSP's office address is Tahuna, North Sulawesi, PT. PNA's office address is Krueng Sabee, Aceh, PT. CMBP's office address is Bandung, West Java, PT. DKT's office address is Palu, Central Sulawesi. Evaluation of bids for 6 service providers is carried out by the Selection Working Group for the Procurement of Goods/Services in South Minahasa Regency. Bidding method for construction work providers with the lowest price 1 file bidding method. The things that are evaluated consist of:

a. Administrative evaluation, bids are declared to meet administrative requirements, if the bid letter and bid guarantee meet the provisions in the Bidding Document, bids that meet administrative requirements are followed by technical evaluation. From Table 1 there are 2 service providers who do not meet the requirements, so only 4 service providers can proceed to the next stage.

Table 1. The results of the evaluation of the administration of bids

NO	Nama Peserta											
1	PT. CMBP	√	√	√	√	√	√	X	√	9,741,819,391	9,741,819,391	TMS
2	PT. BSP	√	√	√	√	√	√	√	√	10,078,999,810	10,078,999,810	MS
3	PT. PNA	X	X	X	X	X	X	X	√	10,291,877,601	10,291,877,601	TMS
4	PT AKA	√	√	√	√	√	√	√	√	10,999,125,186	10,999,125,186	MS
5	PT. DKT	√	√	√	√	√	√	√	√	12,818,135,422	12,818,135,422	MS
6	PT KNM	√	√	√	√	√	√	√	√	12,879,147,944	12,879,147,944	MS

b. Technical evaluation is carried out on participants who meet the administrative requirements. The elements that are evaluated are the implementation method, implementation period, main equipment, managerial personnel, the part of the work to be subcontracted, the construction safety plan (RKK) document and other required documents.

Table 2. Results of the technical evaluation of bids

No	Nama Peserta	Spesifikasi Teknis	Metode Pelaksanaan	Kurva S	Gambar Teknis	Personil Manajerial	Peralatan	Dokumen RKK	Hasil Evaluasi
1	PT AKA	√	√	√	√	√	√	√	MS
2	PT BSP	√	√	√	√	√	√	√	MS
3	PT. DKT	√	√	√	√	√	√	√	MS
4	PT KNM	√	√	√	√	√	√	√	MS

c. Price Evaluation is carried out by performing Arithmetic Correction, Price Fairness and Price.

Table 3. Results of the evaluation of bids price

No	Nama Peserta	Harga Penawaran	Harga Terkoreksi	% terhadap HPS	Harga Penawaran terkoreksi tidak melebihi nilai total HPS	Harga Satuan Timpang (Harga satuan 110% HPS)	Kewajaran Harga Penawaran	Hasil Evaluasi
1	PT AKA	√	√	√	√	√	√	MS
2	PT BSP	√	√	√	√	√	√	MS
3	PT. DKT	√	√	√	√	√	√	MS
4	PT KNM	√	√	√	√	√	√	MS

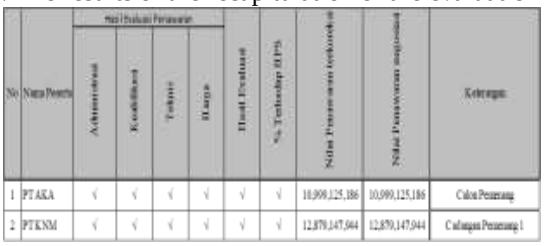
d. Qualification Evalution, Qualification evalution is carried out on competence, business ability and fulfillment of the requirements as a provider specified in the selection document, participants are declared qualified if they meet all qualification requirements, qualification verification is carried out to potential winners.

Table 4. Results of evaluation of bid qualifications

NO	Nama Peserta	Administrasi Legalitas												Kualifikasi Teknis		Kemampuan Keuangan		Hasil Evaluasi
														Pengalaman Pekerjaan				
		Konsorsium	Masa Berlaku	Tanggal dan Nomor Surat Jaminan	Tanggal dan Nomor Surat Dukungan	Kualifikasi Usaha	Masa Berlaku TDP	NPWP	SPT 2017	AKTA PENDIRIAN	Akta Pendirian Terakhir	Surat Kuasa (Apabila diperlukan)	Surat Perjanjian Konsorsium(SBU) (Apabila Ada KSO)	Pekerjaan dalam skup yang sama dalam kurun waktu 1 (satu) tahun terakhir termasuk pengalaman sub kontrak	Pekerjaan dalam kurun waktu 4 (empat) tahun terakhir termasuk pengalaman sub kontrak	Mempunyai Laporan Keuangan tahun terakhir	Memiliki Nilai Kemampuan Neto (NKN) paling kecil 50% dari nilai HPS	
1	PT BSP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TMS
2	PT AKA	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	MS
3	PT. DKT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TMS
4	PT KNM	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	MS

e. Recapitulation of Evaluation Results, From the 4 (four) evaluations above, it is found that there are two service providers for the procurement of the Matani beach safety wall,

