The Integration of Value Engineering and Risk Management in Strategic Alliance Public Private Partnership

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The Integration of Value Engineering and Risk Management in Strategic Alliance Public Private Partnership

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Abstract

Indonesia has just entered the second mid-term development planning 2010-2014. Economy is projected to grow from 5.5 percent in 2010 to 7.7 percent in 2014. A continued push for the development of infrastructure is therefore crucial to support the economic growth and to sustain it during the next five years and beyond. It is widely agreed that only efficient, effective, reliable, and stable infrastructure system and networks that can sustain Indonesia's rapid growth and increase its competitiveness in an increasingly global environment. Government spending on infrastructure has recently increased significantly. But efficiency and effectiveness of the expenditures are still low. To improve efficiency and effectiveness, government has been seeking private investors to build infrastructure through public-private partnership but so far has not been very successful. Since public spending for infrastructure tends to increase in the near future, it is necessary for Indonesia to find ways to improve the efficiency and effectiveness of its infrastructure project development and financing. Efficiency of both government expenditures and private investment are believed to be improved when risk assessment can be assessed simultaneously with the creation of value management.

This paper reviews studies and practical experiences about the integration of value engineering and risk management in Indonesia's infrastructure development and financing through public-private partnership. The main principles of the integration are then hypothetically applied to Selat Sunda Bridge project, a large scale forthcoming long-span bridge project connecting Jawa and Sumatera islands. It is also assumed that given the nature of the project, SSB would apply a strategis alliance type of PPP scheme which can simplify the integration process. The result of this research is intended to be contributing to the body of knowledge in both PPP and Value Management fields and in the best practice of modern project management where private involvement matters.

Keywords: Strategic alliance, public-private partnership, project financing, risk management, value creation

1. Introduction

Under the current administration, Indonesia is now stepping in the first year of its second mid-term development planning, 2010-2014. Economy was projected to grow steadily from 5.5 percent in 2010 to more than 7.0 percent in 2014. Total investment needed for making the growth possible is in the magnitude of around US$ 1.1 trillion for the next five year. A continued push for the development of infrastructure is therefore crucial to support the economic growth and to sustain it during the next five years and beyond. It has also been predicted that Indonesia will need about US$ 130-150 billion for infrastructure investment for both rehabilitating the existing inadequate infrastructure and building new facilities in the next five years to come. For Indonesia to reach a 6 to 8 percent medium-term economic growth target, additional infrastructure investments of 2-3 percent of its GDP per year are required from the current level of 3-4 percent of GDP. Government recognized the clear impediments to infrastructure growth and laid out a three- pronged approach designed to tackle these issues comprehensively:

- First, the Government is focused on sector reform to ensure a continually larger portion of infrastructure services are commercially viable and allow sustainable private sector participation in infrastructure investment and provision.
- Second, the Government will focus its own resources increasingly on sectors which are not commercially that can help the poor and remote communities.
- Third, over the medium-term, the Government will

enact programs to support greater private sector involvement in infrastructure investment and provision through creating and maintaining public-private partnerships (PPP) in infrastructure service and by removing all bureaucratic bottlenecks which currently inhibit private sector involvement.

2. PPP in Indonesia Infrastructure

2.1. The Background

The huge investment in infrastructure needed over the next five years and beyond represents an enormous challenge for Indonesia. Increasing PPP in infrastructure provision is therefore urgently necessary as state budget had been and would always be insufficient. On the other hand, private sectors have access to financial resources, new technology, and management skills that can lead to greater efficiency and effectiveness of infrastructure provision. Actually, PPP in infrastructure is not a new concept for Indonesia as it had been applied in several power and toll road projects in the early 1990s. The political circumstances evolved very recently have also indicated that it is not the issue of whether the public or private sector that should provide the infrastructure services but more to the issue of how the government with the participation of private sector could accelerate the provision of infrastructure services in an efficient and effective manner. The answers to this question involve economic and political choices that depend on the relative efficiency of public services in the country, on the potential availability of capital, on the social consensus about acceptable ways of delivering certain services, and last but not least on the willingness of the bureaucracy to change their attitudes. The public and social acceptability and strong political support of such partnerships is very often a key factor to the success of the undertakings.

