https://dx.doi.org/10.22161/ijaers.4.10.12 *ISSN: 2349-6495(P) | 2456-1908(O)*

Value Management: Implementation of Asset Life Cycle in one of Oil and Gas Service Company

Mohd Rizman Md Ghazali, Herman Shah Anuar

Othman Yeop Abdullah, Graduate School of Business, Universiti Utara Malaysia

***Abstract*—** *This paper reviews the role played by a company's project asset in stimulating operational performance for oil and gas company, which is moderated by asset readiness in life cycle activities. The constructs of this paper are based on a comprehensive review of recent literature on value management, asset management and asset life cycle costing. A detailed discussion revealed effects activities on asset acquisition, asset maintenance and asset disposal. Several risks also have been identified. Implementing good asset management system will give value to an organization. It considers and optimizes the conflicting priorities of asset utilization and asset care, of short-term performance opportunities and long-term sustainability, and between capital investments and subsequent operating costs, risk and performance. "Life cycle" asset management is also more than simply the consideration of capital costs and operating costs over pre-determined asset "life" assumptions. Truly optimized, whole life asset management include risk exposures and performance attributes, and considers the asset's economic life as the result of an optimization process (depending upon the design, utilization, maintenance, obsolescence and other factors). In summary, this paper highlights the importance of Asset life cycle activities toward operational performance of PBJV Company, as well as reviews the latest literature from the perspective of value and asset management.*

***Keywords*—Value Management, Asset Life Cycle, Asset Management.**

I. INTRODUCTION

Most people today would agree that long-term profitability is the main objective of private enterprise, while the timely delivery of needed services would describe the goal of public bodies. They would also quickly point out that the products and services these entities produce should be competitively priced and efficiently provided while meeting or exceeding the performance expectations of their customers. In order to adapt to an ever-changing environment, organizations are challenged to make better use of their most important resource, their people.

Lacking the compass of value, an organization is in danger of losing its way. Additional, if it can find its compass, it must become fluent in its use in order to interpret its meaning. All of this first requires an acknowledgment that the organization lacks the tools, training, and necessary attitude by its leaders. Developing this insight is the first step, and the greatest hurdle, to overcome. In today's economic environment, maintaining a focus on performance while controlling costs and managing risk are essential for long-term survival and sustainable growth.

Value management (VM) is a service which maximizes the functional development from concept to completion, through the comparison and audit of all decisions against a value system determined by the client or customer. Value management is an integrated, organised and structured process, led by an experienced facilitator and broken down into various stages to enhance the value of any projects, not necessarily only by cutting costs.

Meanwhile, the focus of asset management (AM) is on the strategic alignment of physical assets as an organizational resource with the organization's strategy. At the core of this is how physical assets enable those strategies and as a result add value, either commercially, socially and/or politically. As such, AM manages the linkages between the organization's strategic plan and the whole life management of physical assets, the subsequent investment decisions associated with managing those assets through time, and any related bundle of 'rights' and 'interests' that may be involved in the use of assets to create value for an organization. There is a consequent close alignment with the philosophy of asset management and that of value management (VM).

The importance of asset management for Barakah Offshore Petroleum can be seen from projects' profit recently. Barakah Offshore Petroleum Berhad ("Barakah" or "Company") was incorporated in Malaysia on 1 March 2012 as an investment holding company for PBJV Group SdnBhd (PBJV) and its subsidiary companies (collectively

https://dx.doi.org/10.22161/ijaers.4.10.12 *ISSN: 2349-6495(P) | 2456-1908(O)*

referred to as "Barakah Group" or "Group"). The business of PBJV started in August 2000 in offshore pipeline services. PBJV has since grown to become one of Malaysia's leading companies in pipeline services.

In 2012, PBJV was recognized with the Outstanding Vendor Award from PETRONAS CarigaliSdn Bhd. Being focused and committed in this ever-challenging industry and consistently striving to be the best, are the key success factors of the company. From pipeline services, PBJV expanded its business activities into offshore transportation and installation works, hook-up and commissioning, onshore construction, underwater services and chartering of marine vessels and equipment.

In 2009, as part of its expansion strategy to strengthen its offshore installation services, PBJV commissioned the construction of its 137 meter length pipe-lay accommodation barge, known as "KOTA LAKSAMANA 101". With this barge ownership, PBJV is able to undertake bigger and more challenging offshore pipeline activities. In 2016, PBJV added another business pillar, Underwater Services involving inspection, maintenance, repair, drilling support and related services for underwater facilities. Barakah Group is poised to be a "one-stop center" as an integrated oil and gas service provider.