Table 8. The results of the recapitulation of the evaluation of bids



No	Nama Peserta	Hasil Evaluasi Penawaran				Hasil Evaluasi	% Terhadap HPS	Nilai Penawaran terkoreksi	Nilai Penawaran negosiasi	Keterangan
		Administrasi	Kualifikasi	Teknis	Harga					
1	PT AKA	√	√	√	√	√	√	10,999,125,186	10,999,125,186	Calon Pemenang
2	PT KNM	√	√	√	√	√	√	12,879,147,944	12,879,147,944	Cadangan Pemenang 1

After that, the working group invites potential winners and 1 (one) reserve potential winner for Qualification Proof. however, there was only one service provider, namely PT. KNM so that for the Matani Village security wall work package, the winner gets namely PT. KNM with a contract value of Rp 12,879,147,944, - (Twelve Billion Eight Hundred Seventy Nine Million One Hundred Forty Seven Thousand Nine Hundred Forty Four Rupiah).

IV. Data Analysis

1. Determination of variable risk level

From the results of the identification that has been carried out, it can be identified as many as 32 (thirty two) risk variables. The results of the identification of these risk variables are divided into 6 (six) risk factors. The data used to determine the risk level for each variable obtained is as shown in table 4.

Furthermore, the risk level is determined for each of these variables. Analysis of risk variables is carried out based on the frequency of occurrence and the consequences/impact of the occurrence of these risks. In comparing various related risks, a "risk index" is often used where:

Risk Index = Frequency x Impact …..(1)

In this study, the reference used to determine the risk level for each variable is based on the risk analysis matrix according to The Australian / New Zealand Risk Management. The data analysis is then grouped into a matrix table which contains the overall results of the questionnaire to determine the risk level priority based on the mode (the value that appears the most) and the median (the middle value).

The analytical approach used is a qualitative approach, so the data used for determining the risk level priority of all respondents is selected the median data. Variables in the stage questionnaire

2 (two) after the risk level priority has been carried out, it produces 6 (six) risk factors and 29 (twenty nine) risk variables with the following details:

No	Faktor Risiko	Variabel Risiko
1	**Kemampuan teknis (*Technical Excellence*) Calon Penyedia jasa**	8 variabel risiko
2	**Kemampuan manajerial (*Management Capability*) Calon Penyedia jasa**	6 variabel risiko
3	**Kemampuan Finansial (*Financial Capability*) Calon Penyedia jasa**	3 variabel risiko
4	**Kualifikasi Personil (*Personel Qualification*) Calon Penyedia jasa**	8 variabel risiko
5	**Kemampuan dan pengalaman (*Skill and Experience*) perusahaan calon penyedia jasa**	3 variabel risiko
6	**Evaluasi Harga Penawaran (*Pricing*)**	4 variabel risiko

2. Determination of Variable Weights with Analytical Hierarchy Process (AHP)

a. AHP at the Risk Variable Level

In the second stage of the questionnaire, respondents were asked to make pairwise comparisons of several variables to be compared. Data that used in this AHP calculation is the median data from all respondents

To be able to provide a clearer picture of the AHP calculation, see the table below: Table 6. – median calculation and technical capability risk

Table 6. AHP technical capability

TEKNIS	X1	X2	X3	X4	X5	X6
X1	1.00	1.00	0.20	0.30	0.30	0.70
X2	1.00	1.00	0.70	1.00	1.00	1.00
X3	5.00	1.43	1.00	1.00	1.00	1.00
X4	3.33	1.00	1.00	1.00	1.00	1.00
X5	3.33	1.00	1.00	1.00	1.00	1.00
X6	1.43	1.00	1.00	1.00	1.00	1.00
TOTAL	15.10	6.43	4.90	5.30	5.30	5.70

From the calculation results above, it is obtained the mean or median value from the assessment of all respondents and then the results are entered back into the pairwise comparison assessment format for risk factors for the technical ability of prospective service providers as shown in table 7 as follows:

