



**PHYSICAL ASSET MANAGEMENT IN SRI LANKAN ORGANISATIONS:
FINDINGS OF EXPERT INTERVIEWS**

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ABSTRACT

Physical Asset Management (PAM) is one of the most important disciplines which positively affects the profitability of an organisation. It helps to optimize the performance of assets while reducing the cost and risk which can be associated with those assets. In the modern world, PAM has received an increasing attention due to the enormous benefits it provides towards business success. Asset lifecycle planning, effective asset utilization and maintenance, asset risk management, asset information management and asset performance measurement are the most popular PAM practices in the world. Though PAM has received increasing attention in the global context, it has not been adequately researched in the Sri Lanka. However, understanding the current practices is important to take improvement measures and therefore, the aim of this research paper is to investigate the current PAM practices in Sri Lankan organisations. A comprehensive literature was conducted to review the literature on different PAM practices and an expert survey was conducted to study the current practices of PAM specifically in the Sri Lankan context. As the findings revealed, though the maintenance of assets are at an acceptable level, the application of asset performance assessments, risk assessments, use of analysis techniques and life cycle evaluations are at a very less level of practice. Hence, the research revealed that PAM practices in Sri Lanka is not at a satisfactory level, and measures should be taken to enhance the current practices as the contribution of effective PAM is immense in terms of optimizing the balance between risk, cost and performance aspects of assets and ultimately supporting positively for the business success. Keywords: Physical Asset Management (PAM), Current Practices, Sri Lanka



INTRODUCTION

Physical Asset Management (PAM) is progressively becoming a more vital area for reaching positive decisions for improved organisational performance. Therefore, PAM practices have to be concerned from the planning to disposal stage of assets. Throughout the world, hundreds of billions of dollars are spent on managing assets. It is very much important to reduce associated cost and risks and enhance the performance of physical assets across their lifecycle. PAM allows an organisation to understand the capabilities of its assets, and how they can be operated in the most effective manner. The aim of this paper is to review the literature on PAM practices and to discuss the experts' opinions of current PAM practices in Sri Lanka. The physical assets which are considered in this paper include the engineering and utility assets which are used for supportive operations for the core business. A total of five semi structured interviews were conducted among experts in the field of PAM and the collected data were analysed by adopting content analysis. The paper starts with a review of literature related to physical assets, concept of PAM and different practices related to PAM. Subsequently it discusses the methodology used in achieving the aim of this paper. Then, the findings of the study are discussed and finally the conclusions are presented.

INTRODUCTION TO PHYSICAL ASSETS

Physical assets are the fundamental resources for organisational activities

which can be categorized into two different types as current assets and non-current assets (The university of Sydney, 2016). Both types of assets are essential for organisations to carry out their activities. Non-current assets such as buildings, machinery, plants and land, etc. provide potential value to the organisations for more than one year while current assets such as stocks, money, finished goods and materials provide value for less than one year (Theron, 2016). The British Standards Institute (BSI), described five kinds of assets which can be found in an organisation. The standard main five categories are financial assets, physical assets, human assets, information assets and intangible assets (Hastings, 2016). There are various types of assets relevant to all process industries such as physical, human, information, financial and intangible. However, the optimum interface among those assets and physical assets is critical for maximum value addition (Robert, 2017).

According to PAS 55 (2008), physical assets are categorized as plant, machinery, property, vehicles and other items and related systems that have a distinct and quantifiable business function or service (D'ALESIO, 2012). As it is shown in Table 1, over the year's physical assets have been emphasized by different parties in different ways. As a summarisation of the definitions, physical asset can be identified as a strategic resource which has long term useful life and actual economic value to help an organisation to gain revenue and to achieve organisational objectives.