Table 1. Indonesia PPP Projects by Sector (US$ million)

Sector	Ready to Offer	Priority	Potential	Total
Land Transport	-	-	274	274
Ports	36	-	2,859	2,895
Airports	-	-	1,558	1,558
Railway	-	-	9,547	9,547
Toll Roads	-	7,592	19,261	26,853
Water Supply	-	522	1,328	1,850
Solid Waste and Sanitation	-	220	57	277
Power	-	-	4,045	4,045
Total	36	8,334	38,929	47,299

Source: PPP Book Bappenas, March 2010.

2.2. Recent Development

On March 3, 2009, Bappenas issued Minister Regulation Number 3/2009 on the procedure of PPP project planning and determination, categorized into potential projects, priority projects, and projects that are ready to be offered to private investors. The so-called Bappenas' PPP Book was first launched on March 15, 2009 containing 87 projects with an estimated total investment of US$ 34.2 billion. The book was revised in early 2010, now with 100 projects and total investment of US$ 47.3 billion. Table 1 summarized the projects listed in the 2010 PPP Book. Toll roads is by far the largest investment with US$ 26.8 billion followed by railway with total investment of US$ 9.5 billion and power plants with US$ 4.05 billion. Listed also in the category of potential projects is the Sunda Strait Long Span Bridge with 29 km length and with an estimated cost of US$ 11 billion. Indonesia is now working hard to finalize all the necessary policy and regulatory frameworks to smoothing out PPP for all aforementioned large-scale infrastructure projects. Preparation to embark on the PPP undertakings includes the establishment of Land Acquisition, Guarantee, and Investment Funds under the auspices of Ministry of Finance in which around US$ 500 million has been allocated from state budget to the funds as seed capital. Although the majority of the projects are potential in nature but the list has shown government strong will to go ahead with PPP projects.

2.3. Basic Features of Indonesia's PPP

PPPs are contractual arrangements between the public sector and private entities company for the delivery of infrastructure services and are seen as a way of raising additional funds for infrastructure investment but more importantly as a means to extend or leverage better budget funding through efficiency gains (Delmon, 2009). PPPs are complex structures, involving different parties, long and demanding negotiations and relatively high transaction costs. PPPs invariably involve government at the planning, construction and operating stages. It is the responsibility of the government to ensure that the new facility will fit in with existing systems or networks.

But PPPs are much more complex than originally thought and requires a level of sophistication on the part of government that takes time to develop. The responsibility on the government to guide the process is even greater than when infrastructure provision was almost exclusively public. This is because adding a private component to any infrastructure network opens up a whole new range of complicated management, design and contractual issues.