Table 7 – Pairwise comparison matrix of technical capability risk

NILAI EIGEN						JUMLAH	RATA-RATA	
0.07	0.16	0.04	0.06	0.06	0.12	0.50	0.08	
0.07	0.16	0.14	0.19	0.19	0.18	0.92	0.15	
0.33	0.22	0.20	0.19	0.19	0.18	1.31	0.22	
0.22	0.16	0.20	0.19	0.19	0.18	1.13	0.19	
0.22	0.16	0.20	0.19	0.19	0.18	1.13	0.19	
0.09	0.16	0.20	0.19	0.19	0.18	1.01	0.17	
							1.00	OK

n (order matrix) = 6

λmax(EigenMax) =

=15.10*0.08+6.43*0.15+4.90*0.22+5.30*0.19+5.30*0.19+5.70*0.17

= 6.2244

CI (Consistency index) = (6.2244 – 6)/(6-1) = 0.0533

CR (consistency ratio) = 0.0533/1.24
= 0.0430

CR value < 0.1 (consistent)

From the results of the above calculations, it is found that the X3 variable, namely the technical specifications proposed by the contractor, does not meet the requirements set out in the selection document and has a weight of 22%. Furthermore, the calculation for the managerial ability risk factor is as follows:

Table 8. Median calculation and managerial ability risk

MANAJERIAL	X7	X8	X9	X10	X11	X12
X7	1.00	1.00	0.20	0.30	0.20	0.20
X8	1.00	1.00	0.70	1.00	1.00	0.30
X9	5.00	1.43	1.00	1.00	1.00	1.00
X10	3.33	1.00	1.00	1.00	1.00	0.20
X11	5.00	1.00	1.00	1.00	1.00	0.30
X12	5.00	3.33	1.00	5.00	3.33	1.00
TOTAL	20.33	8.76	4.90	9.30	7.53	3.00

From the calculation results above, it is obtained the median value of the assessment of all respondents and then the results are entered back into the pairwise comparison assessment format for risk factors for the managerial ability of prospective service providers as follows:

Table 9. Matrix of pairwise comparison of managerial ability risk

NILAI EIGEN						JUMLAH	RATA-RATA	
0.05	0.11	0.04	0.03	0.03	0.07	0.33	0.05	
0.05	0.11	0.14	0.11	0.13	0.10	0.65	0.11	
0.25	0.16	0.20	0.11	0.13	0.33	1.19	0.20	
0.16	0.11	0.20	0.11	0.13	0.07	0.79	0.13	
0.25	0.11	0.20	0.11	0.13	0.10	0.90	0.15	
0.25	0.38	0.20	0.54	0.44	0.33	2.14	0.36	
							1.00	OK

Source: processed results of stage 2 questionnaire

n (order matrix) = 6

λmax (EigenMax)
=20.33*0.05+8.76*0.11+4.90*0.20+9.30*0.13+7.53*0.15+3.00*0.36
= 6.4606

CI (Consistency index) = (6.4606 – 6)/(6-1) = 0.0921

CR (consistency ratio) = 0.0921/1.24
= 0.0743

CR value < 0.1 (consistent)

From the above calculation results, it is found that the X12 variable, namely the absence of boulder quarry support (suppliers) in the project management function, has a weight of 36%.
This analysis process is continued for Financial Ability, Personnel Ability, Experience Ability and Pricing Ability.

b. AHP at the level of risk factors

The data used in this AHP calculation is the median data from all respondents in the questionnaire phase 2 (two) filling in the comparison between risk factors can be seen in table 10 below:

Table 10. Calculation of the median of all risk factors

TOTAL	XI	XII	XIII	XIV	XV	XVI
XI	1.00	0.10	0.60	0.60	0.60	0.30
XII	10.00	1.00	1.00	1.00	5.00	1.00
XIII	1.67	1.00	1.00	1.00	1.00	1.00
XIV	1.67	1.00	1.00	1.00	1.00	1.00
XV	1.67	0.20	1.00	1.00	1.00	1.00
XVI	3.33	1.00	1.00	1.00	1.00	1.00
TOTAL	19.33	4.30	5.60	5.60	9.60	5.30

From the calculation results above, the median or median value of the assessment of all respondents is obtained and then the results are entered back into the pairwise comparison assessment format for all risk factors as follows:

Table 11. – Matrix of pairwise comparisons of all risk factors

NILAI EIGEN						JUMLA	RATA-	
0.05	0.02	0.11	0.11	0.06	0.06	0.41	0.07	
0.52	0.23	0.18	0.18	0.52	0.19	1.82	0.30	
0.09	0.23	0.18	0.18	0.10	0.19	0.97	0.16	
0.09	0.23	0.18	0.18	0.10	0.19	0.97	0.16	
0.09	0.05	0.18	0.18	0.10	0.19	0.78	0.13	
0.17	0.23	0.18	0.18	0.10	0.19	1.05	0.18	
							1.00	OK

n (order matrix) = 6

λmax (EigenMax)

=19.33*0.07+4.3*0.3+5.6*0.16+5.6*0.16+9.6*0.13+5.3*0.18
= 6.6102

CI (Consistency index) = (6.6102– 6)/(6-1) = 0.1220

CR (consistency ratio) = 0.1220/1.24
= 0.0984

CR value < 0.1 (consistent)

Based on the above calculation, the result is that the X-II variable, namely managerial ability, has a weight of 30%.