Table 1 - Definitions of physical assets

Source	Definition
Wallingford & Sticklen (1992)	Physical asset is an asset that has a useful life greater than a year and is expected to earn income sufficient to cover the operating expenses and amortized acquisitions cost associated with it
British Standard Institution (2004)	Physical infrastructure, vehicles and non-consumable items and related systems that have a distinct and quantifiable business function
The Institute of Asset Management (2014)	Physical asset is an item, thing or entity that has potential or actual value to an organisation.
Trojanowski (2015)	Assets are the basis for any business activity which carries out tasks and achieving organisation's objectives.
Investopedia (2017)	Physical asset is any item of economic value owned by an individual or corporation

PHYSICAL ASSET MANAGEMENT

With the ever growing competition, PAM is becoming a prime challenge for business organisations and has acquired a special attention as a management function (Emmanouilidis & Komonen, 2013). Proper management of physical assets is one of the most critical factors that lead

towards the achievement of organisational goals and objectives (Madusanka, Rajini, & Konara, 2016).Over the time different authors and institutes have defined PAM in different ways. Table 2 provides some of the definitions on PAM.

Table 2 - Definitions of physical asset management

Source	Definition
The Asset Management Council (2009)	PAM is the optimal life cycle management of physical assets to sustainably achieve the stated business objectives.
The Institute of Asset Management (2014)	PAM is defined as systematic and coordinated activity through which an organisation optimally and sustainably manages its asset systems, their associated performances, risks and expenditures over their life cycles for the purpose of achieving its organisational strategic plan.
ISO 55000 (2014)	PAM management is a coordinated activity of an organisation to realize value from assets.
Trojanowski (2015)	PAM is guiding the processes of acquisition, use and disposal of assets to make the most of their future economic benefit and manage the related risk and costs over the entire life cycle
Davis (2016)	PAM is an approach that looks to get the best out of the assets for the benefits of the organisation and its stakeholders

As summarization of above definitions, it can be mentioned that PAM is an optimal

lifecycle management of physical assets by effectively identifying, designing,



constructing, operating, maintaining and ultimately disposing physical assets in order to maximize performance and minimise risks and expenditures. It helps to gain greatest lifetime effectiveness, utilization, return from physical assets and sustainably achieve the stated objectives.

The main objective of PAM is getting the best return from investment of physical assets and minimising the whole life cost of assets and risk while ensuring optimum performance and business continuity (McKeon & Ramshaw, 2013). Thus, as it is mentioned in Figure 1, an important aspect of PAM is to strike the right balance between performance, cost and risk in pursuing the enterprise goals (Emmanouilidis & Komonen, 2013).

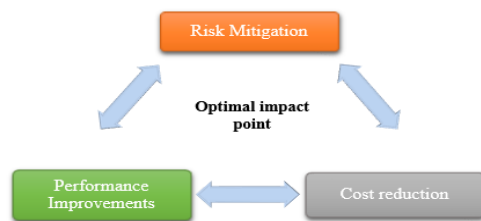


Figure 1 - Optimal balancing of risk, cost and performance

Source: Hastings (2016)

ISO 55000 (2014) outlined the requirement to achieve the desired balance of cost, risk and performance. Accordingly, the three parameters are as follows.

Performance: the purposes fulfilled, functions performed by an entity or system or the outcomes or results its stakeholders expect it to produce and measurable result.

Cost: the totality of inputs necessary including energy, time, intangibles or natural resources.

Risk: relates to the assurance of continued capability and is defined by ISO 31000 as “the effect of uncertainty of objectives”.

As per Woodhouse (2001), whole life business impact is not the balancing point where costs, risks and production impacts are equal. The true optimum is where the combination of costs, risks and performance shortfall is of minimum total impacts. It is vital to find the right combination of risk, performance and cost, where commercial safety impact of failure is high (Woodhouse, 2001). Effective control and governance of assets by organisations is essential to realize the value through managing risk and opportunity, in order to achieve the desired balance of cost, risk and performance (International Organisation for Standardization, 2014).

