Application of Value Engineering at Public Private Partnership Project to Improve Quality of Feasibility Study (Case Study: Airport Railway in Indonesia)

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Application of Value Engineering at Public Private Partnership Project to Improve Quality of Feasibility Study (Case Study: Airport Railway in Indonesia)

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Abstract: Private Public Partnership (PPP) plays an important role on the infrastructure development, particularly for developing countries. The basic concept of PPP projects is to achieve value for money (VFM) and clear risk sharing between government and VFM analysis is expected to be carried out at early stage to determine the financial feasibility and risk sharing on infrastructure projects. The PPP regulation in Indonesia is addressed by Presidential Regulation (Perpres) No. 13/2010 governing Public-Private-Partnership in infrastructure procurement to encourage investor private sector to participate in financing infrastructure projects in order to overcome limited budget of the government. However, there are also some failures that impact the projects offered don't meet investor's interests because a lack of feasibility study of the project offered.

This research is proposed to improve the quality of the feasibility study phase of a project infrastructure by implementing the value engineering in Public Private Partnership investment process in Indonesia. Value engineering is a methodology that has been widely applied in many countries to provide added value and to enhance maximum result for both project and product development in terms of improvement on quality, technology, efficiency and innovation.

The research methodology is conducted by a combination of qualitative and quantitative approaches through questionnaire surveys both online and offline, action research and focus group discussions. A model for applying VE on PPP process is proposed, meanwhile results and discussions from the questionnaire survey including internal and external risk identification that may affect project performance, identification of additional functions for innovation and key success factors of Public Private Partnership (PPP) scheme in Indonesia to finance infrastructure project are presented on this paper. The study case will be implemented on Soekarno-Hatta International Airport Rail Link (SHIARL).

Keywords:, Infrastructure Project, Public Private Partnership, Feasibility Studies, Value Engineering, Quality

1. INTRODUCTION

Infrastructure development plays a strategic role in encouraging investments and in driving economic growth to meet the targets set by the government (Faye and Yeppes, 2003). Seeing that Indonesia is a vast archipelago country, right concepts and a large amount of funds are required to support the acceleration of national economic development in the country. The national economic development must be conducted continuously and be oriented to future needs. To achieve the acceleration of economic development, the government of Indonesia through National Medium Term Development Plan (RPJMN) 2010-2014 is targeting economic growth gradually from 5.5%-5.56% in 2010 to 7.0%-7.7% in 2014, or at an average growth rate of 6.3%-6.8% in 5 years (UU No.17 Tahun 2006 tentang RPJP 2005-2025 dan RPJM 2010- 2014).

As a consequently of rapid economic growth, there must be a great number of investments to support the development. Even though the government has increased budget for infrastructure development from IDR 108 trillion in 2010 to IDR 126 trillion this year, the amount is still far from what is required. The government is not able to provide budget for all infrastructure projects. Therefore, the government issued Presidential Regulation (Perpres) 13/2010 amending Perpres No 67/2005 regarding Public Private Partnership in infrastructure provision.

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Thus, infrastructure development has now become the first priority in development programs by encouraged participation from private sector, both domestic and foreign investors in infrastructure development in Indonesia.

Although PPP in Indonesia has already been known since the 1990s., but the application still not optimal in attracting private investments. The projections for private investment in PPP projects in 2010-2014, predicted absorption capacity of only 30% (Priatna, 2010).

PPP in Indonesia is popular merely as a theory because there have not been any projects successfully implemented with the PPP scheme during the past five years. As we realize the importance of infrastructure for national economic growth, it needs an effort to maximize the investment needs of infrastructure projects offered through the PPP scheme. The efforts including the innovation in improving the quality of feasibility studies as part of the investment process with PPP scheme before the project was offered to the private sector. This paper is proposed application of Value Engineering (VE) on PPP scheme. VE has been widely applied to various infrastructure projects in developed countries, especially for projects with large cost and has been accepted as a tool for effective project management (Palmer et al, 1996, Bytheway & Charles, 1971, Berawi & Woodhead, 2005 , Weatherhead & Grifin, 2006). The attraction lies in the assumption that VE can improve cost-effectiveness of projects funded by the public. VE as a management technique that has been tested and systematically to analyze the function of a system (Berawi & Woodhead, 2005a; Berawi & Woodhead, 2005b) is expected to optimum outcome for a project in terms of quality (Abdul Rahman & Berawi, 2002; Berawi, 2004), technology (Berawi & Woodhead, 2005c; Berawi, et.all, 2008), efficiency (Abdul-Rahman, Berawi, et.al, 2006; Woodhead & Berawi, 2008) and innovation (Berawi &

Woodhead, 2008 ; Berawi, 2009). Application of VE at the concept stage and the feasibility of infrastructure projects will provide the potential efficiency and effectiveness of the optimum project financing. VE study involves the activity of identifying and analyzing risk, which means the application of VE in the feasibility study phase of PPP projects is also a effective process in controlling the risk of an infrastructure project that includes identification and quantification of these risks, determination of preparation steps to address the strategic and operational risks.

