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Designing Risk Qualitative Assessment on Fiber Optic Instalation Project in Indonesia

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***Abstract*—** A project always has risks that can lead to project failure. In the project, a risk analysis is required to provide an evaluation for the project to proceed as planned. In the event of inadequate planning and ineffective control, it will result in irregularities identified as a risk to the project. This study aims to analyze the qualitative risk on Fiber Optic Installaion project in Sukabumi, West Java, Indonesia. In addition, risk assessment is undertaken on project implementation. Assessment of risk using the impact and probability to measure the impact of risk occurrence. The impacts are more detailed by classified by time impact, cost impact, quality impact, safety and security impact, proximity. The result is there are 36 risk that may occur and mostly risks are associaated by quality and safety&security impact.

***Keywords*—** risk assessment, qualitative analysis, Project, fiber optic.

I. INTRODUCTION

Infrastructure is one of the main prerequisites for achieving high and sustainable economic growth (Simanjuntak & Widiastuti, 2014). The availability of infrastructure reflects on equitable investment reflecting the existence of adequate infrastructure development that able to serve the economic movement. Infrastructure project include buildings, bridges, dams, roads, tunel, pipes, and airports. It also indicates the advancement of human civilization and also the quality of science and technology growth of a country. One of the infrastructure that support the current economic movement is optical cable or called fiber optic.

Fiber optic is a glass fiber cable equipped with advanced technology and also has faster data transfer speeds than copper cables. Fiber optic cable network in Indonesia is still slightly rare compared to copper cable network. Fiber optic cable network is used only in some big cities in Indonesia which has a lot of internet users.

The internet user in Indoensia has accelerated increasing year by year (Sumber: Asosiasi Penyelenggara Jasa Internet Indonesia Tahun 1998-2015). This demand has casued the big project for government to fill this request. ABC company has been assigned as the provider to develop fiber optic intstallation project. This project aimed to increase the data speed from 10 Mbps to 80 Mbps. Since copper cable was already settled down and can not accommodate the the high speed data then the changing network line into fiber optic cable is urgently needed.

However, this project is very risky because the network which had been installed long time ago will be opened again and changed into new network. At the same time, the customer requests are booming. So the short time project will be the main issue that must be faced by the company. Beside the tight schedule there are also several threats that will impact on project success including unreadable location, difficult site location, wheather, limited equipement and wrong design.

This project has been started on February 2017 and will be finised on 31 May 2017. During the execution, the risk control must be conducted to know the correctness of project execution toward project baseline. Unfortunately, the risk management are not properly enough to be planned by this company. The ABC company hasn't set the risk managemement plan including investigating risk that will be happened when project started, risk assessment, risk responses and controlling procedure.

Based on PMBOK 5 edition, the Risk Management plan should not be studied while the project is currently on going, however the controlling risk sould be applied in whole life cycle.

II. RELATED WORKS

Risk is inevitable and sometime gain advantage on it. Many researchers investigate indealing with project risk. Study from Baghdadi & Kishk (2015), risk associated wih Saudi Arabian Aviation comprise 54 risk which categorized by internal risk, external risk and undpreditable risk. The authors said that aviation sector is very important to Saudi because yearly ritual moslem held. Government of Saudi Arabian has spent abundant resources including project budget in managing aviation project since the safety is the main factor. The risk was collected by plotting the risk's consequence and probability which also known qualitative approach.

Risk has close relationship with safety issue which has been investigated by Wicaksono & Singgih (2011). They used AS/NZS 4360:2004 Risk Management Standard to evaluate risk in apartment construction project they also applied root cause analysis (RCA) to analyze further all the cause of risk. There are 5 big risk which will be impact on the project as a whole. Most of the risk is associated with the construction technique and really useful for those who manage the construction project.

There are two methods for managing the risk, quantitave and qualitative. Qualitative method has plus and also minus. The advantage of qualitative method is the visual representation which assist the analysit to give the quick judgment compare to quantitative method. However, quantitave method is more firm because it less subjective and the resuld depends on numerical parameter. Research about quantitave method on risk management is also investigated by Gladysz et al (2015), Muriana & Vicinni. They used PERT (Program Evaluation Revew Technique) to determine the amount of risk and their impact on project.