According to Mardiasmo, et al. (2008), for physically asset-intensive organisations, asset management processes and intervention strategies are considered a crucial element. Because, there is a heavy reliance on optimal performance of assets in order to maximise organisational performance and business goals. To gain even greater value, the asset management process should extend from design, procurement and installation through operation, maintenance and retirement, i.e. over the complete life cycle (Blanchard & Fabrycky, 1998). PAM may be regarded as an essential technical as well as a business process, and is increasingly considered as a contributor to an organisation’s objectives through managing asset performance with the intention of achieving the competitive strategy (Dwight, 2013). According to Enterprise Software Product Group, (2016), there are five ways to improve performance and profit in asset intensive businesses i.e. improving asset availability



and performance, optimizing the maintenance, repair and operations supply chain, improving decision making at the point of maintenance, addressing safety issues at the point of potential incident and standardizing on ISO 55000/01/02 (Enterprise Software Product Group, 2016).

The coordinated PAM system plans and controls the asset-related activities and their relationships to ensure the asset performance to meet the intended competitive strategy of the organisation (Dwight, 2013). Asset management is pivotal to the performance and growth of an organisation, where effective management is essential to maximise utilisation of an asset during its lifecycle (Mardiasmo, et al., 2008). Proper asset management leads an organisation to optimise benefits such as reducing the repairing and operational cost of assets, reducing the health impacts of operating assets and reducing the legal risks associated with their life time and increasing the attraction of the customers and employees (Davis K. , 2016). According to Wendling (2011), most of the facilities such as hospitals, hotels, public utilities, and manufacturing organisations, etc. depend deeply on physical assets (Wendling, 2011). Further, as mentioned by Charles and Brent (2005), every organisation has to face significant challenges to manage their physical assets (Schuman & Brent, 2005). Without proper management of physical assets serious health, safety, environment, and financial consequences can occur (Ratnayake & Markeset, 2012). However, PAM is one of the most important disciplines to maximise the profitability of any organisation.

PHYSICAL ASSET MANAGEMENT PRACTICES AT DIFFERENT STAGES OF ASSET LIFE CYCLE

The substantial life of an asset needs to be distinguished from its useful life to an organisation. The useful life is the period over which the benefits from the use of the asset are expected to be derived (Management Audit Bureau, 2016). The ISO 55000 Asset Management Standard positively establishes the forecast that assets will be handled throughout their lifecycle. The substantial life cycle of an asset has thus four various phases as it is depicted in Figure 2 and described in following section.



Figure 2 - Physical Asset Lifecycle Stages

Source: (ISO 55000, 2014)

PLANNING STAGE

Planning is the first stage of the asset life cycle. This stage establishes and verifies asset requirements. Establishment of asset requirements is based on assessment of the existing assets and their potential to meet service delivery needs (Keqa, 2016). According to Schuman & Brent (2005), the identification of a need for assets will begin during the initial investigation stage of a project in the process industry. At this phase, a selected asset is carefully evaluated in terms of its planned utilization,



meaning that the acquiring team needs to plan exactly how the asset is to be used and what goals for utilization need to be set. (Warner, 2014).

Lifecycle planning is a key asset management tool that takes into account the whole of the life implications of acquiring, operating, maintaining and disposing of an asset. (Department of Housing and Public Works, 2010). It is an integral part of strategic asset management and enables investment and other decisions to be made using appropriate evaluation tools and decision making criteria (Department of Planning, Transport and Infrastructure, 2017). As per Davis (2016), planning stage covers everything the goes into planning, designing and procuring an asset. The key processes associated with the planning phase include strategic planning, capital planning and evaluation, lifecycle cost analysis, and auditing (International Organisation for Standardization, 2014).