This paper is part of an ongoing research effort that aims to improve the quality of the feasibility study stage of an infrastructure project by applying Value Engineering (VE). The case study in this research is Soekarno Hatta International Airport or Railway Links (SHIARL). SHIARL is one of the railway infrastructure project funding will be implemented by the PPP scheme. The idea of development has begun since 2002 but still not implemented yet.

2. LITERATURE REVIEW

2.1. PPP Process in Indonesia

The old mindset stated that infrastructure must be built using government budget. When the government has limited budget, the mindset faced difficulties in fulfilling adequate infrastructure needs for the rapidly growing economy. Nowadays, a more advanced mindset is encouraged. Infrastructure provision should be implemented through the Public Private Partnership (PPP) scheme. In Indonesia, PPP has already been known since the 1990s. With PPP, the government can focus on building infrastructures that are not commercial but are needed by the public, such as village infrastructure, railway, drainage, etc. PPP is a collaboration of government and the private sector in the provision of infrastructures which includes: design and construction, capacity building/rehabilitation and operation and maintenance in order to provide service. The Purpose of PPP are to fulfill funding needs sustainably through the mobilization of private funds; increase the quantity, quality and efficiency of service through healthy competition, improve the quality of management and maintenance in infrastructure provision; and to encourage the principle of "user pays for services received" or in certain cases consider the users' ability to pay. PPP involves the government and the private sector with the principle of mutually beneficial cooperation between the parties, where each party will provide value for the mutual cooperation. The risks sharing and responsibilities between the relevant parties are essential.

The basic principles of PPP are;

- The application of risk allocation between the government and private sector by delegating the management of the types of risks to the party capable of managing such risks;
- Risk allocation must be governed by an agreement between the parties where the private sector is bound to provide services or its management or a combination of both;
- Return of investment is paid through project revenue paid by the user (user charge);
- The obligation to provide services to the public remains in the government's hands. Therefore, if the private sector fails to provide services (in accordance with the agreement), the government can take over.

Although private sector financing for infrastructure is possibly more costly than conventional public spending, PPP financing can still compensate by providing better value for money for the following reasons:

- The private sector is more innovative in design, construction, maintenance and operation over the life of the contract.
- It creates greater efficiencies and synergies between design and operation. It is claimed that PFI/PPP result in better services, better value for money and efficiency savings.
- It invests in the quality of the asset to improve long-term maintenance and operating costs.
- The discipline of the market place ensures that the private sector manages risk better.

However PPP is popular merely as a theory because there have not been any projects successfully implemented with the PPP scheme during the past five years.

PPP process on Indonesia is arranged by Presidential Regulation (Perpres) No. 13/2010 governing Public-Private-Partnership as below;

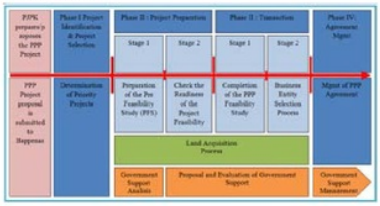

Figure 1. PPP process on Indonesia

Identification and Selection PPP Projects

Even Indonesia has high infrastructure needs but not all projects are necessary and appropriate to be categories as a PPP project. Considering that the government as well as the private sector has limited resources, the selection of a project determines where this limited resource should be used.

The purpose of the project selection phase is to identify projects that can attract the private sector by taking into account government policies and purposes as well as limited resources and readiness of the project. The project selection process is essential to convince investors that a particular project has economic and political motivations making it not easy to be stopped, diverted or amended entirely.

In order to develop PPP, the government should ensure that the private sector who will become the government's partner should fully understand the condition of the project where they will invest in so they can make the appropriate calculations to generate optimal profits. Therefore, the government should prepare PPP projects adequately in the planning phase, the pre feasibility study preparation phase, the transaction phase and the management phase of the implementation of the cooperation agreement.