In this study, the project will conduct risk response by adopting qualitative method. The main reason of the research objective is about time. Qualitative research gives quicker judgment and also response which suitable for this project. The limited timeframe of the project pushes the analyst to select easier and fast method. The disadvantegas of the method is minimized by choosing the appropriate key person who will be given the quistionaire and also deep interview. The key person should be the one who are experiencing in managing the same and current project.

III. METHODOLOGY

The project took place in Sukabumi,West Java, Indonesia at one Sentral Telephone otomate. This project comprised 2 part including the pre-development and migration stage. Task that must be done in the pre-development and migration stages such as site survey, create cost budget proposals, execute procurement processes and analyzing contract amendments. Meanwhile, on development and migration includes feeder development, distribution, Optical Distribtuion Cabinet (ODC) addition and migration.

Qualitative risk analysis has been chosed as the methodology of this research. Using PMBOK 5 edition (PMI, 2013) as the guidance, the first process is investigating the risk that may occur in the project. To know further the all risk in the project, investigating risk in the work break down structure is very useful for the first iteration. In this time the output of first iteration is risk register. To support complete risk register, there are several data that should be put in the register including the statement of work as the high-level project summary, project schedule and also stakeholder register.

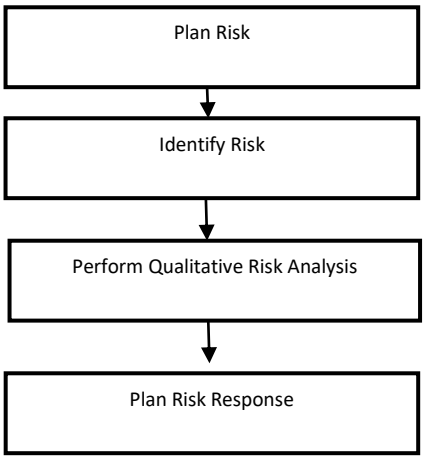

Fig. 1 Risk Management Process

After all the risk has been collected then the next step is categorizing the risk based on probability impact matrix. This is the main characteristic of qualitative analysis because risk categorization based on expert judgement. The expert are 2 project managers who are engaged in the same project. The expert itself has more than 5 years experiencing project task. Thus their voices are assumed more convincing to produce.

The next step is giving reponse to all risks. The response itself will be categorizing by probability and

impact matrix again. This process aimed to anticipate whether the responses are feasibly to run. Risk register now is equipped with more important information such risk owner, risk categorization, impact, and risk response.

IV. RESULT AND DISCUSSION

According to PMBOK (PMI, 2013), one of the input of creating risk management plan including scope baseline. Scope baseline has 3 item for instance work breakdown structure, WBS dictionary and Scope Statement. According to another process in the project, risk management plan has many input. Almost all the project resources support the creation of risk management plan. Beside WBS, there is also item that should be in creation of Risk management plan.

Risk Breakdown structure is an output of risk management plan. It helps project manager to identify all possible risk by categorizing the risk. The structure has similar with WBS. The RBS is classified by the structure of WBS. Thus, this research follow work break down structure in the project to identify the main risk.