In the planning stage, asset management policy objectives, plans and strategies focusing on service delivery objectives of assets are clearly stated (Campbell, Jardine, & McGlynn, 2016). The starting point for any organisation seeking to develop and implement an asset management system is to review and compare the organisation's current management of its assets against the available good management practices, guidelines and standards, and determine the extent to which these requirements are currently met, what are the gaps and what improvements can be made. Thus, based on the findings and conclusions, an organisation will make future policies, strategies and plans for improving the current practices by setting the vision, goals, objectives and respective activities related to asset management (Network of

Association of Local Authorities of South-East Europe, 2014).

CREATING/ ACQUIRING STAGE

Create or acquire phase of the life cycle is where the decisions made have the greatest impact on the total cost of ownership of an acquired or created asset. This is also where the greatest collaboration of a cross-functional team is needed to ensure that intended benefits will be realized (Life Cycle Engineering, 2014). Detailed engineering through commissioning occurs in this phase (International Organisation for Standardization, 2014). It includes all the activities that are involved in the financial and technical analysis and justification of the creation/ acquisition of the assets. The need for the asset is established and the method of acquisition is determined (El-Akruti & Dwight, 2013).

Further, at this phase, the asset is either purchased or leased/rented and installed/built/delivered to its intended location. According to Warner (2014), this is also the point at which any cost negotiations can take place, including any guarantee, warrantee or other contractual terms that may be important. The acquisition phase is taken into encompass need identification, alternative exploration and selection and synthesize decision. As stated by El-Akruti & Khaled , (2012), acquisition means all the activities involved in technical and financial analysis, justification and planning for acquisition of new assets as well as managing asset acquisition. This is reflected in the need for the commissioning stage in the life cycle to oversee the initial operation of the assets (Davis, 2016). Risk assessments also need to be conducted during this stage.



OPERATION & MAINTENANCE STAGE

Operation and maintenance phase is where value is created. The newly commissioned assets function to provide the solution defined in the planning stage. This is also the longest phase by duration of the asset life cycle. Once this phase of the life cycle is reached, only about 15% of the total operational cost can be influenced (International Organisation for Standardization, 2014). During this phase, the asset should be maintained in a condition that matches the service delivery demands placed on it. Operating cost, such as energy and cleaning costs, statutory charges and management costs will also be incurred during this phase (Management Audit Bureau, 2016).

The operation and maintenance stage indicates the application and management of an asset, including maintenance, with the aim of delivering services. The plan of asset management should have a high focus on asset maintenance issues. Throughout this time, the asset should be focused to appropriate maintenance, monitoring and potential improvement to overpass any adjustment in operational requirement (Keqa, 2016). All the activities are involved in most effectively maintaining asset availability, longevity and capability (quality & performance) (El-Akruti & Khaled, 2012). The operation of the assets is where performance is most affected (Campbell, Jardine, & McGlynn, 2016). At this phase, the asset is used or operated and then maintained as necessary (and costs are collected to ensure the full life cycle costs are being properly captured). Depending on the asset, this phase may go from months to years or even decades and the business

therefore needs to have a much planned use and maintenance approach (Warner, 2014).

During the operational stage, information collected from internal and external sources should be maintained on an ongoing basis. Information related to physical assets are physical, financial, operational, market information and organisational policy and statutory requirement (Schuman & Brent, 2005). Asset registration is the process of recording and accessing asset information to measure and report on the performance of assets in the delivery of services. Asset register is the output document of asset registration (Department of Housing and Public Works, 2010). Mostly organisations maintain asset information in the form of asset registers which usually include the information regarding type of asset, location, financial information, technical information and operational information (Management Audit Bureau, 2016).

Asset review and analysis is a structured and systematic process which involves the identification, collection and analysis of relevant data for the purpose of assessing the performance of an asset portfolio (Department of Housing and Public Works, 2010). During this period, the asset should be subjected to appropriate monitoring, maintenance, refurbishment and potential upgrade to meet any change in condition or operational requirement (Davis, 2016). In the operation and maintenance stage, performance indicators such as percentage of asset base which satisfies the organisation's service delivery objectives, operational and maintenance cost, depreciation and useful lifetime of the asset are used. The major focus of this phase is on evaluating effectiveness of the controls to mitigate or eliminate predominant failure modes and identifying waste within the



value stream (International Organisation for Standardization, 2014).