One of the policy directions in the provision of infrastructure through the PPP scheme is the well preparation of PPP projects. The planning phase is the first phase in the implementation of a project which includes the identification and selection process of project and project prioritization.

The certain criteria approach/analysis is used in the identification and selection process. The first approach to be used is the needs analysis. This approach is used to ensure that the project is included in the government's development plan and program, ensure that the project has technical and economic rationales and ensure that the project received support from the relevant stakeholders.

Secondly, the compliance criteria approach is used. When identifying and selecting a project, one must ensure that the project aligns with the national/regional medium term development plan, the infrastructure sector strategic plan and ensure that the location aligns with the Regional Strategic Spatial Plan.

Thirdly the value for money qualitative criteria is applied. The basic concept of this approach is the comparison between

the benefits obtained over cost incurred in a PPP project and a non PPP project.

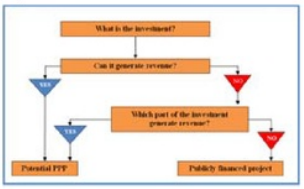

Figure 2. Identification and Selection PPP Projects

Pre Feasibility Study

The low interest of investors towards PPP projects is among others caused by lack information about the project in terms of its technical detail, financial information and analysis on a variety of risks and government guarantees for the management of these risks. The most important thing to do in the development of PPP is the preparation of an infrastructure project that could be implemented in cooperation with the private sector. Preparation is conducted based on international norms so information regarding the project is highly credible in the eye of the investor. Thus, a well prepared and adequate project document, particularly that is bankable, can attract private investors to invest.

The lack of success of PPP projects in Indonesia have four constraints that suggests by Bambang Susantono (2009e), namely:

a. Lack of project preparation so cannot be responded properly by the market
b. Project risk is still too high to be borne by the private sector
c. Factors that land acquisition protracted
d. The inability of investors to raise funding so that was not achieved financial closure.

That is why PPP in Indonesia require that infrastructure projects that will implement in cooperation with the private sector must be equipped with a pre feasibility or feasibility study before entering the tender process. Why must a pre feasibility study be prepared? In case the government needs to be convinced that the project is technically, economically and financially viable. In addition, it should not have any major risks or negative impacts socially and environmentally. The project feasibility study is conducted in the initial phase to determine whether the project is good and could be further implemented.

2.2. Prerequisites for Public Private Partnership in Indonesia railways

In many countries railways have become the primary mode of mass transportation to reduce traffic congestion. Railways are proven to be the most efficient mode in land transportation system both for passenger and cargo. It is nevertheless realized that a significant involvement of private investment in Indonesia railway sector would not come in a very near future. Railway is still perceived as high risk business due to the high investment costs and long-term undertaking.

In 2011 for instance, the Ministry of Transportation has offered 10 railway projects with a total value of USD 9.78 billion. This is the largest portion of all infrastructure projects which includes sea port, airport to terminal which was offered by the Ministry of Transportation in 2011 totaling USD 15.5 billion. The project includes Soekarno-Hatta Airport Railway. Based on the Master Plan of Indonesia Economic Development Corridors (IEDC) from the total infrastructure investment needs of USD 76.2 billion (Priority I: 2010-2015), the railway sector need up to USD 29.9 billion. Likewise, from the total infrastructure investment needs of USD 856.5 billion (Priority II: 2016-2030), the railway sector took the largest portion of up to USD 342.2 billion. It is clearly stated there is strong enthusiasm to encourage the railway sector in Indonesia. The acceleration of the development of the railway sector has been encouraged since 2007 in accordance with the enactment of Law Number 23 Year 2007 regarding Railways. This Law supersedes the former Railway Law Number 13 Year 1992. The fundamental issue of the new Railway Law is dividing of infrastructure and facility. As for infrastructure, it is the responsibility of the government to develop railway tracks, stations and operating facilities such as the signaling and electrification system. While, it is the private sector who is responsible for the purchase, operation and maintenance of locomotives, trains and passenger cars (Article 31). Although four years has passed since the enforcement of the new Railway Law, not many investors have been involved in the development of new railway networks. There are merely very few new players which can be counted by hand, even only with one hand.