Tabel 1
Activity List

ID	Activity	Duration (day)	Predessesor
1.1	Survey	11	-
1.2	The evaluation of surbey	7	1.1
1.3	Official memo for work order	2	1.2
1.4	Budgeting proposal	7	1.2
1.5	Release Budgeting	30	1.4
1.6	Official memo for procurement	2	1.5
1.7	Procurement process	7	1.6
1.8	Amandement	7	1.7
2.1.1	Digging Soil	6	1.2
2.1.2	Pulling Subduct	6	2.1.1
2.1.3	Pulling FO	6	2.1.2
2.1.4	PODC Foundation	6	2.1.1
2.1.5	ODC Instsallation	6	2.1.4
2.1.6	Jointing/Termination	2	2.1.3; 2.1.5
2.2.1	Accessories installation in the pole	7	1.2
2.2.2	Pulling FO cable distribution	10	2.2.1
2.2.3	ODP and Splitter Installation	10	2.2.2
2.2.5	Labeling	10	2.1.6
2.3.1	Permit completion	7	1.3
2.3.2	Stacking	7	1.3
2.3.3	SITAC (ODC)	7	2.3.2
2.3.4	Order Material	2	1.3
2.3.5	Delivery FO cable	7	2.3.4
2.3.6	Delivery ODC	7	2.3.4
.3.7	Delivery Material	7	2.3.4
2.3.8	Delivery Material ODP and Splitter	7	2.3.4
2.3.9	Delivery Material Aksesoris	7	2.3.4
2.3.10	Pole and accessoried installation	5	2.3.7; 2.3.9
2.3.15	Grounding installation	7	2.1.5
2.6.1	Record the customer data and physical configuration	3	1.3
2.6.4	Delivery Material FO Drop Cable	3	2.3.4
2.6.5	Delivery Material ONT	3	2.3.4
2.6.6	Delivery Material IKR/IKG and Cable Power	4	2.3.4
2.6.7	Pulling FO Cable and Drop Cable	76	2.6.6
2.6.9	IKR/IKG installation	76	2.6.6
2.6.10	ONT installation	76	2.6.6
2.6.11	Activation and migration	76	2.6.6
2.6.12	Commisioning Test	76	2.6.11
2.6.13	Acceptance test	76	2.6.11

There are 16 workpackage and each workpackage is decomposed into the lowest level "activity". After all the activity is identified then all possible risk is tracked by the acitivites. the PM and the team works together for identifying the risk. There are 36 possible risk that may be happened to this project.

After all the risk is identified then every risk is qualifying by its possibility and impact. We use probability impact calculation from Vargas (2013). Since qualitative is very subjective, using this tool will minimize this problem. A person who examine the risk is the Project Manager who has more than 5 years experiencing the telco project especially fiber optic installation project.

In this study, we only focus on negative risk which can hamper the project success. The matrix is classified into 3 types of severity. Red quadrant identifies very urgent risk that needs quick response since the impact is catastrophic and the occurance is always certain. Yellow quadran is for medium risk which has medium impact and the occurrence is almost certain. The green quadrant is for the risk which has rare occurance and insignificant impact on the project.

Tabel 2. Risk Level

level	score	Color code
very high	5	
high	4	
medium	3	
low	2	
very low	1	green

Beside categorizing the risk level, we also adapt probability level, impact level including time impact, cost impact, quality impact, proximity impact form Vargas (2013) with several adjustments reflect to the scope of project.

Time Impact means risk that will impact on the schedule of the project. It can cause the project will take longer or ahead time. Since the duration of FO installation project is 3 months with variation range almost 6 months then the level of the time impact will adjust to the project duration.

Cost Impact means risk that will impact on the project budget. It can casue the real cost of the project will be over budget or under budget. The range or varation of the real cost of project is Rp. 25.000.000. Quality impact means risk that will impact on the project scope for instance the deliverable meets the expectation (customer satisfied). If the deliverable does not match with the specification, the owner will ask the vendor to give corrective action depends on the severity of the deliverable.

Safety and security impact is risk that will impact on the safety, security and environmental issue. It also reflects to the stakeholder reaction about the risk impact. Since the project is connected to the use of the land, the project will last the residu left in the ground. This residu is very explicit and will cause safety and environmental issue.

Proximity means risk that will impact on the tme horizon. The effect of the risk sometime will be happening immedietly or long time depends on the severity level. After all the probability and impact cateogories are already introduced to the expert, then he may assess the risk according to each level by givi scale from 1 to 5. The bigger score means the bigger impact of the risk or more important risk.

