

RISK MANAGEMENT IN CONSTRUCTION SERVICE INDUSTRIES

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Abstract—The construction service industry is one of the most risk-prone industries and is facing very diverse and high-impact risks, but the conditions of the risks faced are not offset by a high profit margin. These various risks are also faced by the construction industry with the implementation of intuition risk management, individual considerations and experiences obtained from previous contracts. This is so that, on this basis, this study aims to obtain risk factors, the most dominant influencing project implementation construction, as well as risk mitigation efforts against dominant factors to minimize and even avoid the possibility of a dominant risk that is very influential. The assumption of research is that (1) the construction industry is an industry loaded with various risks so that the level of profits obtained is low, and (2) the risk of business competition is one of the most dominant risks faced by companies playing in the construction service industry sector.

Keywords—Risk management, risk, construction service industry, risk factors, risk mitigation

I. INTRODUCTION

The construction industry is one of the largest industries in the world. The increasingly competitive competition in the construction services industry in Indonesia has led to an increasing need for mechanisms for companies to ensure a strategic or operational target or goal for the company. New equipment that appears to come with the presence of a variety of sophisticated computer software further facilitates work in the construction field. However, the construction industry is also one of the industries with the highest risk level in the world, so that as sophisticated as the technology is it remains unable to minimize the risk that the construction service industry will not be faced with a risk of failure.

The construction service industry is one of the industries with a very diverse level of risk and high risk weighting, but the high and diverse risks are not offset by the high profit margins. The application of risk management must cover the entire life cycle of a project and therefore my research will attempt to examine a construction business to formulate a risk management model that is suitable for the construction business. The purpose of this study is to identify risks that allow the

construction service industry to face and then formulate a risk management model (mitigation action) that is suitable for the construction service industry.

II. LITERATURE REVIEW

One of the objectives of a construction service business is to make a profit. But in every construction service business activity two things will appear side by side. These two things are the opportunity to obtain profits and risks of suffering losses, both directly and indirectly. According to McIntyre, Gentges and Cranley (2013) the success of construction projects depends on the ability of the project manager to manage the risks that occur. Not a few construction service businesses that experience failure or loss. The failure or loss in construction services is largely due to inaccuracies in making decisions in handling risks. Ideally the decision is taken based on complete data and information, so that a high success rate can be expected. But in reality in the world of construction services most decisions must be taken quickly and without complete data and information. This creates uncertainty that is identical to the risk of its decision.

As a result of the 1998 economic crisis in Indonesia almost 90% of construction services businesses went bankrupt. The occurrence of the tsunami in Aceh in 2005 caused many ongoing construction projects to suffer destruction which resulted in losses. Likewise, the earthquake in the Yogyakarta area in 2006 resulted in considerable financial losses for the construction service business. Reinhard (2012) research in Yogyakarta concluded that the risk that has the highest impact is design risk, while the risk with the highest frequency is legal and regulatory risk. Azhari, Aulia, and Majid (2014) concluded that the top 10 identified critical risk factors in the implementation of infrastructure projects affected the performance of contractors in Aceh Jaya District. On the other hand, Norken, Astana, and Manuasri (2012) concluded that among the 71 identified risks there are 5 unacceptable risks and 43 risks which are not expected, 18 risks that can be accepted and 5 risks that can be ignored on construction projects in Jembrana Regency Government of Bali. The results of these studies are in line with Anderson's (2009) opinion that construction projects are always faced with various types of risk.

To avoid these risks a project manager must be able to manage risks so that they are not fatal to the achievement of project goals (Serpella, Ferrada, Howard, and Rubio, 2014). This means that the better the risk management, the smaller the risk that the construction service company will face. The risks that occur in a project can adversely affect the project's objectives, namely schedule, cost / budget and quality, as well as at the same time present as an obstacle in project implementation. Project risks associated with the budget often result in budget swelling, resulting in losses for contractors. While the project risks associated with the schedule result in delays in completing construction projects, this results in losses for contractors and project owners. On the other hand, project risks related to quality often result in construction failure, which results in losses for the contractor.

The risks in a construction project can befall all parties involved (Flanagan, 2012). The project owner (owner) can be hit by risks related to investment / finance, the contractor can be hit by construction risks, suppliers can be hit by material / component risks supplied, and the funding bank can be hit by the risk of bad credit. In order to minimize the adverse consequences that may arise, risks must be defined in the form of a reactive plan or procedure. According to Hopkinson (2011) risk management is an activity carried out to respond to known risks. The Project Management Institute (2012) formulates risk management including steps related to the implementation of risk management planning, identification, response, and monitoring and supervision of a project. All of these steps must always be updated throughout the project cycle. The purpose of risk management is to increase the likelihood of a positive impact of an event, and reduce the adverse impact of a project (ISO, ISO3100: 2009 (2009).