2.3. Value Engineering on Feasibility Study of Public Private Partnership Infrastructure Project

2.3.1. Value Engineering

There is no single definition of VE or VM or of the other terms such as Value Analysis. The pioneer Miles (1961) defined VE as "an organized creative approach which has for its purpose the efficient identification of unnecessary cost" (Miles,1961). A definition which encapsulates the principles of VE is as value at systematic, multidisciplinary effort directed towards analyzing the functions of projects for the purpose of achieving the best value at the lowest overall life cycle cost (Norton, 1995). The same definition was develop by Robinson & John (1997) that VE is a systemic process uses analytical, creative and evaluation techniques on a multi-disciplined basis to achieve the desired functions in a design or process while maximizing value and maintaining or improving required function.

The concept of function is based on the principle that the value of an object is determined by what use is fulfilled and is not related to its cost. VE use to eliminate unnecessary life-cycle costs without sacrificing safety, quality, environmental compliances or other functional requirements and it will increases innovation opportunities, improves cost effectiveness, enhances performance and fosters partnering among the owner, engineering and builder (Davis, 2004).

As a systematic process, VE focused on identifiable steps collectivity known as Job Plan Procedure, which was firstly founded by Miles in 1961 using 40 hour workshop. Developed from Mile's original Job Plan, 6 steps are included from information gathering and criteria setting to decision-making-related to selected options. In current practice, Hannan (1994) developed into three distinct stages of Pre-Study, Main Study (Workshop) and Post-Study activities, all focused on structured problem identification and problem solving. The Society of American Value Engineers or SAVE International published its own job plan in 1997 while Male et al (1998) have their own as well. The different of job plan phases and procedures are as shown in Table 1.

VE is a multi-disciplinary approach based on an interaction of different disciplines providing a collective analysis of all aspects of a project and the cost implications of ideas so as to achieve the best value. Generally VE is applied when there is a well defined scheme in order to optimize costs and benefits. Palmer (1992) support that the earlier in the design process VE studies are carried out, the greater the potential for cost reduction and the lower the extra design cost of implementing proposals, as the majority of cost is committed during the early design stages. Nowadays value engineering is a contraption to render a better utilization of the financial sources, project timing and eventually

the betterment of the project value. VE can be utilized as an appropriate strategy to enhance project implementation and to access the supreme purposes of the project.
In various countries like USA, UK, Australia, and Japan, the application of VE has solved many problems in the construction industry and further application of the VE application has increased their competitive advantage (Berawi, 2004; Berawi and Woodhead, 2008; Berawi, 2008a; Berawi, 2009a; Berawi, 2009c; Berawi, 2009d). The ability of VE in increasing the competitiveness of construction industry in some countries can't be separated from the enormous benefits that VE can give for construction projects. VE ability in making right decision at the planning stage is one of the benefits that can be given.

2.3.2. Integrating Value Engineering in the PPP Investment Process

The implementation of VE method in infrastructure Project provides many benefits such as reducing project cost (Younker (2003); increasing project performance (Connaughton & Green, 1996; Younker, 2003), increasing customer satisfaction/project owners (Jaapar et all 2009), creation of creative ideas and innovation (Sik & Gee Fong, 1998; Berawi, 2005a; Berawi, 2005b; Berawi and Woodhead, 2008; Berawi, 2004; Berawi, 2009a; Berawi, 2009c; Berawi 2009D), increasing efficiency (Robinson, 2008), value to better project (project (Woodhead & Berawi, 2007; Abdul Rahman & Berawi, et. All., 2008).

VE studies are generally carried out on one of the following stages of the project development;

1. Initial concept phase
2. Early design phase

According to Fanning (2006) VE studies implementation is conducted most effectively in the early concept phase compared to 2 (two) other stages since it provides potential savings and increases the optimal value.

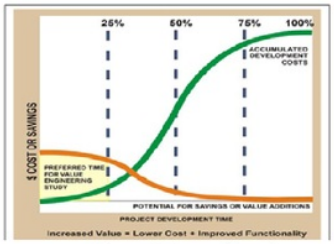

Figure 3. Potential savings

The research conducted by Lim et al (2006) demonstrated that the application of VE method at the project preparation stage in BTL project assisted the decision making process, increased the value, improved project performance through creative ideas and reduced the cost of the project Life Cycle Costing. VE studies conducted in the early stages of the project provide benefits not only to reduce costs and conserve capital, but also to build team relationships and improve constructability. (Muntasir, 2002).

VE Application in the project feasibility study will provide benefits (1) able to resolve the problem of high priority, (2) determining a low cost, (3) identifying and explain the purpose, (4) optimizing component costs, (5) producing a unique solution, (6) increasing the marketing potential, (7) improving communication; (8) improving quality, and (9) reducing time.