Tabel 3. Risk Probability Level

level	score	Description
very high	5	The even will certainly occur
high	4	Th event has a great probability to occur
medium	3	The even may occur
low	2	The even rarely occur
very low	1	Very rarely the even to be occurred, almost never

Tabel 4. Time Impact Level

level	score	Description
very high	5	The project will delay more than 6 months
high	4	The project will delay 3 - 6 months
medium	3	The project will delay 1 -3 months
low	2	The project will delay 2 weeks – 4 weeks
very low	1	The project will delay less than 2 weeks

Tabel 5. Cost Impact Level

level	score	Description
very high	5	The budget will be over more than Rp. 100.000.000
high	4	The budget will be over from Rp.50.000.000 to Rp. 100.000.000
medium	3	The budget will be over from Rp.25.000.000 to Rp. 50.000.000
low	2	The budget will be over from Rp.10.000.000 to Rp. 25.000.000
very low	1	The budget will be over less than Rp.10.000.000

Tabel 6. Quality Impact Level

level	score	Description
very high	5	Cilents decline the projects deliverable
high	4	Clients push to hold corrective action as soon as possible
medium	3	Client notice the defect and urge to give corrective action
low	2	Client notice the defect but forgive. No corrective action is needed
very low	1	Client almost do not notice the defect

Tabel 7. Safety and Security Impact Level

level	score	Description
very high	5	Catastrophic, project will get double trouble
high	4	The evident has immediate impact on environmental and safety and security issue
medium	3	The evident exist and gain stakeholder consideration
low	2	The evident exist and gain very little stakeholder consideration
very low	1	No impact on environmental and safety and security issue

Tabel 8. Proximity Level

level	score	Description
very high	5	Event can occur immedietly withn next 15 days
high	4	Event can occur form range 15 days to 3 months
medium	3	Event can occur form range 3 to 6 months
low	2	Event can occur form range 6 to a year
very low	1	Event can occur more than a year

V. ANALYSIS

The next step for creating risk management plan is giving response in each risk. Risk are registered and divided by their risk owner, risk event, risk severity, risk, risk category and risk response. Risk owner are person who person in charge while the risk is happened. Within this project, the risk owner is grouped by 2 party, owner of the project and vendor who execute or produced the deliverable. Risk severity draws the condition of the risk if that may occur in the project.

There is also total impact whih sums of any used impact on this project. Expected value is the result of the qualitative assessment using probability and impact equation. The bigger value of expected value means the more important the risk are. Thus they will have to give response immediately to mitigate or avoid the risk will be occurred. The number of the expected value then will be ranked form the most important risk to the less important risk.

Risk Category/	Risk number	Risk Event	Severity/ effect/loss	Risk Owner/	Score							expected value	risk rank	Risk Response	remarks
					Inherent Risk										
					probability	impact time	impact cost	impact quality	impact on S&S	Proximity	total impact				
	1	Design of positioning ODP, ODC, Rosette and cable is not correct	Uncovered demand	Vendor	2	1	1	3	1	4	2.37	**4.74**	34	Mitigate	A coordination between engineering sale and project team to improve route design (design review meeting)
	2	BOQ estimation is not correct	The actual work is not yet illustrated. It will cause work item loss	Vendor	3	1	1	4	1	5	2.97	**8.91**	21	Mitigate	Result of the survey shoul be detailed incduling the BOQ estimation with the expert
	3	The schedule of survey is not match	Reschedule survey that will effect installation will be dleayed	Owner and vendor	4	2	1	3	1	5	2.83	**11.32**	8	Mitigate	Vendor and owner should monitor the survey process based on written schedule and give reminder by phone or direct visit (face to face meeting)
	4	Data for survey is not valid	Re-sruvey the data again, delay in installation process	Owner	4	1	1	4	1	5	2.97	**11.88**	4	Mitigate	Owner should confirm and validate the data that used for sruvey is the newest and make sure the data has already gain departments approval
	5	Request for conducting survey is not match with the schedule	Survey process will be behind schedule again	vendor	4	1	1	3	1	5	2.73	**10.92**	10	Mitigate	Owner should give reminder to the vendor for issuing application letter for survey by phone or direct visit (face to face meeting)
	6	There is a gap between existing data and data survey	Candidate customer is not connected to new network	Vendor and owner	4	2	1	4	1	5	3.07	**12.28**	1	Mitigate	When the evaluation meeting, each representative from vendor and owner should be responsible to disscuss the variance and how to minimize the variance (corrective action)
	7	The survey team doesn't present while holding survey evaluation	The evaluation time will take longer since the communicaiton media is only by phone (the noise will be greater)	vendor	4	1	1	3	1	5	2.73	**10.92**	11	Mitigate	Vendor should give notice to survey team that they should attend in evaluation team