DISPOSAL OR REPLACEMENT STAGE

This phase involves disposal, retirement, or liquidation of assets in accordance with the strategy, policies and procedures (Campbell, Jardine, & McGlynn, 2016). The Disposal or replacement phase occurs when the disposal, decommissioning, or replacement of an asset is necessary following the end of an asset's service life or change in asset requirements due to rationalization. According to International Organisation for Standardization (2014), if unplanned, this phase can have a significant negative impact on an organisation's financial statement. During this phase, the organisation divests itself of the asset. This usually occurs when the asset is no longer useable or when its disposal makes greater economic contribution to the organisation than its retention (Sutter, 2014).

When an asset reaches its end of a useful life, it can be treated as a surplus, or otherwise is considered as an underperforming asset. Disposal should be treated in the perspective of the effects of the decision on service delivery and any departmental responsibilities (Management Audit Burea, 2016). A special focus should be placed on cultural heritage where there are detailed requirements that organisation should take into consideration. If in the near future an asset is to be disposed, in order that statutory maintenance to be taken, the maintenance strategy should be properly

adjusted (Keqa, 2016). At the end of their useful life or when the cost of operating or maintaining them becomes too high, assets need to be planned fully retired and properly disposed of. This should be done in an organised way and overlapping with a new asset being acquired (Warner, 2014).

The asset review and analysis process is undertaken to determine asset deficits, asset surplus and asset to be kept. This disposal stage will list in priority order, the assets identified for disposal, identify any associated costs which may need to be incurred in order to dispose of assets and provide information to meet annual reporting and budget forecasting requirements. In the disposal stage cost of disposal in relation to return, funds achieved from identified disposals and client satisfaction with the disposal outcomes can be used as performance indicators (Elmbridge Borough Council, 2014).

RESEARCH METHODOLOGY

After a comprehensive literature survey, expert interviews were carried out in order to investigate the current PAM practices in Sri Lanka. The experts who were selected for the expet interviews were the professionals who are well experienced and knowledgeable on managing physical assets in business organisations. The details of the selected interviews have been summarized in Table 3. The required data were collected through semi structured interviews while the collected dta were analysed using manual content analysis.

Table 3 – Profile of Experts



Respondent (Experts)	Designation	Experience in the PAM field
A	Senior Facilities Manager	More than 20 years
B	Chief Engineer	More than 20 years
C	Premises Manager	More than 10 years
D	Maintenance Engineer	More than 10 years
E	Facility Manger	More than 10 years

DISCUSSION AND ANALYSIS OF FINDINGS OF EXPERT INTERVIEWS

As per the experts’ views, PAM is also an important management that is required to be practised by business organisations similar to their other management practices. Physical assets are the keys to create effective physical environment as routine business activities cannot be carried out without physical assets. If the physical asset is in a good condition, useful lifetime of the asset is high and it is free from safety problems. Further, a good physical asset creates the workplace very comfortable and supportive for business processes. These will help to achieve higher standards of the businesses and consequently will uphold the reputation and increase the customer attraction towards the organisation.

According to the research findings, PAM is an important practice for any organisation as almost all the organisations are largely depend on their physical assets. As majority of the respondents mentioned, proper PAM is crucial for an organisation to save its money. If necessary consideration is given to physical assets, the running costs and uncertain repair costs can be minimised. As respondents highlighted, failure of a physical asset even for a second may disturb the business

operations and reduce the production and lead to lose the income in huge amounts. Therefore, managing physical assets is of utmost importance to ensure that the smooth functionality of the respective operation is not disturbed thus the potential income is not lost. Findings further revealed that physical assets highly contribute to efficient operations as well. If the physical assets are properly managed, it will ensure that the assets are operated with maximum efficiency so that maximum level of productivity can be achieved.