Research on integrating the VE method at the infrastructure projects with PPP schemes has not been widely employed. Below are some examples of the integration method of VE on infrastructure projects with the PPP scheme.

a. Built-Transfer-Lease Scheme Implementation in Korea

One of the countries that have done the integration of VE methods on infrastructure projects with Built Transfer Lease (BTL) scheme is a Korea (Lim et al., 2006) shown in figure 2. Amid the many issues of the planned public infrastructure projects, the application of VE in the BTL scheme was proved capable of providing solutions to the limitations of PFI investment. VE process was carried out at the project preparation stage. Creative ideas that arise when determining the function of the project and analysis of Life Cycle Cost (LCC) became the main attraction for potential investors compared to the general infrastructure projects. FAST diagram determined the primary function of the project and used to improve the performance of the functions through the creative ideas of the VE study team members. Through the FAST diagram, the relationship between the function and the cost will be very visible and decisive.

VE implementation procedure on the BTL project consists of 3 (three) phases, namely (1) feasibility study phase and investment planning, (2) actual project planning phase and, (3) construction phase. From those three (3) phases, VE method was integrated in the first phase and the second phase. The significant results obtained were cost savings and improvement of function performance by using the VE appropriately and timely.

A case study was conducted in Daegu City Art Gallery BTL Project. The analysis showed that the area increased 5% from the initial design but it earned savings of 5.7% of the total initial investment calculated without VE. Value of the project increased not only by reducing the cost of the project but also by improving the performance of the basic functions of the project (Lim et al, 2006). The results of the application on several infrastructure projects plan which costs more than USD $ 50 million obtained cost reduction to USD $ 10 million.

b. Design-Build-Own Scheme Implementation in United States

Since 1997, USA State DOTS required transport infrastructure projects at a cost of over U.S. $ 25 million in the U.S. to conduct VE studies in the proposal. Design-Build-Own scheme was widely applied to infrastructure projects with public-private financing. The application of VE in that scheme could increase the value of the project where professionals and companies were directly involved in the procedure collaborated VE studies (Fanning, 2006).

To maximize the value added in large projects, hence the application of VE only at one stage is still considered as insufficient. USA State DOTS carried out VE method implementation on Design-Bid-Build scheme in 2 (two) phases. Jerry Blanding (2005), a FHWA Innovative Contracting Engineering in AASHTO Value Engineering Conference stated that "multiple value engineering studies may be appropriate for major projects".

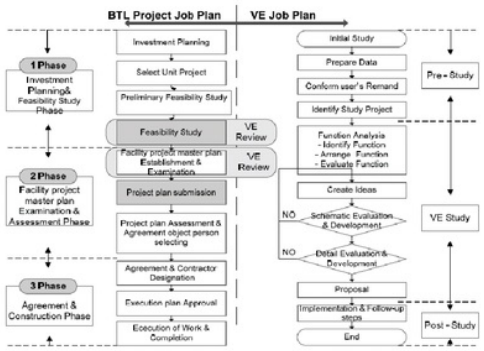

Figure 4. Integration model of VE on PPP in BTL Project at Korean

On major infrastructure projects, DOTs conducted the VE study twice, as follows;

1. At the concept stage; VE study team got serious thoughts from the professional planners and came up with a number of alternative concepts. VE study team's recommendations will be a parameter in the design phase of the project.
2. At the early stages of design development, to apply predefined alternatives at the concept stage.

Fanning (2006) concluded that the application of VE method on infrastructure projects with private government financing benefits all parties involved (DOTs, contractors, engineers, project stakeholders and VE professionals) as follows;

1. VE study at the initial concept results the creative thinking.
2. Produces best ideas for economy and functionality.
3. Get *best value ideas for cost and functionality*.

3. RESEARCH METHODOLOGY

In order to achieve the research objectives, this study will use a combination of quantitative and qualitative approaches (Green & Caracelli, 1997). Quantitative approaches are characterized by the use of control variables and objectivity will be conducted through a questionnaire survey. Qualitative approach (Creswell, 1998) will be conducted using a participatory action research (participative action) criticizing the assumptions and allows the learning process (Argyris et al., 1985; Carr & Kemmis, 1986) and 'grounded theory' (Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1998) through Focus Group Discussion. The practitioners and stakeholders directly related to rail infrastructure projects in Indonesia are the respondents of this research.