Risk Category/	Risk number	Risk Event	Severity/ effect/loss	Risk Owner/	Score							expected value	risk rank	Risk Response	remarks
					Inherent Risk										
					probability	impact time	impact cost	impact quality	impact on S&S	Proximity	total impact				
	8	Uncomplete data	The Evaluation Process will be delayed because the required info is incomplete so the development process is delayed as well		3	1	1	4	1	5	2.97	**8.91**	22	Mitigate	Vendor should checked the required data for evaluation process
	9	The result of the survey has not yet illustrated (delay in planning design)	Delay in construction and migration phase		4	1	1	4	1	5	2.97	**11.88**	5	Mitigate	Vendor should remind her team to finish the technical frawing based on written schedule, and give additional team for drawing process
	10	Survey evaluation is not as timely as scheduled	Delay in constructon and migration phase	Owner and vendor	4	1	1	3	1	5	2.73	**10.92**	12	Mitigate	Both owner vendor shoul monitor the evaluation process based on schedule.
	11	The Official memo for work order is late due to more than one Official Note Inspector	Delay in constructon and migration phase	Owner	4	1	1	3	1	5	2.37	**9.48**	14	Mitigate	Vendor should give reminder to owner for issuing official memo of work order. Fast track survey process and always give reminder for inspector to check the official memo by phone
	12	The information in the official memo is not complete	Blurred information, future work is left behind		3	1	1	4	1	5	2.37	**7.11**	28	Mitigate	Use owners template for work order official memo
	13	RFQ is not as timely as scheduled	Vendor can not start to work		4	1	1	3	1	5	2.73	**10.92**	13	Mitigate	Coordinate with fulfillment department, intensively giving reminder. The previous activity must be on time it means this activity critical path. Everybody must pay attention to this activity.
	14	Digging soil process is not match with owner'standard (depth of digging process)	Rework in Digging soil process, planted cables are not perfectly protected	Vendor	5	3	5	4	3	1	2.37	**11.85**	6	Avoid	Both owner and vendor should monitor intensively and push to report the progress of the activity.

Risk Category/	Risk number	Risk Event	Severity/ effect/loss	Risk Owner/	Score							expected value	risk rank	Risk Response	remarks
					Inherent Risk										
					probability	impact time	impact cost	impact quality	impact on S&S	Proximity	total impact				
															Adding this activity to acceptance test requirement
	15	Digging soil process is not as timely as scheduled	Delay in construciton and migration phase		5	2	1	4	1	5	2.37	**11.85**	7	Mitigate	Previous work must be on time, make sure the availability of resouces and tool for excavation process including: hoe, bucket, water, truck Add this activity to quality checklist
	16	Subduct placement does not conform to standard	Rework and defect n subduct process	vendor	3	3	3	4	1	1	2.37	**7.11**	29	Avoid	Both owner and vendor should monitor intensively and push to report the progress of the activity. Adding this activity to acceptance test requirement
	17	pulling subduct is not as timely as scheduled	Delay in construciton and migration phase		4	3	1	4	1	5	2.37	**9.48**	15	Mitigate	Previous work must be on time, make sure the availability of resoruces and tool for excavation process including: driller, rope Add this activity to quality checklist
	18	Prosedure of pulling FO does not conform to standard	Defect in FO	vendor	2	3	3	4	1	1	2.69	**5.38**	32	Avoid	Socialize the SOP for pulling FO, use expert while pulling FO
	19	Pulling FO is not as timely as scheduled	Delay in construciton and migration phase		4	3	1	4	1	5	2.37	**9.48**	16	Mitigate	Previous work must be on time, make sure the availability of resoruces and tool for excavation process including: gloves, rope, lubricant Adding this activity to acceptance test requirement
	20	dimension of ODC foundation does not meet the standards	ODC can't be installed	Vendor	2	1	1	4	1	5	2.37	**4.74**	35	Avoid	Integration team should be actively coordinate with installation team.