A. Types of Risk

In the context of a simple business, risk can be divided into two, namely business / speculative risk and risk that can be guaranteed / pure risk (Wena, 2015). Business risks are related to opportunities for profit and loss. Included in this type are bad weather, inflation, recession, consumer claims and the like. Speculative risk is a risk that if taken can provide two possibilities, namely loss / profit. At risk that can be guaranteed / pure risk there is only one possibility, namely loss. These types of risks are: (1) the risk of damage to property rights such as fire risk, (2) the risk of indirect losses, related to the protection of contractors from indirect losses, such as risks due to equipment removal / placement, removal of remaining building materials, (3) risk because there are legitimate obligations / laws, such as risks due to incorrect product design, design errors, failure to achieve project objectives, and (4) labor risks, such as workforce accidents, key workforce releases, and so on. In the scope of pure risk projects it can

potentially bring losses in an effort to achieve project goals (Suharto, 2001).

Project Management Institute (2012) categorizes risks into five, namely: (1) external risks cannot be predicted, such as government regulation, natural disasters, acts of God., vandalism, unexpected side effects, (2) predictable external risks such as costs finance, loan interest, availability of raw materials, market risk, environmental impact, social impact, changes in exchange rates, inflation, taxation, and so on. External risk is outside the control of the project manager, but affects the project, (3) internal / non-technical risks, such as labor strikes, fund flow problems, labor safety issues, health and profit plans, delays in schedule, termination of employment by workers, cash flow jams. Internal risk is under the control of the project manager, (4) technical risks such as technological changes, design changes, design issues, implementation and maintenance issues. These risks are related to the use of technology in projects, such as technological changes, operational and maintenance performance, changes and adjustments, (5) legal risks such as the use of licenses, patents, court cases, sub-contractor performance, contract failure, lawsuits, force majeure.

Soeharto (2001) classifies risks based on the potential sources of risk as follows: (1) risks related to the field of management, (2) risks related to the technical field and implementation, (3) risks related to the contract and legal fields, (4) risks related to economic, social and political situations. Whereas Mingus (2008) states that there are four general risks that exist in almost every type of project, namely: (1) technical risks such as technology not available / not running as it should, (2) financial risks such as reduced project budget, (3) HR risk, for example key members of the team leaving the project, and (4) politics, for example the project sponsor leaves the organization.

Based on the above explanation, it can be concluded that the risks in the construction project are of various kinds and can occur in all external, internal, and legal risk sources.

B. Management of Project Risk

Project Management Institute (2012) and Kerzners (2005) state that risk management is one of the important components of overall project management. To carry out effective and efficient risk management, appropriate strategies, knowledge and more experience are needed (Serpella, Ferrada, Howard, and Rubio, 2014). Without the right strategy, adequate knowledge and experience, a project manager will find it difficult to succeed in overcoming the risks that arise in project implementation.

According to Project Management Institute (2012) the risk management process includes six stages of activities, namely: (1) risk management planning, namely activities to determine how to approach, plan, and implement risk management activities on a project, (2) risk identification, namely risk-determining

activities which risks will affect the project and document the characteristics of risk, (3) qualitative analysis of risk, namely determining methods for prioritizing risks that might arise in jobs, (4) quantitative risk analysis, namely numerical analysis of the effect of risk on the objectives of the overall project, (5) risk response plan that is developing choices and actions to increase opportunities and reduce threats to project objectives, and (6) risk monitoring and monitoring, namely risk track identification activities, monitoring remaining risks (remaining risks), identify the new risks that arise, implement a risk response plan, and evaluate the effectiveness of the project cycle. These activities interact with each other and also with other activities in project management.

C. Risk

Risk planning is the first step in risk management activities. Careful and explicit planning will be able to increase the success of other processes in risk management (Anderson, 2009).

According to Project Management Institute (2012) the risk management plan contains several things, namely, (1) methodology, namely the stage of

determining approaches, tools and resources that may be used in implementing risk management in a project, (2) roles and responsibilities, namely determining rules, tools, supporting factors, and members of the management team for each activity and their roles and responsibilities, (3) budget, namely activities to determine the resources used and estimates of the budget needed to implement risk management, as input and cost measurement project, (4) time, that is, the activity of determining when and how often the risk management process is carried out during the project cycle, and setting a risk management activity schedule, (5) risk category, namely the activity of presenting an arrangement / structure to ensure that a comprehensive process of risk identification has been carried out consistently at the most detailed level. One approach used for the structure of risk is a risk breakdown structure, as illustrated in Figure 1, and (6) the determination of the likelihood and effect of risk, namely the process of quality and credibility of the qualitative risk analysis needed to determine the likelihood and impact of risks at different levels.