PBJV's departments that need to do research is Operation Support and Asset Management Department. The objective of this department is to be the central operational-asset management function for the operation at company level, coordinating and providing inputs to asset planning, taking a role in providing: equipment and machineries to support the in-house operations, its logistics, acquiring assets, yard management and providing facilities for maintenance of assets throughout its useful life that ensures a company's assets are used in the most efficient manner and maximizing an asset's lifespan to achieve the greatest benefit at the lowest cost while enhancing its profitability.

1.1 Problem Statement

Asset management is being regarded as a key element for PBJV's operation activities and has value to PBJV. When asset support activity is successful, it gives impact to the overall company performance. It enables PBJV to maximize value and deliver its strategic objectives through managing its assets over their whole life cycles.

Owned Asset utilization has been practiced by many oil and gas companies due its less consuming funds to be allocated by the management. Therefore, it has become the most preferred choice by many corporations. Generally, companies understand that huge amounts of money are needed to be allocated for companies to rent asset for project support.

There has been increased in cost and risk when asset was not managed properly. Asset lifecycles activities included in procurement and asset acquisition, asset maintenance and asset disposal activities need to be measured more details.

Therefore, a company's wise decision to use and manage their own asset should be seen as long term investment to safeguard its own business. This is yet to be revealed in order to see how effective asset utilization can play its role to be a key element in project support. To conclude, this study is important to know if it possible to put a strong emphasis that asset lifecycle activities consideration can play its role to support the delivery of an organizational strategic plan, in turn aiming to meet the expectations of a variety of stakeholders.

1.2 Aims of the Paper

The need for asset management as a recognized discipline arises from the complex technical nature (Nicholas, 2015). In recent years, a determined effort by those working in the field has resulted in the development of a formal approach to asset management systems, knowledge, and education. This led to the publication in 2014 of the International Standards Organization's ISO 55000 series of Asset Management standards (ISO 55000, 2014). This study mainly focuses on Asset Management practices in OSAM. It studies the interrelationship between several activities in asset lifecycle. More specifically, the main objectives of the study are:

a) To enable PBJV to realize value from its assets as it pursues its organizational objectives. Asset management supports the realization of value while balancing financial, environmental and social costs, risk, level and quality of service, and asset performance.
b) To understand the reason for asset life cycle costing and have seen a check list of factors that go into a life cycle costing analysis. To improve efficiency and effectiveness by reviewing and improving processes, procedures and asset performance

The paper proceeds as follows: firstly, the researchers provide the literature review pertaining to asset lifecycle activities in global and its relation to the current practices of asset activities in PBJV. Subsequently, the concept of asset lifecycle activities is elaborated followed by a description of audit. Later on, it continues with a description of the sample, observation and potential risk. The paper ends with

https://dx.doi.org/10.22161/ijaers.4.10.12 *ISSN: 2349-6495(P) | 2456-1908(O)*

a discussion and suggestions for PBJV to practice the concept elaborated in the discussion.

II. LITERATURE REVIEW

The concept of Value is based on the relationship between satisfying needs and expectations and the resources required to achieve them. According to Othman, (2012) and Che Mat (2001) the main objective for VM is to merge all stakeholders' views and to obtain the greatest balance between satisfied needs and resources.

> "VM is concerned with improving and sustaining a desirable balance between the wants and needs of stakeholders and the resources needed to satisfy them (https://ivm.org.uk/what-is-value-management)"

Stakeholder value judgements vary, and VM mergescontradictory priorities to deliver best value for all stakeholders (https://ivm.org.uk/what-is-value-management). VM is based on principles of defining and adding measurable value, focusing on objectives before solutions, and concentrating on function to enhance innovation. It uniquely combines within an integrated framework a value focused management style; a positive approach to individual and team motivation; an awareness of the organizational environment; and the effective use of proven methods and tools.

An asset is an item, thing or entity that has potential or actual value to an organization. The value will vary between different organizations and their stakeholders, and can be tangible or intangible, financial or non-financial (ISO 55000). The period from the creation of an asset to the end of its life is the asset life. An asset's life does not necessarily match with the period over which any one organization holds responsibility for it; instead, an asset can provide potential or actual value to one or more organizations over its asset life, and the value of the asset to an organization can change over its asset life. An organization may choose to manage its assets as a group, rather than individually, according to its needs, and to achieve additional benefits. Such groupings of assets may be by asset types, asset systems, or asset portfolios.