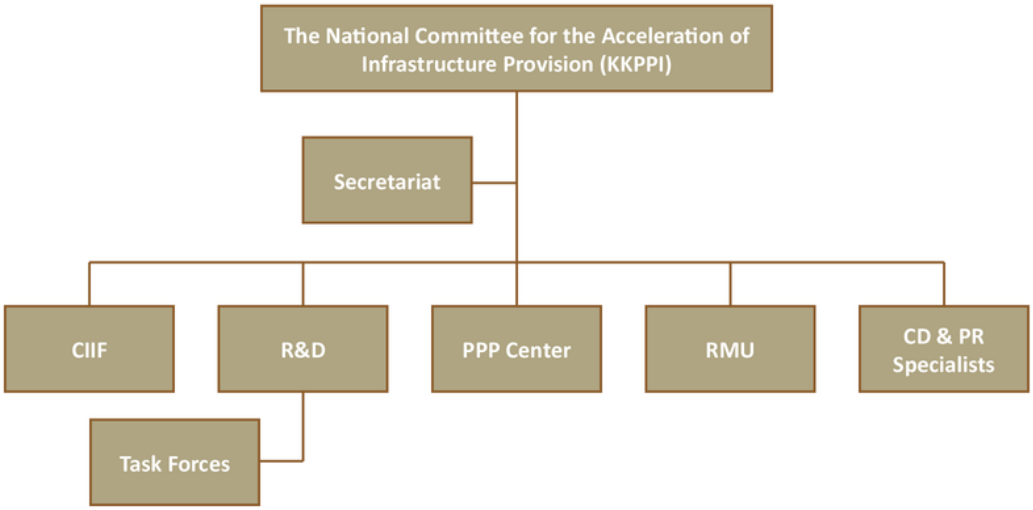

Figure 1. The Infrastructure Committee

Indonesia's PPP is administered by a national committee for the acceleration of infrastructure provision by means of private sector participation. Figure 1 shows the organization of the committee with its supporting units (public relation, R&D, forum, risk management unit, and PPP Center). This inter-ministerial coordinating committee is chaired by Coordinating Minister for Economic Affairs with related infrastructure ministers as the members and established by a presidential decree in 2001. In May 2005, the decree was renewed by a presidential regulation. The Committee was tasked with two main portfolios: (1) enhancing private sector investment (PPP) and (2) improving the policy and strategy of public service obligation (PSO). The Committee's main functions include coordination and decision making process of infrastructure policy, planning, and investment, including finding solution for various problems related with the acceleration of infrastructure development. Line ministries, however, will stay responsible for sector policy, project preparation, procurement, and transaction. Indonesia, however, has no PPP Law and the governing regulation is only a Presidential Regulation (PR No. 67/2005 and later revised by PR No. 13/2010). The PR regulates all the principles and procedures for public-private partnership for infrastructure projects from the preparation until the transaction.

2.4. Risk Management in Indonesia's PPP

Risks and uncertainties are a pervasive aspect of project management and public-private partnership scheme. In general terms, risk can be defined as uncertainty in regard to cost, loss, or damage (Hoffman, 2001). In project management term, risk could also be looked at as an uncertain event or set of circumstances that could have an effect on the achievement on the project's objectives (Chapman and Ward, 2002,2003). In PPP terms, risk relates to uncertain outcomes which have a direct effect either on the provision of the services or the financial viability of the project. In either case, the result is a loss or cost which has to be borne by some parties (Yescombe, 2007). Risk management, therefore, can be defined as a systematic process of identifying, analyzing and responding to project risk, including maximizing the probability and consequences of positive events and minimizing the probability and consequences of negative events to the project objectives. The objectives of risk management is to ensure that risks are identified at project inception, their potential impacts allowed for and where possible the risks or their impacts minimized and to improve project performance via systematic identification, appraisal and management of project related risk (Ward, et.al., 1997). In other word, the aim of risk management is not to eliminate risk but to control it. Risk management ensures that risks are identified, reviewed, and mitigated accordingly and key stakeholders are made aware of the risks prior to any decision making process.

As a systematic process, there are many models used to manage the risks. The standard model is divided into four parts, namely risk identification, risk analysis, risk response, and risk monitoring and review. Meanwhile Baker et al (1999) developed a methodology encompasses 5 staged: identification, analysis, evaluation, response, and

monitoring. Successful risk management reduces the uncertainty in achieving a successful outcome to acceptable and manageable levels. A formal risk management process delivers the following benefits for the project team (Dallas, 2006):

- It enables management to embark on innovative, high reward projects in the knowledge that they can control the risks.
- It requires that the management infrastructure is in place to deliver successful outcomes. This includes setting clear, realistic and achievable project objectives from the outset.
- It established the risk profile of the project, enabling the appropriate allocation of risk, so that the party best placed to manage it has the responsibility for doing so. Risk allocation is a key component of contract documentation.
- It allows the team to manage risk effectively, concentrate resources on the things that really matter, resulting in risk reduction as the project proceeds.
- It also enables them to capitalize on opportunities revealed through use of the process. On infrastructure project, risk can have a positive impact upon project performance.

In Indonesia, risk analysis for private infrastructure projects is officially performed by Risk Management Unit (RMU), a unit under the Ministry of Finance (MOF), but works also under the Committee through the PPP Center. RMU is formed by MOF Decree in 2005. The Committee is to evaluate and determine whether specific infrastructure transactions qualify for public money support or any other non-financial supports. Together with the Committee, RMU works on different government support schemes and risk sharing to be provided. Government support and risk sharing arrangements will be finally decided by Minister of Finance based on the assessment and recommendation made by the Committee. In general, government will stay responsible for basic, non-financially viable infrastructure projects. For projects that are financially viable, private investors will be the main actors for financing with a possibility for government to provide a government support. Thus far, only three risks are covered by the decree: (i) political risk; (ii) project performance risk, and (iii) demand risk. Government has moved forward to enhance the Unit by establishing Indonesia Guarantee Fund (IGF) to take care risks arise from infrastructure projects with PPP and to formulate risk sharing arrangement which is appropriate according to the best practice of PPP contracts. Figure 2 depicts the government support scheme in which for any financially viable project, three funds would be made available: land fund in the preparation stage, guarantee fund in the bidding and construction stage, and investment fund in the operation stage. While Land Fund is tentatively managed by a special public service unit in an executing agency, Guarantee and Investment Funds have been established as a commercial legal entities under the supervision of Ministry of Finance.