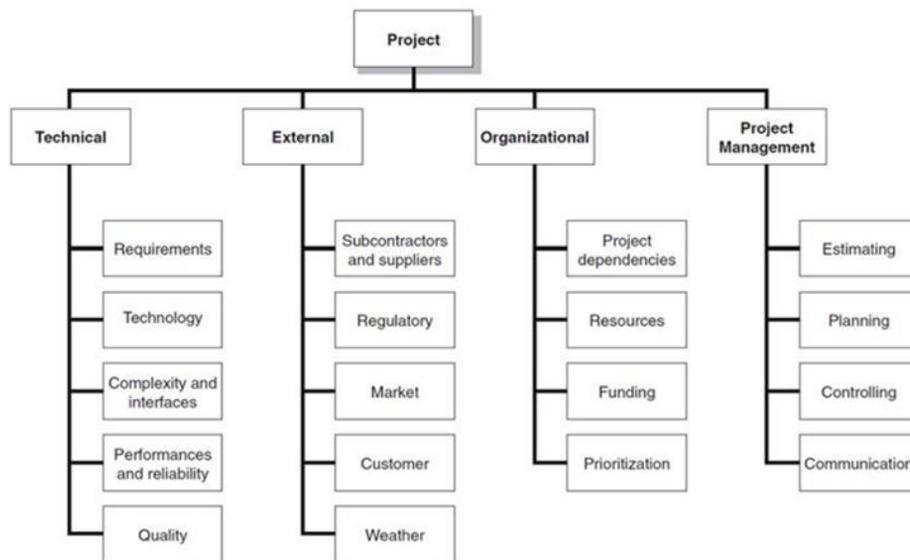


Figure 1. Risk Breakdown Structure (Project Management Institute, 2012)

D. Risk Identification

Risk identification is an activity to determine the types of risks that might affect the project and document the characteristics of the risks involved (Wang, Dulaimi, and Aguria, 2004). Teams that are members in identifying risks include project managers, project teams, risk management teams, experts from outside the project, customers, end-user products, stakeholders, and risk management experts. Risk identification is an iterative activity whereby new emerging risks will be identified in the ongoing project cycle. The results of the risk identification process are documents about the risk register. This list of risks generally includes several things, namely (1) a list of risk identification, namely a list that contains the root causes of risk and uncertain

project assumptions, (2) a list of potential responses, namely potential responses to risks that might be identified in the identification process risk, (3) root causes of risk, namely factors that cause risk, and (4) renewed risk categories.

If the risks arising from an activity have been identified, then actions are taken to reduce the risks that arise. This action is called risk mitigation. Risk mitigation that can be done in risk management includes risk retention, which is an action to accept / withhold risk because the impact of an adverse event is still acceptable. If possible, the impact of the incident can be reduced by carrying out risk reduction, although with this action there may be residual risk that needs to be assessed again. Or it can also transfer risk to third

parties, for example to insurance at a certain cost. While the last action that can be taken in risk mitigation is to avoid the risk itself, if the impact of the risk is not acceptable (Flanagan, 2012).

E. Qualitative Risk Analysis

Qualitative risk analysis is the activity of determining methods for prioritizing in order to identify risks that might arise in subsequent actions. An organization can improve performance by paying more attention to high risk priorities. Qualitative risk analysis assesses the priority of risk identification with the possibilities that occur and the impacts on project objectives (Sadaba, Ezcurdia, Lazcano and Villanueva, 2014).

The results of qualitative risk analysis activities are in the form of an updated risk list, which includes: (1) relative ranking or priority list of project risks, (2) categories of risk groups, (3) list of risk responses that are immediately demanded / needed (4) list of risks for additional analysis and responses, (5) list of risk observations that have low priority, and (6) results of trends in qualitative risk analysis

F. Quantitative Risk Analysis

Quantitative risk analysis is carried out on risks that have been prioritized in the qualitative risk analysis process, which greatly impacts the project objectives. Quantitative risk analysis is the process of analyzing the impact of risk and making a numerical rating / rating on existing risks. Quantitative risk analysis activities can be carried out using Monte Carlo simulation techniques and decision tree analysis. This activity aims to, (1) assess the possibility of achieving specific project objectives, (2) identify risks that need to be considered, (3) identify realistically costs, schedules, scope that can be achieved, (4) determine the best decisions from project management if unexpected results occur.

The results of quantitative risk analysis are updated risk lists, which contain components: (1) analysis of possible projects, (2) possible achievement of time and budget targets, (3) list of priority risks that have been quantified, and (4) results the results of quantitative risk trend analysis. According to Anderson (2009) risk analysis carried out systematically can help to: (1) identify, assess and rank risks clearly, (2) focus on risk (3) clarify decisions about limits of losses, (4) minimize potential damage if the worst situation arises, (5) control aspects of uncertainty, and (6) clarify and emphasize the role of each person / body involved in risk management.