As experts mentioned, while having proper management of physical assets only, they can understand when and how to carry out all the activities related to life cycle of physical assets such as, to carry out maintenance, repair, lubrication, replacing worn components before they actually fail, equipment checks, partial or complete overhauls at specified periods, oil changes, lubrications, etc. Further, PAM ensures that there should be a well knowledgeable responsible party to take care of all the PAM related activities. Making all the decisions related to physical assets by such responsible party will ensure that the objectives of the PAM can be effectively achieved.

The responses given by the respondents regarding the responsibility for PAM indicated that the organisations in other countries have a separate group or personnel who take care of the PAM of the



organisation whereas a very few organisations in Sri Lanka practice PAM in the similar way. As per the respondents, engineering department is mostly responsible for the PAM in most of the organisations. However, in some organisations physical assets are managed by other departments such as maintenance department, administration department, asset management division, etc. Thus, PAM is mostly done by professionals such as chief engineer, premises manager, maintenance engineer, maintenance supervisors, and maintenance technicians, etc. in Sri Lanka. Findings showed that the decisions related to PAM in some organisations are made by asset management teams. These teams are either led by chief engineer, maintenance manager or finance manager and representatives from all other departments of the organisation are selected as team members. However, in most of the time, different assets are managed by different professionals and therefore single point of responsibility cannot be seen and it can be identified as a drawback in the existing PAM practice. Further, as the study revealed, personnel such as general manager and purchasing manager also involve in PAM though they are not competent specifically in PAM. As the experts pointed out, it is difficult to handle physical assets without having a specified knowledge on PAM and the accuracy of the decisions made by such professionals cannot be ensured and also such decisions may negatively affect the performance of the organisation. Moreover, it could be identified that PAM in some organisations in Sri Lanka are done by outsourced companies or by an outsourced personnel. These outsourced companies have experts on the services that they are providing for the client organisations and therefore, the

decisions made by such professionals are more reliable. However, it again depends on the expertise of the parties employed by the outsourced companies and the professionals who make PAM related decisions.

According to ISO 55001 (2014), asset life cycle involves planning, acquisition/creation, operation and maintenance, refurbishment, and/or disposal of physical assets. The interview results demonstrated that, organisation should consider about all these stages to manage their physical assets effectively. The views of experts on current practices of PAM in business organisations in Sri Lanka in different stages of their asset life cycle have been discussed in following paragraphs.

Planning stage

Planning stage is the first and foremost step in the physical asset lifecycle. Generally, if there is a need for new equipment (utility systems), the request is made by the respective department and the request is evaluated by the responsible party in the organisation for PAM. The respective professional then checks the availability of budget and get approval from Chief Financial Officer (CFO) and Chief Executive Officer (CEO), i.e. from the top management. Some organisations conduct feasibility studies for the system, select the best tender for the system and get approval from finance department for the system procurement.

Acquisition stage

The acquisition stage generally involves technical and financial analysis, justification and planning for acquisition of new assets as well as managing asset acquisition. This is reflected in the need for



the commissioning stage in the life cycle to oversee the initial operation of the assets. Similar to literature findings, as the study revealed, commissioning and testing for newly purchased equipment are carried out in this stage. Further, warranty documents and other relevant documents are also obtained during this stage. In experts' words they "capitalise the items in the financial statement during this stage".