Risk Category/	Risk number	Risk Event	Severity/ effect/loss	Risk Owner/	Score							expected value	risk rank	Risk Response	remarks
					Inherent Risk										
					probability	impact time	impact cost	impact quality	impact on S&S	Proximity	total impact				
		and owner' specifications													Integration team should has capability for reading the As-plan drawing
	21	The construction of ODC foundation does not match the schedule	Delay in construciton and migration phase		4	1	1	4	1	5	2.37	**9.48**	17	Mitigate	Previous work must be on time, make sure the availability of resoruces and tool for excavation process including: hoe, cement, sand, water, scope Adding this activity to acceptance test requirement
ODC installation	**22**	ODC installation does not conform to owner's standard	Unstable ODC	vendor	2	1	1	4	1	5	2.97	**5.94**	30	Avoid	Training, use experience worker
	23	Jointing / termination does not conform to standards	Quality of transferred signal to fiber not meet the requirement	Vendor	3	1	1	4	1	4	2.65	**7.95**	27	Avoid	Training, use experience worker
	24	The process of jointing/termination does not meet the desired schedule	Delay in construciton and migration phase		2	1	1	4	1	4	2.37	**4.74**	36	Mitigate	Previous work must be on time, make sure the availability of resoruces and tool for excavation process including: fiber terminator Add this activity to quality checklist
Installation for aerial cable	**25**	Installation of accessories in the existing pole does not conform to owner's standard	Cable can not be installed	vendor	3	1	1	4	1	5	2.97	**8.91**	23	Avoid	As-planned drawing should depict the real situation of site
	26	Installation of accessories in the existing pole does not meet the desired schedule	Delay in construciton and migration phase		4	1	1	4	1	5	2.37	**9.48**	18	Mitigate	Previous work must be on time, make sure the availability of resoruces and tool for excavation process including: screw driver, cutter, ladder, safety belt, helm

Risk Category/	Risk number	Risk Event	Severity/ effect/loss	Risk Owner/	Score							expected value	risk rank	Risk Response	remarks
					Inherent Risk										
					probability	impact time	impact cost	impact quality	impact on S&S	Proximity	total impact				
ODP installation and splitter	**27**	Type of ODP does not meet the order	Disfunction	Vendor	2	2	1	4	1	4	2.76	**5.52**	31	Mitigate	installator team should has capability for reading the As-plan drawing
	28	Wrong label	Product activation is not working		2	1	1	4	1	4	2.65	**5.3**	33	Avoid	installator team should has capability for reading the As-plan drawing
Permit	**29**	Permit for locating ODC is not gainging approval from land owner	The location of ODC is changing Delay in schedule	vendor	4	2	1	4	1	4	2.37	**9.48**	19	Mitigate	Gaining neighborhood leader attention, satisfied community needs
Material delivery	**30**	The delivery of material does not meet the schedule	Delay	vendor	4	2	1	4	1	5	3.07	**12.28**	2	Mitigate	Review should be conducted as soon as possible and Resend standard of FO cable and its specification
	31	Data validation doesn't meet the technical data (the onsite data is different with the database)	Delay in migration	Owner	4	2	1	4	1	5	3.07	**12.28**	3	Avoid	Owner should make sure the given data is valid
	32	ODP that will be used for migration is full	Delay in migration	Owner	3	2	1	4	1	5	3.07	**9.21**	20	Mitigate	Vendor Should conduct survey more detail
	33	Application to activate the system is down	Delay in migration	Vendor	3	1	1	4	1	5	2.97	**8.91**	24	Mitigate	Regular maintenance and engineering on site always available
Commissioning test	**34**	Vendor do not bring equipment, data or tool while doing the commissioning test	Delay ini commissioning tes	Vendor	3	1	1	4	1	5	2.97	**8.91**	25	Mitigate	Vendor and owner should has cek list for commissioning tes requirement and owner should remind the vendor about commissioning test requirement tha sould be brought
	35	Vendor do not bring equipment, data or tool while doing the accpetance test	Delay ini acceptance test	Vendor	3	1	1	4	1	5	2.97	**8.91**	26	Mitigate	Vendor and owner should has cek list for commissioning tes requirement and owner should remind the vendor about commissioning test requirement tha sould be