III. METHODOLOGY

An asset management system is used by the organization to direct, coordinate and control asset management activities. It can provide improved risk control and gives assurance that the asset management objectives will be achieved on a consistent basis. The process of establishing an asset management system requires a thorough understanding of each of its elements and the policies, plans and procedures that integrate them.

Key elements of good practice in AM encompass the development of a physical asset strategy, which establishes the portfolio of physical assets that most appropriately, effectively and efficiently meets an organization's service delivery requirements, and in turn relates and supports directly organizational strategy (Lyons, 2004). This forces an organization to consider why it needs to invest in certain physical assets, maintain or renew others, and also consider divesting itself of other physical assets that are no longer required or are obsolete.

The organization, having established a physical asset strategy and the associated scope of its asset portfolio, needs to manage this through time on a whole life basis (TAM, 2013). Within an asset strategy, this requires consideration of the following (TAM, 2006): Capital investment and procurement costs, which would include the acquisition, renewal and adaptation of physical assets, the maintenance costs over the life of the asset, the operating costs over the life of the asset, including staffing and finally any disposal costs.

Life cycle costing (ISO 55002) is the estimation of the cost of acquiring, commissioning, operating, maintaining, and disposing It is a "cradle to grave" cost analysis. The aim of life cycle costing is to ensure that all relevant costs are identified, and that through life costs are considered at the planning, acquisition, and budgeting stages.

PBJV need life cycle costing to assist company with the following types of asset management decisions: Acquisition decisions, with consideration of the life cycle costs of different acquisition options, life cycle asset management planning as an input into determining the operating and maintenance resources and budget for in-service assets and finally for replacement decisions.

IV. FINDINGS

Asset Acquisition

Data or findings were collected on the variables of asset lifecycles included in procurement and asset acquisition, tracking of asset movement, asset maintenance and asset disposal activities.

Additional assets can be acquired in various ways from other organization. This include purchase of assets that are already operational, or accepting the hand-over of asset constructed by others. This can either be as the owner, or contracted to manage the assets for a defined period. This first observation considers the creation, installation and commissioning of assets, including elements of approval

https://dx.doi.org/10.22161/ijaers.4.10.12 *ISSN: 2349-6495(P) | 2456-1908(O)*

and release of funding, arrangements for hand-over to operations, and the monitoring and capture of 'as-built' costs.

Establishment of capital expenditure budgetary procedures was observed. From Limit of Authority (LOA) of company states the authorities with regards to recommend, approve and inform of budgetary activities, including preparing budget (CAPEX and OPEX). However, the company has yet to establish policies and procedures relating to preparation and monitoring of CAPEX budgets as illustrated below:

Nevertheless, for the year 2016, Operation Support Division of PBJV has prepared a New Asset Requisition Plan (NARP), to plan for asset acquisition for Pipeline Services and Hook-up Departments. The asset purchases were tracked by Operation Support Division against the NARP. In reviewing the NARP, we noted the following: requisition of new assets was omitted from NARP, approval of NARP, limitations in monitoring of NARP. Management represented that CAPEX budget for 2017 was approved as a Group-level effort and had been approved by the Board on 25 November 2016. However, the Company has yet to establish guiding procedures on budgeting activities, e.g. preparation and monitoring.

Effect of potential risk included CAPEX budget prepared may not be aligned to Company's operation requirements and financial capabilities to finance the purchase; Inaccurate projection of CAPEX leading to in ability to assign appropriate amount of funds to various areas of expenditure and significant excess in capital expenditure may not be readily identified and the justification may not be timely provided for remedial action.

Asset Maintenance

The aim of maintenance is to deliver availability of machines and equipment to operation departments, within the envelope provided by underlying machine condition and the available resources. Maintenance management systems are often used to coordinate maintenance activities. These systems may be based on simple scheduling tools, such as card/index systems, or more sophisticated work programming and schedule optimization tools (Higgins, 2008). Second observation relating with enhancement in monitoring of maintenance of equipment.

Based on current practices, scheduled and unscheduled maintenance works are requested by appointed Maintenance Contractor using Equipment Maintenance Request Form and verified by the Asset Management Department ("AMD"). Details on work performed are reported in Equipment Repair Report which would then be verified and closed by AMD. In addition, progress of maintenance work carried out for each equipment in Miri, Paka, Puchong and Kota Kinabalu is recorded in the Master Equipment List ("MEL") maintained by the maintenance provider, i.e. Dynamic Curve SdnBhd ("DCSB"). The MEL is submitted by DCSB on a monthly basis to AMD for monitoring purposes.