2.5. *Value Engineering in PPP*

Value Engineering (VE) is the systematic review of a project, product, or process to improve performance, quality, and/or life-cycle cost by an independent multi-

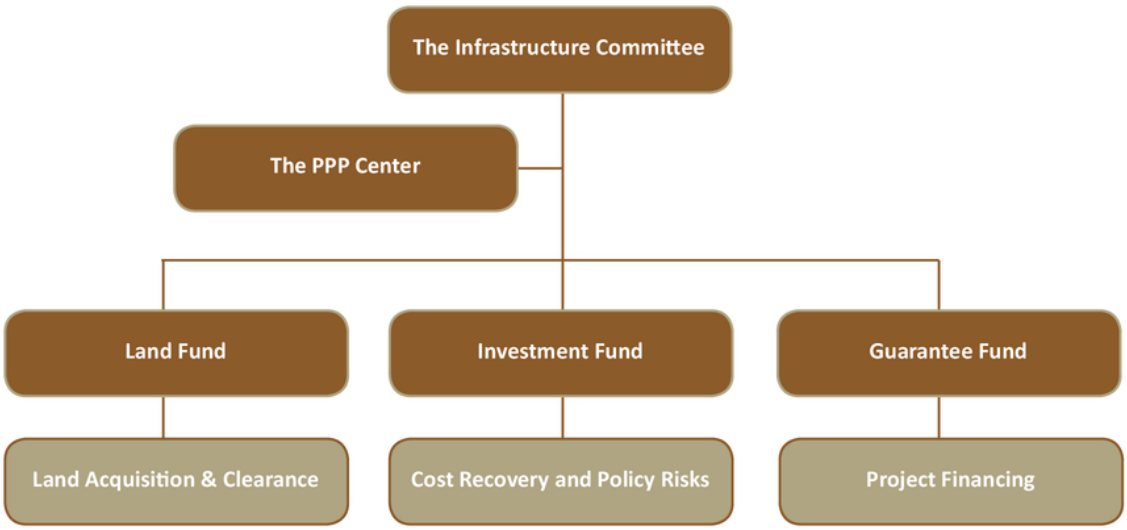

Figure 2. Government Support Scheme

disciplinary team of specialists. The VE process, referred to as the Job Plan, defines a sequence of activities that are undertaken during a VE study, before, dur¬ing, and following a workshop. During the VE workshop, the VE team learns about the background issues, defines and clas¬sifies the project (or product or process) functions, identifies creative approaches to provide the functions, and then evalu¬ates, develops, and presents the VE proposals to key decision makers. It is the focus on the functions that the project, prod¬uct, or process must perform that sets VE apart from other quality-improvement or cost-reduction approaches. VE had been widely implemented in infrastructure projects, especially for large scale projects financed by public sector money (Bytheway and Charles,1971; Palmer et all,1996; Weatherhead and Grifin, 2006; Woodhead & Berawi, 2008).

Value engineering can be utilized as an appropriate strategy to enhance project implementation and to ensure the project satisfies its need and purpose in an effective and efficient manner (Hays, 2006; Berawi and Woodhead, 2005a; Berawi & Woodhead, 2005b). VE may occur during the project's design, bidding process, or execution phase. Each of the design, bid and execution phase of the project presents opportunities for the owner to benefit from VE activities. Generally VE is applied when there is a well defined scheme in order to optimize costs and benefits. VE has a rather long history to be improved, combined and used together with several other methods. Syverson (1992) and Berawi (2004) have combined VE with Quality Management to convert customer expectations into quantified technical design characteristics and development of the product plan. Noda and Tanaka (1997) have seen VE as an essential technique to Target Cost Management (TCM) while Al-Yousefi and Hayden (1995) have combined VE with TQM.