Risk Category/	Risk number	Risk Event	Severity/ effect/loss	Risk Owner/	Score							expected value	risk rank	Risk Response	remarks
					Inherent Risk										
					probability	impact time	impact cost	impact quality	impact on S&S	Proximity	total impact				
															brought
	36	Delivereables do not match the desired plan (owner specification)	Rework until meet the owner spesfication	Vendor	3	2	5	4	1	5	3.77	**11.31**	9	Mitigate	Vendor shold know the owner specification before conduct the installation and vendor should always coordinate to the owner about the specification.

From Table 9, all the risk had been evaluated and ranked by its number of expected value. Expected value is gain by multiplying the probability and impact. Since the impacts are classified by time, quality, cost, proximity, safe and security, we must proceed the sum of the impacts by using the equation. The equation for calculating total impact is squareroot of total impact of times square, quality square, cost square, proximity suare, safe and security square, divided by number of used impact (Vargas, 2013). In this case the used impact is 5.

The distribution of risk impact is carried out to investigate the severity of the risk. in level very high (score 5) is mostly found in proximity impact. It means the effect of the risk will occur soon after the risk is happened. The risk response of this category should be avoided by asking corrective and preventive action. For those risk impact in high level are mostly found in quality impact. The risk response of this category should be avoided by asking corrective and preventive as well since it will be moment of the truth. Although these two category are not cost and time impact that will caused overudget and project completion, proximity and quality impact will be indirectly associated with project budget and scheduling also.

level	score	impact time	impact cost	impact quality	impact on S&S	Proximity
very high	5	0	2	0	0	27
high	4	0	0	29	0	6
medium	3	5	2	7	1	0
low	2	9	0	0	0	0
very low	1	22	32	0	35	3

Only few risk happen in medium to low level. However, the remaining risk (very low level) will be mostly found in cost impact and safe&security impact. In this level the effect of risk is minor to the project success and it can be neglected since it is easier to find the corrective solution and execution

Top ten expected value of the risk which indicate of the most importatnt risk among others is risk associated by survey process and digging soil. This risk will impact most of budget of the project, schedule, and quality.

Critical path used to evaluate the risk also. In critical path method, the longest path will be critical activity to the project. In this project the critical activites are survey, releasing official memo for survey, collecting the customer data, logic and physical configuration, order material, migration and activation, commissioning test and acceptance test. These findings tell us that almost all activites are critital that will increase the risk of the project including the delay, rework and low quality. Form qualitative risk assemment those categories are most relevant found in the critical activity.

VI. CONCLUSION

Risk assement are needed when the project will start. Qualitative risk assessment is applied when the project must start to work, limited time or tight schedule. However, the subjectivity in the assement can be minimized by using more comprehensive measurement. In this researched all qualitative data should be need translated in numerically by some scales. From the previoud study the risk are ranked by it number of probability and impact assement. The impact is only assessed by one single factor thus we suggest impact assement by Vargas (2013) to give more comprehensive impact assement. The impact of the project now will be grouped by time impact, cost impact, quality impact, safe and security impact, proximity impact and you can also put relevant impact to the project. on the other hand, risk can be proceeded to quantitative assessment using Monte Carlo simulation to give firm and strong result which not carried out in the research.

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