In our review of maintenance works done under the purview of AMD, we noted the following enhancement opportunities in the monitoring of machine maintenance: documentation on maintenance work reported not found, maintenance performed not reflected in Master Equipment Listing of DCSB and absence of analysis on machine condition, downtime and breakdown. The causes of machineries repair/breakdown are recorded in the Equipment Maintenance Request Forms by DCSB. However, a trend analysis on persistent problems that recur over a period of time was not reported and monitored.

Service month

Maintenance work 1 PBJV-FP-09 Flooding pump Miri May New major service 2 PBJV-HYD-04 HydratronPaka June FRL and check valve damage 3 PBJV-FP-23 Flooding pump Miri August Faulty tachometer (Source: Master Equipment Listing of DCSB for the respective months)

Effect or potential risk include The lack of proper maintenance may accelerate the process of an equipment's efficiency to diminish, which in turn may cause it to burn up energy and shorten its useful life and in the absence of equipment breakdown analysis, management would not be able to readily identify equipment that frequently fail or those that are beyond economic repair and continuously spend high maintenance costs.

Table.1.

No.	Tag ID	Equipment Type	Location	Service month	Maintenance work
1	PBJV-FP-09	Flooding pump	Miri	May	New major service
2	PBJV-HYD-04	Hydraton	Paka	June	FRL and check valve damage
3	PBJV-FP-23	Flooding Pump	Miri	August	Faulty tachometer

Source: Master Equipment Listing of DCSB for the respective months

https://dx.doi.org/10.22161/ijaers.4.10.12 *ISSN: 2349-6495(P) | 2456-1908(O)*

Asset Decommissioning and Disposal

Although assets can have long lives well beyond normal business cycles, there almost invariably comes a point where they are removed from service, decommissioned and disposed. There are many factors that can drive the decommissioning of assets, including: noncompliance with changes in legislation, inability to deliver revised levels of service, obsolete technology, cost of retaining in service and excess of service capacity (Campbell, 2016).

Final observation related with delays in technical assessment of assets. In perusing the Master Equipment List ("MEL") maintained by Asset Management Department ("AMD"), we noted that a total of 49 equipment were indicated as Beyond Economic Repair ("BER") or Quarantine ("QR"), which meant that they were not in use due to their inoperable condition or obsolete technology. The NBV of the BER and QR equipment as at 30 September 2016 and their respective locations are summarized below.

In Asset Disposal Procedures states that AMD should perform inspection and maintain documentation relating to the asset and inspection performed. However, as at 22 December 2016, only nine (9) out of 49 equipment were supported with technical assessments on the condition of each equipment as well as reason and proposed method of disposal, which performed by Dynamic Curve SdnBhd ("DCSB"). We noted that there was an instruction from AMD for DCSB to perform the technical assessments on 17 September 2016 and also reiterated in the PBJV Operation Support meeting on 11 November 2016 for the disposal procedures implementation to be expedited. Potential risk may rise include undue utilization of space for storage of unusable assets.

V. SOLUTIONS

PBJV would be involved in multiple activities in asset management system when running any of their projects. The proposed improvement is as follows:

a) To enhance the budgetary process, management should consider feasibility of incorporating CAPEX budgeting as part of the Company's annual budgetary process and to designate a particular department to plan and co-ordinate CAPEX requirements of both operational and support functions of the Company; basis of the CAPEX budget,
b) nature and value of each purchases, should be justified by the originating/ requesting department/ division showcasing its consistency with the Company's activities in the forthcoming year as well as condition of existing assets as far as asset replacement programs are involved;
c) the preparers and reviewers of the CAPEX budget should provide their acknowledgment (e.g. sign-off) at the respective points of their involvement in the budget preparation stage to accord proper endorsement of the budget;
d) collaboration with Finance should be made prior to seeking approval of the CAPEX budget for cash flow planning purposes,
e) and at the monitoring stage as an additional check and balance function; inclusion into periodic financial reports to Management on reporting of CAPEX budget variance analysis,
f) i.e. comparison between budgeted to actual expenditures as well as explanatory notes to justify significant variances;
g) as the authorization levels have been provided in the LOA to safeguard interest of the Company, these should be strictly adhered to in obtaining budget approvals, including re-allocations; and establish in writing and;
h) formalize the relevant practices into standard operating procedures to provide structured guidance to personnel involved in the CAPEX budgetary process,
i) to address the activities involved, documentation required and roles of responsible personnel.