The respondents through questionnaire offline are government and companies that related to infastructure development including PT Kereta Api Indonesia (KAI), PT Railink, PT INKA, Department of Transportation of Jakarta, Tangerang City Government, Public Works Department, PT Jasa Marga, PT Wijaya Karya, Bappenas, PT IIGF (Indonesia Guarentee Infrastructure Fund), PT Sarana Multi Infrastructure (SMI), the Special Committee Acceleration of Infrastructure Indonesia, and the Investment Coordinating Board. While online survey questionnaire was sent to the respondents via e-mail to the 6 (six) group mailing of practitioners of construction industry and value engineers in Indonesia.

Case Study: Soekarno-Hatta Airport Railways

The estimated of US$ 400 million railways linking Jakarta to Soekarno-Hatta International Airport in neighboring Banten province has been in planning for many years and after some considerable delays, development should be underway in the near term. It would connect Manggarai railway station in central Jakarta with the airport with a total distance about 34 kilometers. PT Railink, a joint venture between state-owned railway company (PT KAI) and airport operator PT Angkasa Pura I)I, has originally been assigned to undertake the investment and construction of the project. The airport railways would be expected to ease the congested road traffic to the airport and its operation would be under a separate management from PT KAI.

PT Railink, however, has failed to build the system for some financial and regulation difficulties. Controversy has also arisen as whether the project is solicited or unsolicited. As the private developer doing all preparation works from the beginning, the joint venture company felt very strongly and requested the government to declare PT Railink as the initiator of the project, and hence eligible for 10percent compensation had the project been undergone a competitive bidding. The government, i.e. the DGR, has been undecided and kept the issue floating for some considerable time, delaying the process of project procurement.

This stalemate provided a strong indication of the incapability of the government to embark on private initiatives, unsolicited project although Presidential regulation No. 13/2009 had provided some legal basis to do so. Later, it was strongly recommended by stakeholders that government itself construct the infrastructure and let the private investors runs the operation and management system.

4. RESULT AND DISCUSSION

4.1. Integration Plan Model of VE and PPP

This research proposes a model of integration plan with the application of VE and risk in PPP investment process. In this case, the PPP Process is in accordance with the Perpres No. 67 Year 2007 which then revised to Perpres No 13 Year 2010.
The integration process will be employed at the stage of feasibility study preparation, as illustrated below:

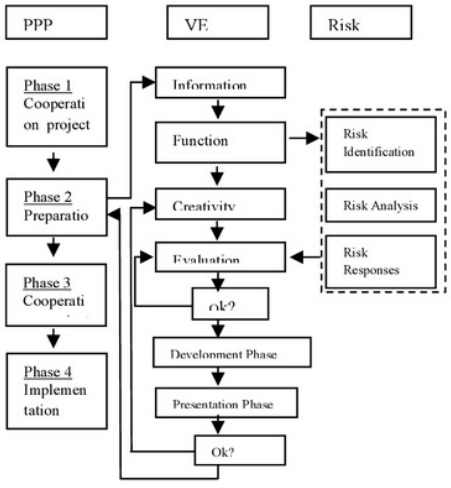

Figure 5. Proposed Model for Integration VE and RM in PPP Scheme

4.2. Questionnaire Survey

Data processing was performed based on the results of the respondents' answers to the questionnaire which have been made structurally to facilitate the respondents in completing the survey. The questionnaire consist of four parts to include the analysis of the benefits and impacts SHIARL development, risk identification, identification of additional functionality, and PPP scheme as well. In the further paper the results of this questionnaire will be use to develop FAST Diagram.

4.2.1. Benefits and Impacts of SHIARL Development

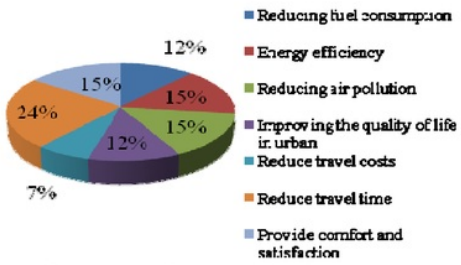

Figure 6. Benefits of SHIARL Development

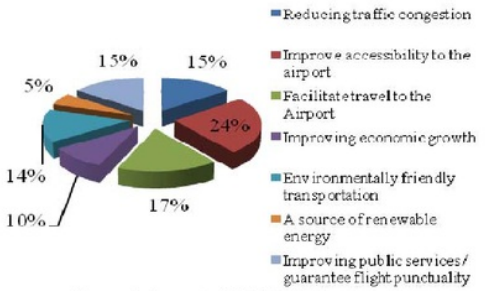

Figure 7. Impact of SHIARL Development

4.2.2. Additional Function Identification (Innovation)

In Table 1, the respondents could see that it is possible to add functionality to the development SHIARL as the benefits derived from any such additional functions.