3. Analysis Results

From the results of matrix calculations using the Analytic Hierarchy Process (AHP) method, the risk factors can be sorted by the average value (weight) of priority for all risk factors as follows:

Table 12. Overall weight of risk factors

Faktor Risiko	Bobot (%)
Kemampuan Manajerial	30%
Kemampuan Harga	18%
Kemampuan Finansial	16%
Kemampuan Personil	16%
Kemampuan Pengalaman	13%
Kemampuan Teknis	7%

The data in Table 12 can be seen that the managerial ability risk factor has the largest weight, namely 30%, while the technical ability risk factor has the smallest weight, which is 7%.

Based on the calculation above, it can be seen that the dominant variable weights for each risk factor are as follows:

Managerial Ability : No quarry support (suppliers) in boulder stone in project management function = 11%. Experience Capability : Lack of sub-contractor capability and capability = 10%. Financial Ability: Have Basic Ability Requirements (KD) = 8%. Pricing Capability : Does not submit the estimated cost of implementing occupational health and safety and Construction Safety = 5%. Personnel Ability: Qualifications and number of core personnel from contractors do not match the requirements specified in the selection document = 4%. Technical Ability: The technical specifications submitted by the contractor do not meet the requirements set by the selection document
= 1%.

C. Identification of Boulder Stone Supplier

Based on the research data obtained 6 (six) owners/entrepreneurs of excavated C land and have experience in construction work, especially the work of the Coast Guard Wall (Boulder) in South Minahasa Regency, as follows:

1. PT. KNM office in Manado, the location of the mine in the village of Tapian, South Minahasa or Supplier 1 (one) (Q1)

2. PT. FSG office in Manado, mining location in Koha village, Minahasa or Supplier 2 (two) (Q2)

3. PT. SKJ office in Manado, mining location in Koha village, Minahasa or Supplier 3 (three) (Q3)

4. The Mandey family in Amurang, the mining location of the village of Tawaang, South Minahasa or Suppliers of 4 (four) (Q4)

5. Lelemboto family in amurang, tenga village mining site, South Minahasa or 5 (five) suppliers (Q5)

6. The Jocom family in Manado, the location of the tenga village mine, South Minahasa or 6 (six) suppliers (Q6)

All of these owners/entrepreneurs have experience in supplying boulder stones, both in work in the South Minahasa Regency and in North Sulawesi (manado).

Figure 9 – Map of boulder quarry distribution (suppliers)

V. Conclusion

1. The risk of the boulder supply chain in the evaluation of the service provider offer for coastal safety wall construction in Matani Village, based on Presidential Regulation 16 of 2018 is not included in the evaluation of the service provider offer so that even though the provider does not provide quarry (supplier) as a support for the supply chain, the boulder stone work remains can be determined as the winner of the tender. From the analysis of 29 (twenty nine) risk factors and 6 (six) sources of risk, it was found that the X-12 risk factor, namely managerial ability in the absence of quarry support (suppliers) in the boulder stone in the project management function, has a dominant element. as big as 11% (Eleven), so that it becomes the dominant/main criteria in the evaluation of the bidding service providers for the construction of the coastal safety wall. There are 6 (six) identities of boulder stone suppliers, both individuals and business entities, with their advantages and disadvantages in the supply chain management strategy, 6 (six) identities of suppliers of boulder stones consisting of 4 (four) identities of suppliers of boulder (quarry) stones for the construction of a coastal safety wall in Matani Village, South Minahasa Regency and 2 (two) suppliers of boulder (Quarry) outside the district of South Minahasa who have sufficient availability of boulder stone and have stone specifications that meet the standards. And it is recommended that in addition to other factors, the support of the quarry (supplier) of boulder stones in the work of the coastal protection wall may be one of the technical bidding documents that can be evaluated by the selection working group so that a good service provider can be obtained and avoid work delays. With knowing the determinants of the increase efficiency of time, cost, quality and implementation of the coastal safety wall construction project and the creation of integration in the project so that it is profitable not only for the South Minahasa Regency Government, but also for service providers in the construction of the coastal guard wall. It is necessary to carry out further research on the existence of quarry support (suppliers) in construction work, without compromising the procurement process which is open to anyone.

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