G. Risk Response Planning

Risk response planning is an activity to develop choices and determine actions to increase profit opportunities and reduce the threat of loss to project objectives (Wena, 2015). The results of this stage are in the form of an updated risk register that has the following components: (1) identification of risks and descriptions, the scope of the project affected, the causes and how those risks affect the project objectives, (2) risk owners and those responsible for resolving, (3)

results of qualitative and quantitative risk analysis processes including priority list of project risks and analysis of project possibilities, (4) planning of agreed responses, (5) budget activities and schedules needed to implement selected response plans, (6) uncertainty of plan reserves of time and budget provided for stakeholder risk tolerance, (7) uncertainty of plans and triggers requested in their implementation, (8) backward planning (feedback), used as a reaction to the risks that occur, (9) remaining risks, namely risks that might appear after a response plan, (10) the second risk that appears is a direct result of risk response activities, (11) unexpected reserves as the basis for calculations in qualitative analysis of project and organizational thresholds.

H. Risk Monitoring and Monitoring

Monitoring and monitoring of risk is also related to the selection of alternative strategies, implementing unexpected plans or backtracking, taking corrective actions and modifying project plans (Perera and Holsomback, 2005). The risk response person in charge reports periodically to the project manager about the effectiveness of the plan, unanticipated influences and some corrective actions needed to handle the risk. The expected results of the risk monitoring and monitoring process are in the form of (1) an updated risk register, which contains, (a) the results of risk reevaluation, periodic risk audits and risk reviews, and (b) tangible results of project risks and responses against risk, which can help project managers to plan risks in the entire organization, and also for future projects, (2) request for change, (3) recommendations for corrective actions, (4) recommendations for preventive measures, (5) process of renewed organizational assets and (6) updated project management plans.

III.METHODS

The method used in this literature review is a descriptive method carried out by reviewing scientific articles on evaluating the involvement of risk management in the construction service industry. The article contains the keywords "risk management" and "construction service industry". Articles used by the author are taken from various sources.

IV.RESULTS AND DISCUSSION

Each construction service business activity will always emerge two things side by side, namely the opportunity to obtain profits and risks of suffering losses, both directly and indirectly. Not a few construction service businesses that experience failure or loss. Most of the failures or losses in construction services are caused by inaccurate decision making in handling risks.

In order to avoid these risks a project manager must be able to manage risks so that they are not fatal to the achievement of the project objectives. This means that the better the risk management, the smaller the risk that the construction service company will face. The risks

that occur in a project can adversely affect the project's objectives, namely schedule, cost / budget and quality, as well as at the same time an obstacle in project implementation. Project risks related to the budget often result in budget budgets, resulting in losses for contractors. The project risks associated with the schedule result in delays in completing construction projects, this results in losses for contractors and project owners.

In order to minimize the adverse consequences that may arise, the parties related to the construction project must view risk management as an integral part of overall project management. Risk management includes steps related to the implementation of risk management planning, identification, response, and monitoring and supervision of a project. All of these steps must always be updated throughout the project cycle. The aim of risk management is to increase the likelihood of a positive impact of an event, and reduce the adverse impact of a project.

Risk management activities include six stages of activity, namely, (1) risk management planning is an activity to determine the approach, planning, and implementation of risk management activities on a project, (2) risk identification is an activity to determine which risks will affect the project and documentation of risk characteristics, (3) qualitative risk analysis are methods for prioritizing risks that might arise in jobs, (4) quantitative risk analysis is a numerical analysis of the effect of risk on the overall project objectives, (5) a risk response plan is the development of choices and actions to increase opportunities and reduce negative impacts on project objectives, and (6) risk monitoring and monitoring is an effort to identify risk trajectories, monitor remaining risks, identify emerging risks, implement response plans risk, and evaluate the effectiveness of the project cycle.

V. CONCLUSION

Risk management in the business of construction services companies and construction projects must be part of a cultural organization. This will enable development and implementation and become a standard for project planning and implementation. An important part of this is to produce effective knowledge management to have a system, which can make lessons stay learned so that they can be disseminated and reused in future projects. Having the right communication channels between construction service companies for risk management is also very important, as is training on this topic. Based on the results of a literature review of some of the results of previous scientific research, the realization of this study has observed that a lack of knowledge about risk management in the domestic construction services company industry is expected to change after the research findings spread to the community construction services company. Also, companies will realize that an evaluation system will help them to identify gaps in risk management

performance and utilize the best practices available for improvement. This information is intended to support companies to remain constant in assessing the maturity level of their risk management and to implement activities that will help them reach the level of maturity they want to achieve.

Much remains to be done in this field, which is becoming increasingly important for the performance and success of construction service companies, especially where the consequences of risk are very relevant.

ACKNOWLEDGMENT

Thank you for USU and WASKITA KARYA for support in this research.

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