Table 1: Additional function Variables

Added Function	Expected Benefit
Utilization of electrical energy sources (solar, kinetic energy of the train)	Reducing dependence on fossil fuels
	Reduce greenhouse gas emissions
	Non-polluting
	Save the cost of care
	Provide cool effects (blocking the heat of the sun to enter into a concrete wall)
Neighborhood Development (human residence, business center)	Improve the economy
	Create jobs
	Investor interest
	Increase local revenue
	Increase the welfare of the area
	Push social development
	Reduce regional disparities
Construction of city check-in facility at the train station	Reduce queues at airport check-in counters
	Save time
	Provide ease and comfort travel
	Avoid delay or delayed flights
	Avoid flight cancellations
Construction of cargo services	Increase the volume of flow distribution
	Facilitate the delivery of goods
	Improving service delivery and security
	Ensure timeliness of delivery
	Improve the economy

The new additional functions will increase the cost of construction, and according to the respondents, it is allowed to increase the cost at about 16-30% of the total investment of SHIARL development.

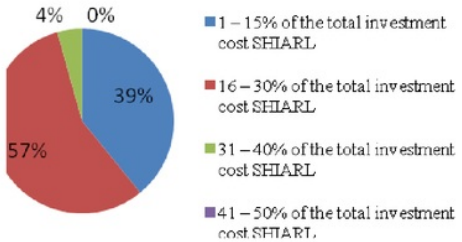

Figure 8: Adding New Function Diagram

In addition to creating innovation, VE can also optimize the performance of projects such as improving quality, technological innovation, and cost efficiency. From the results, the absence of additional functions in SHIARL development, respondents expect to reduce the cost for 0-15% of the total investment SHIARL.

By processing the data that has been collected, respondents expect that the increased costs do not exceed the 30% of the total investment in order to create innovation, whereas if we apply the methods of VE on the project so respondents expect to reduce 15% of the investment cost.

4.2.3. Risk Identification on SHIARL Development

Table 2: Risk Internal Variables

Function	Dominant Risk
Risks that affect the improvement of accessibility to Soekarno-Hatta	1. The issue of land acquisition and compensation 2. Unavailability of funds by the government
Risks that affect the development of Infrastructure SHIARL	1. The issue of land acquisition and compensation 2. Price escalation
Risks that affect the selection/ define the route SHIARL	1. The issue of land acquisition and compensation 2. Not in line with the regulations or urban areas

4.2.4. Public Private Partnership Scheme

Table 3: Benefits in PPP Scheme Variables

No	Benefits	Persentage
1	Reduced project costs	4%
2	Increase the performance of the project	10%
3	Increase quality of project	13%
4	Satisfaction of minimum service standards	10%
5	Fulfillment of infrastructure services	15%
6	Improve coordination among stakeholders	7%
7	The creation of a lot of creative ideas and innovation	11%
8	Increase efficiency	8%
9	Value to better project	11%
10	Increase production services	9%

Table 4: Key Success Factors in PPP Scheme Variables

No	Key Success Factors	Percentage
1	The way the whole process was facilitated and managed	6%
2	Warranty return on investment	6%
3	Balanced risk sharing / risk allocation	15%
4	Special government guarantees	6%
5	Key performance indicators that clearly measurable	11%

6	Good communication and cooperation between the solid	8%
7	Stable macroeconomic policy	5%
8	Low interest rates	2%
9	Communication and strong support from decision-makers	9%
10	Benchmarking and continuous performance monitoring	3%
11	Settlement problems with negotiation and mediation	2%
12	Balance between costs and benefits	4%
13	Trust and equality between the parties	3%
14	The commitment of the parties involved	10%
15	Transparency in the procurement process	9%

From the table based on data from respondents above, it can be concluded that the key factors in the success of the PPP scheme are a balanced risk sharing / risk allocation and Key Performance Indicators (KPI) that clearly measurable.

In addition to the key success factors identified in the PPP scheme, in Table 5 below is a dominant constraint to the implementation of PPP scheme. Dominant constraints on PPP scheme that have been defined based on the data of respondents were land acquisition protracted and a rash of project preparation.