3. The Previous Integration Studies

There have been a number of studies looking at the integration between value management (VM), including value engineering, with risk management (RM) in project management discipline. In 1997, Dell'Isola, identified that the integration had probably began in 1993 when a city-port authority required a value engineering effort that would be augmented with an application of a risk assessment. Hilley and Paliokostas (2001) asserted the fact that VM and RM are two well-established disciplines and both are recognized as a part of best practice and that the links between them are strong. If risk is nicely managed it is possible to achieve a cost saving and an enhancement in value. Norton & McElligott (1995) suggested that VE could enhance risk management process. This is because risk management is oftenly perceived as a negative process and its combination with value management approach would generate positive atmosphere to mitigate risks. Meanwhile, Paliokostas (2000) indicated that VM and RM appear to be so compatible and complementary that continuing to use them separately could mean waste of time and resources.

The VM and RM integration had been supported by some further studies. In 2003, the Office of Government Commerce (OGC) of UK asserted that VM and RM are interrelated concepts that should be carried out in parallel in preparing project management activitiy. According to OGC, the application of VM will help client to identify the best way of meeting business need while RM is used to manage the risks associated with the solution that offers the best whole-life value to the business and should not be seen as barrier to innovation. The OGC proposed that VM exercises are carried out first to determine what exactly constitutes value to the business from the delivery of a project. After that, the likely risks to occur to the preferred option are identified. This exercise will be repeated to all options in defining value and associated risks until they arrive at optimum balance of value and risk. The concept of integration, according to Weatherhead, (2006) and Griffin (2006), has been widely accepted as best practice tools for effective management of projects. Later, Abd Karim et.al., (2007) asserted that combining risk and value in project management is an observable fact driven by a desire to minimize the time taken to act and to produce results with optimum performance and quality.

The main idea for integrating VM and RM is to optimize the value of a project. Othman (2004) supported the idea of integration of VM and RM as two complimentary disciplines, saying that best value could not be achieved unless associated risks have been managed. The idea emerges from the facts that there will be rather meaningless to optimize the value of a project if significant risks prevail and impair its delivery, thereby destroying the value (Dallas 2006). Strong rationales behind the need for integration of VM and RM were provided by Connaughton and Green (1996), Paliokostas (2000), Smith et. al. (2006), and Thompson (2004). They have in principles agreed the following reasons for the integration: (1) avoidance of duplicating efforts by using the same resources and multi-disciplinary team; (2) involvement of stakeholders in the value management process; (3) providing a nice way of introducing VM and RM into an organization; (4) maintain and improve future appraisals and assessment of projects; (5) influences the VM

proceeds in this case-option appraisal, by allowing the users to consider specific options used in the past similar projects; (6) makes them aware of their weaknesses and strengths; (7) shortening the time taken to develop viable solutions based on the risks facing a project; (8) identifies specific risk allocation structures in association to contract strategies; and (9) provides in-depth assessment process.

4. The Integration Process

There are four advantages in integrating value and risk management practices (Weatherhead, et.al. (2005):

- Integration enables value and risk issues to be considered together. From the very beginning of the project a full picture is available to help decision-makers develop an understanding of opportunities and uncertainties.
- Integration is more efficient, not only from the depth and quality of the discussion process, but also because fewer workshops and meetings are required.
- The use of this integrated discourages the use of ambigious and inconsistent language and so promote a common team understanding and coordinated effort to realize the client's objectives. This should reduce the levels of confusion in the industry and make it easier for facilitators and others to work within project team.
- Any value management, value analysis, value engineering or risk management tool or other relevant business management tool can be incorporated where, and whenever desired.

The fact that risk and VE are interrelated tasks that should be carried out in parallel and cannot be segregated from large infrastructure investment project was highlighted by Berends and Long (2007). The use of risk management and value management is instrumental to the successful delivery of construction project on time within the budget. Haghnegahdar and Ashgarizadeh (2008) pointed out the fact that more than 75 percent of many infrastructure projects are not accomplished in accordance with the apportioned expenses and schedules. One of the major reasons of this failure is risky eventualities and occurrences in projects. Like in many other parts of the world, Indonesian infrastructure projects are still struggling with inefficiency and ineffectiveness due to the lack of obedience, incomplete, and inaccurate analysis leading to inefficiency and ineffectiveness of budget spending in the infrastructure projects of public works (Latief and Untoro, 2009). Long before that, Alwi et. al. (2002) had identified the problems of inefficiency and ineffectiveness of Indonesia's construction industry as caused by delayed schedule and cost overrun.