Operation and Maintenance stage

After obtaining the assets and while operating the assets, it is very much important to carry out maintenance activities. The respondents stated that the main activities during maintenance are preventive in nature including equipment inspection which include cleaning, repairing, replacing worn components before they actually fail, equipment checkups, partial or complete overhauls at specified periods, oil changes, lubrications etc. Further, the research findings revealed that apart from the internal employees who involve in managing physical assets, in some instances, outside parties are employed. This is mainly done when the organisation cannot carry out certain asset maintenance activities by employing their internal employees. Though the internal employees engage in major maintenance activities in day to day operations, if the breakdown is beyond their technical knowledge or the preventive activity requires in-depth knowledge on the system, the outsource organisation is employed to address it. Most of the time, maintenance activities are outsourced to the company from which they purchased the equipment/system. As per the experts, organisations always adopt preventive maintenance plans and corrective maintenance plans, arrange external service providers to train in-house people to carry

out the maintenance operations and in each year they renew the contract with service providers.

As per the respondents, it is very important to identify the risks, issues and failures before it will be materialized. Therefore, they regularly observe the physical assets through walk through rounds. Manager responsible for PAM always keeps the eyes and ears on the assets and if there is any issue, the required actions are taken. Organisations maintain an asset register to note down all the details regarding assets such as: name, location, capacity, model number, code number, date of purchase and service details, etc. Mainly, the decisions related to maintenance activities, frequency of maintenance and responsible persons are done based on the asset register.

Disposal stage

At the end of a lifetime of an asset, the organisation has to carry out some activities to take them away from the premise. The department responsible for PAM determine the condition of asset and decide that the asset should be replaced. After communicating the decision to the top management, justifying the reasons for replacement and obtaining approvals, the disposal actions are considered. The general disposal options include either disposal or replacement. If there is any possibility to resale they always give priority for that. If resale option is not possible, only they go for disposal option.

As the research findings revealed, PAM in Sri Lanka is not at an acceptable level. The major issue the interviewees highlighted was that though the management of physical assets is an important practice for any of the organisations to ultimately achieve their core business objectives, the



understanding this importance by the business owners in most of the business organisations in Sri Lanka is at a very low level. Most of the organisations are therefore reluctant to invest in physical assets specially the utility assets, considering them as an expense rather than a resource that supports to achieve organisations' intended objectives. Although the managers who involve in PAM mostly come up with plans for new purchases or extensions/improvements of existing assets or major repairs in order to improve the service delivery or the comfort to the occupants of the buildings, mostly, such plans are not approved or approved with certain limitations due to budgetary issues of their organisations. PAM does not involve only management of assets during its operational stage and simply it involves all the activities from planning to asset disposal. Therefore, when making decisions on assets, whole life business impact should be evaluated. This is mostly lacking in the Sri Lankan context, even when purchasing assets mostly the initial cost, maintenance cost and depreciation are considered but the useful life time, technological obsolescence, replacement costs and time periods are not considered. However, most of the organisations in Sri Lanka therefore operate with assets with inefficiencies or old assets and therefore, organisations are not capable of replacing assets at right time. As a result, most of the organisations have to spend unnecessary cost on their physical assets, causing due to high operational cost, high maintenance cost and high replacement costs. On the other hand, this will lead to decreased employee satisfaction, increased idling time (repair time) etc. and ultimately will negatively affect the profitability and reputation of the organisation.

As there are professionals who are experienced and qualified in the field of maintenance management, preventive, predictive and reactive maintenance of assets are carried out in a sufficient level. However, as per the experts' views, apart from asset maintenance, most of the other PAM practices are not up to the required level. Mostly, organisations operate on a reactive basis and find solutions when the problem occurs and do not consider about eliminating future issues. Organisations think assets maintenance is the only cost which they can minimise and organisation consider the assets maintenance as well. Though purchasing new assets and dispose the assets, etc. involve a considerable amount of money, reduction of such costs have not been given adequate attention.

There are several standards for PAM such as ISO 55000 (2014), PAS 55 (2008), etc. which are globally accepted and practiced for effective management of physical assets. However, in Sri Lankan organisations, such standards of practices cannot be seen for PAM. Normally, asset management policy, objectives and plans are not set and communicated to relevant stakeholders. Further, aligning asset management objectives with organisational strategic objectives is also hardly found and linking them with maintenance, risk management, health and safety and other relevant practices is also rarely done. Thus, practicing PAM as a system is not still practiced in Sri Lankan organisations.