Table 5: Dominant Constraint in PPP Scheme

No	Constraint	Persentage
1	A rash of project preparation	13%
2	Project risk still incriminating private parties	6%
3	Inadequate government support	9%
4	Land acquisition protracted	18%
5	Regulations are less supportive	11%
6	Type of PPP schemes	2%
7	The bidding process is not transparent	3%
8	Inability funding by investors	6%
9	The high cost of construction	3%
10	Lack of information on PPPs	6%
11	Lack of coordination between agencies / stakeholders	9%
12	Long bureaucratic procedures	10%
13	Poor communication between the two parties	6%

In terms of the division of responsibility for financial activities of development of SHIARL project is illustrated in the Table 6.

Table 6: Parties Responsible for Project Financing Activities

NO	Description	Public	Private	PPP	Largest %
1	Development Phase				
	Pre – FS	91%	0%	9%	Public
	Feasibility Study	30%	26%	43%	PPP
	Planning and Design	30%	35%	35%	PPP
	Land Acquisition	78%	4%	17%	Public
2	Construction Phase				
	SHIARL	0%	70%	30%	Private
	Renewable Energy	13%	48%	39%	Private
	Regional Development	17%	39%	43%	PPP
	Construction of Additional Facilities	9%	59%	32%	Private
3	Operation and Maintenance Phase				
	SHIARL	0%	87%	13%	Private
	Renewable Energy	13%	57%	30%	Private
	Regional Development	9%	39%	52%	PPP
	Construction of Additional Facilities	4%	52%	43%	Private
4	Transfer Phase	28%	0%	72%	PPP

From the table above, it can be concluded that the respondents expect the Pre-FS and land acquisition as the responsibility of the government, while the construction and operational maintenance of SHIARL, renewable energy, and construction of additional facilities become the responsibility of the private sector, while other events have been shared between private and government. The division of responsibility and risk is necessary to achieve common goals and to improve the effectiveness and efficiency of the project and to maintain the quality of the project.

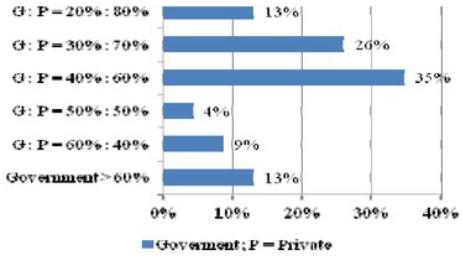

Figure 9: Division of Responsibility

Based on the image above we can conclude the majority of respondents expect the financing of investment by the private sector and the comparison between the government and the private sector by 40 - 60% of the total investment cost of SHIARL development.

Based on the analysis above, several points can be claimedas described: the greatest benefit expected from SHIARL development is to improve accessibility to the airport which will have an impact on the reduction in travel time towards the airport. In SHIARL development process, risks need to be aware of are the problem of land acquisition and compensation. While additional functions desired by the respondents are urban development (human residence, business center) and city check-in facilities at the train station with increased costs in laboratory conditions at 16-30% of the total investment cost. And if they do not perform additional functions, it is expected that the VE can reduce investment costs by ± 15% of the total investment cost. By using PPP scheme, the most expected benefits by the respondents are the fulfillment of the service infrastructure as well as the improvement of the quality of the project. Furthermore, a balanced risk sharing/risk allocation and Key Performance Indicator (KPI) that clearly measurable becomes the key success factors of PPP scheme. One of the most dominant constraints in the PPP scheme is the pre-FS and land acquisition are expected to be the responsibility of the government, while the construction and maintenance operational of SHIARL, renewable energy, and construction of additional facilities will be the responsibility of the private sector. The others activities can be shared by both parties between government and the private ideally amount 40-60% of the total investment cost.

5. CONCLUSION

Value Engineering has been applied in many developed countries and proven to increase optimum results for construction projects, especially for infrastructure projects with good quality, more advanced technology, optimum efficiency to achieve innovation. With the application of VE in SHIARL project will result in a project with a different approach. In this study, there are two additional functions expected of SHIARL development, urban development (human habitation, business center) and the development of the city check-in facilities at the railway station. The results of this questionnaire will be used as a discussion at the focus group discussions (FGD) in order to construct a FAST diagram for SHIARL development project, which would be content for discussion in the next paper.

The study is expected to provide maximum results in the form of innovation through the addition of new functions, provide analysis in determining risk factors to be faced and the key success factors in the scheme of partnership between government and the private sector.

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