Indonesia is now embarking on a rather massive development of its economic infrastructure. Efforts to increase project performance and outcomes would certainly be demanded accordingly. As infrastructure plays an important role in economic growth, Indonesia would have to pursue new ways to significantly improve the performance of its infrastructure projects. Value management combined with risk management in PPP projects are perceived to be a legitimate option to this demand. There are two substantial conditions for the success of a project; first is contractor's capability to require expected value by project owner with initial agreed cost of the contract, and second is the effort of minimizing the impact of unavoidable risk and possible project loss (Ventakaraman and Pinto (2008). First condition can be fulfilled by value engineering (VE) which provides effective ways to maximization value in certain project according to owner expectation. Whereas the second condition is overcome by implementing risk management contributed to effective process in order to control the risk of a project.

The combination of value engineering and risk management within integration process is an excellent strategy, able to maximize the project value and reduce uncertainty. Should value engineering and risk management procedures be integrated during the project developments, compilation and recognition, one can gain mastery over the project's worth in a series of consecutive operations by means of several workshops to define, analyze, and control the pertinent values (Terry 2004). Griffin (2006) argues that the issue is no longer about whether they should be used but whether the processes should be integrated. The application of VE will help client to identify the best way of meeting business need while RM is used to manage the risks associated with the solution that offers the best whole-life value to the business and that way should not be seen as barrier to innovation (The OGC, UK 2003).

5. The Sunda Strait Bridge

5.1. Strategic Alliance Type of PPP

The concept of the integrated VM and RM is hypothetically applied to the forthcoming Sunda Strait Bridge (SSB) project. This long span bridge connecting Jawa and Sumatera islands in Indonesia (Figure 3), is listed in Bappenas' PPP 2010 Book with an estimated total cost of about US$ 11 billion. With 29 km total length, in which

the longest span is 2.3 km, SSB would probably be the longest bridge in the world when it completely built 10-15 years from now. A presidential decree has been issued to officially commence the project by establishing a national coordination team headed by Coordinating Minister for Economic Affairs. The project had been initiated almost 25 years ago but still in preliminary study stage. It re-emerged recently by the pre-feasibility study conducted by two provincial governments at the end of the islands, supported by a private company as the sponsor. The history of the project generates a debate whether this project is solicited or unsolicited. Apart from the controversy, SSB would emerge as the largest PPP project ever built in Indonesia with the skeleton of its project financing illustrated in Figure 4. The sponsors would presumably be the government of Indonesia, the provincial governments of Banten of Jawa and Lampung of Sumatera, and other domestic entities. The sponsors would have to provide equity financing of 30 percent of the total cost. The sources of financing would be the state and provincial budgets, government bonds, international lending agencies, and investors. The lenders - which presumably are consortium of creditors-presumably bilateral and multilateral lending agencies, syndicate of international commercial banks, syndicate of China's bank, Middle East financial institutions, and others- would have to provide debt financing of 70 percent of total project cost.

Figure 3. Location of SSB Project

A strategic alliances type of PPP (SA-PPP) is hypothetically applied to SSB project, presumably for eliminating the controversy of solicited-unsolicited issue. In this strategic alliances of PPP, both government as the original sponsors and the investors, the initiator of the project, would need to form a strategic alliance as a consolidated, hybrid organization to conduct all the preparation works of the SSB project. In this scheme, unsolicited issue is no longer relevant as both government and project creators merge into the alliance. It is assumed that this type of PPP configuration would ease the implementation of VM-RM integrated approach during the course of the project preparation, construction, and operation. This is going to be a long range project management undertaking as a 10-15 years time span would be anticipated for the completion of the project. No empirical evidence has so far been emerged in this kind of project and its is realized that this idea still in the infant stage of implementation.

SSB project is a complicated undertaking, involving a large amount of parties, working together in an orchestrated work under the direction and supervision of the SA-PPP and executed by the SPV-SSB Newco. Complexity creates conflicts, uncertainties, and project risks all the way from financing down to construction risks. The room for risk management, as well as value management processes is large and mandatory. It is assumed that for this large-scale and complex infrastructure project, the process of VM-RM integration constitutes an important and coherent process, embedded within the course of project management from preparation until the operation.

5.2. The VM-RM Integration

The concept and process of VM-RM integration have not been widely used in PPP projects, at least not in Indonesia normal practice of PPP undertakings. While PPP is usually involving risk analysis in its preparation, it is, however, rarely involving value engineering (VE) as an integral part of the process. It is interesting, therefore, to see whether the application of value engineering and risk management could lead to a more efficient and effective project preparation and development for a large-scale infrastructure PPP project such as SSB.