Risk management is seen as an indispensable aspect of asset management and the alignment of asset management with risk management approach is essential part of it (ISO 55000, 2014). The majority of experts have identified that, most of the Sri Lankan organisations do not follow any particular risk management procedure for



PAM. Generally PAM exposes to number of uncertain events. But, the PAM responsible parties in Sri Lankan organisations do not give prior concern on PAM related risks and management of such risks. The reason pointed out by the respondents was lack of standardised risk management procedure to understand and estimate the risks. They do not follow the legal standardised format for risk management. Therefore, they do not know the actual procedure of risk management and how to estimate the severity and probability related to PAM.

As it was discussed in the literature, PAM is all about optimizing three parameters i.e. risk, cost and performance of the assets (Hastings, 2016). As per the expert survey findings, in current practice, organisations in Sri Lanka give the priority for reduction of cost of PAM rather than, going for risk reduction and optimizing performance thus, not achieving the optimum balance. Yet, consideration of performance of asset is higher than trying to minimise the risk related to physical assets. However, performance evaluations of assets are not regularly carried out and operational decisions are not made based on them.

Organisations can manage their physical assets in the best way by using appropriate tools and techniques. Life cycle costing is the widely used tool in making decisions related to PAM. According to all the experts, a specific tool is not used in decision making related to PAM in the current practice. However, as mentioned by the respondents, instead, past records, management opinions, past experience are considered in making decisions. When it comes to PAM, maintaining asset life cycle data is very important. Though some of the organisations maintain asset registers, most of the organisations in Sri Lanka do not

maintain asset information in a form of assets register yet. The organisations who use asset registers even include only the physical information of assets. Details on asset condition, utilization, asset performance and cost are maintained at a very low level. It implies that the decisions taken regarding PAM are mostly not based on historical data of the relevant assets and therefore there is an issue regarding the accuracy and reliability of decisions which are taken without having a sound basis.

Organisations do not consider PAM as an important discipline and do not provide the asset management professionals with adequate training on it. However, this seems important because the professionals involve in this process in the Sri Lankan context are not purely asset management professionals i.e. either financial managers, engineers, maintenance managers who are qualified in a different discipline and gathered some knowledge about PAM with experience. Though facilities managers who are knowledgeable in PAM are also employed in Sri Lanka, they are not involved in PAM. However, having knowledge on overall PAM is important as these professionals involve in making decisions on PAM. Apart from that, a tendency to study the globally accepted practices and applying them in to their working organisations is also lacking from the side of professionals who involve in PAM in organisations in Sri Lanka. Further, as per the experts, negative attitude towards innovation hinders proper management of assets. However, innovative solutions will maximise the usage of physical assets.

CONCLUSIONS

Within an increasingly competitive global economy that enforces the maximising of cost savings with subsequent profit



increases, successful companies have to demonstrate an understanding and commitment with PAM practices to two key benefits that have been identified as increased productivity and growth. PAM in Sri Lanka has not been given adequate attention as a discipline, though some of the areas of discipline such as maintenance management and investment appraisal are practiced up to an acceptable level. The professional involve in PAM in Sri Lankan organisations are not experienced well in PAM discipline, but only one or few areas related to PAM. However, having a thorough knowledge and experience in the same field if the professionals directly involve in PAM, especially in making decisions. By employing well qualified and experienced professionals in the PAM area will help the organisations in Sri Lanka to apply the practices which are lacking in the current context. The lacking areas identified through the research are asset performance monitoring, risk management, asset registration with all required information, asset life cycle planning, asset management systems implementation, etc. In addition, providing training on the above areas need to be motivated. Further, implementation of internationally recognized standards of practices such as ISO 55000 (2014), PAS 55 (2008) can be recommended in order to improve the current PAM practices in Sri Lankan organisations.

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