Management should consider implementing an asset management system which tracks the following: completion of maintenance jobs for each equipment, with comparison made against the respective equipment's planned preventive maintenance schedule; and repair/ breakdown analysis by noting the types, severity, period, duration and root causes of each breakdown occurred.

Management should also ensure that documentation on all maintenance work performed are properly kept, including the request, types of repair works carried out, verification of work performed and analysis on the causes thereof. Conducting formal diligent recording and reviewing of equipment breakdowns would assist Management in determining whether the said equipment is beyond economic repair and should be scrapped.

The information could also be used to appraise the quality of maintenance services rendered by the outsourced service provider, including the quality of parts used. The analysis on BER/ QR equipment should be expedited for asset

https://dx.doi.org/10.22161/ijaers.4.10.12 *ISSN: 2349-6495(P) | 2456-1908(O)*

disposal procedures to be followed through with approvals obtained in accordance with the LOA.

VI. CONCLUSION

Asset management as the term adopted in this article encompasses the effective and efficient management of physical assets as PBJV resource. Asset Management is an extensive and robust overarching organizational capability and framework that is strategic and operational in nature, acts as an interfacing function between organizational strategy, and the strategic, tactical and operational use of physical assets to enable organizational functioning over time.

Value management has an important role to play in asset management. Its role is to understand the linkage, requirements and resolution between organizational strategies, the organization's use of physical assets, and the subsequent prioritization of investment for the creation, renewal, maintenance, disposal and management of physical assets through time (Kelly & Graham, 2015). It also has a focus on decision making interfaces along the AM line-of-sight with respect to prioritizing investment in physical assets and their role in PBJV. In short, the role of VM in asset management is to analyze, explore, develop and implement options to improve the strategic fit between an organization's strategies and its use of physical assets to maintain or enhance organizational value.

To ensure lifecycle value realization, the activities undertaken by PBJV need to balance the costs of different renewal, maintenance, overhaul and disposal interventions. In includes the methods used to ensure the best total value is obtained, by consideration of the interaction between the life cycle activities, and determination of the optimal combination, including costs, risks, performance and sustainability effects. The total value needs also to be considered at the level of asset system or asset portfolio.

In conclusion, VM has an important role to play within the discipline of asset management due to its focus on value, value for money and whole life thinking. The disciplines are complementary and self-reinforcing. In particular, the emphasis on value and whole life thinking reinforces the important role that value management can play within the AM discipline both are strategic, business and organizational strategy focused.

REFERENCES

[1] Campbell, J. D., & Reyes-Picknell, J. V. (2016). Uptime: strategies for excellence in maintenance management. Boca Raton: CRC Press, Taylor &Franics Group.

[2] Che Mat, M.M. (2001). Value Management: Principles and applications, Prentice Hall, Petaling Jaya.

[3] Hastings, N. A. (2015). Physical asset management: with an introduction to ISO55000, Introduction to Asset Management (5). Cham: Springer.

[4] Higgins, L. R. (2008). Maintenance engineering handbook (5th ed.). New York: McGraw-Hill Inc.

[5] https://ivm.org.uk/what-is-value-management retrieved from The Institute of Value Management on July 29, 2017

[6] ISO 55000 Asset management. Overview, principles and terminology. ISBN: 978 0 580 86467 4

[7] ISO 55001 Asset management. Management systems—Requirements. ISBN: 978 0 580 75128 8

[8] ISO 55002 Asset management. Management systems—Guidelines for the application of ISO 55001. ISBN: 978 0 580 86468 1.

[9] Kelly, J., Male, S., & Graham, D. (2015). Value management of construction projects, Value management and asset management, (241-273) Chichester, West Sussex, United Kingdom: John Wiley & Sons Inc.

[10] Lyons, M. (2004) Towards Better Management of Public Sector Assets. A Report to the Chancellor of the Exchequer. HMSO December 2004.

[11] Othman, O.I. (2012). Application Of Value Management At Design Stage – A Case Study (Identifying The Awareness Level), UTM Master of Science thesis retrieved on July 28, 2017 from http://eprints.utm.my/11884/1/OnnyIriawanOthmanMFKSG2012.pdf

[12] TAM (2006) Total Asset Management Guideline: Asset Strategic Planning, TAM06-1, New South Wales, The Treasury, June 2006

[13] TAM (2013) Total Asset Management (TAM) Submission Requirements: Policy & Guidelines Paper TPP 13-03, New South Wales, The Treasury, October 2013