Researchers have suggested the implementation of VM-RM integration, presumably for all stages of project development. In SSB project, this task would be carried

Figure 4. Strategic Alliances PPP Scheme

out by SA-PPP in the early stage of development and by SA-PPP and the SPV-SSB Newco in the later stage. It is noted that both equity and debt financing would have to demand a credible and legitimate risk analysis to take place.This risk analysis would have to be clearly stated and incorporated in the full-scale feasibility study of the project.

5.3. The Interfacing

SSB project is not a stand-alone project. It has to be closely linked with regional economic development in the two poles of the bridge as well as all supporting infrastructure projects and access facilties supporting the smooth economic movement between the two islands. Both risks and value creation could emerge from this circumstances. Figure 5 shows how the mechanic of the interfacing occurs. The SA-PPP of the SSB project will have to conduct preliminary studies for both RM and VM of the project, taking into account all possible risks and value creation that could emerge from the project by looking at the necessary aspects and spectrum of the SSB and regional development projects. The number and type of risks of SSB projects is predicted to be large and vary. Since the preparation works and construction of the project would probably need to take some 10-15 years and the investment costs are huge, it is very critical from early on to identify risks associated with uncertainties of regulation, security, and political umbrella of the project. These political risks are to be assessed and measures to mitigate risks are to be found and negotiated immediately. This process is expected to be finalized within the SA-PPP and later to be negotiated with the government. So far the process could provide all information necessary to the process of value management and the value creation in terms of positive functions that can generate value added to the project. Risks are expected to emerge as the construction begins all the way down to the operation. Risk management process continues with analysis and calculation of its associated exposures according to each of the value added. The interfacing would end up with strategies for both risk mitigation and value creation and alternative function added to the characteristics and performance of the project.

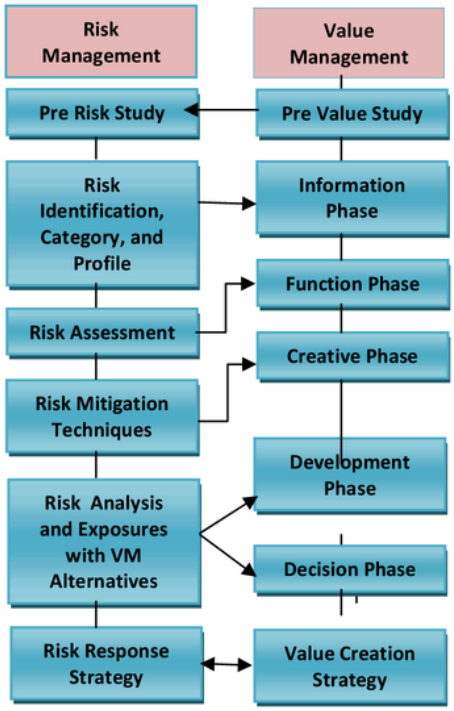

Figure 5. Risk and Value Management Interface.

Source: Adopted from Mootanah, 1998.

6. CONCLUSION

This paper reviews the concept of integrating value and risk management that have been practiced in other countries, borrows, and hypothetically adopted it to forthcoming Sunda Strait Bridge project, a large-scale Indonesia PPP project. The integration between RM and VM, if planned and implemented nicely, is believed to be providing a positive impact on the performance of project management process. PPP always involving risk management from preparation to construction and operation stages. The larger the project the bigger the benefit to project performance. Although it seems practically possible to achieve much greater performance to project management undertaking, especially in big project, the integration, however, has never been implemented in Indonesia PPP project.

The application of the RM-VM integration concept to SSB project is still in academic thinking. But Indonesia has indicated the project will be undertaken with strategic alliance type of PPP. This will pave the way for the implementation of the concept easily since both government and private investors will work very closely to investigate risks and value generated by the project. Combination of both within one integration process is a good strategy to maximize value of a project and in the same time could reduce risk exposure. This in turn would lead to a greater efficiency of project management. The SSB project is to start soon with all the preparation works, including the conduct of full-scale feasibility study. The idea laid out in this paper could inspire further research in the integration of risk and value management for Indonesia infrastructure projects. The SSB project provides big opportunity to conduct research based on real data and management process. It is the room for next research.

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