

Implementing Asset Management: Organizational Capacity as Primary Challenge

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I. Summary

Successful implementation of asset management is more about the “how” implementation should be conducted rather than the “what” should be done – we have plenty of guidance that tells us what we should do. Success using similar, cookie-cutter implementation tasks and approaches is generally elusive, even within the same industry or at different locations within the same company. The authors maintain that the common equation for success is related to choosing an approach that matches Organizational Capacity, whether in the same industry or across different industries or locations. This paper uses “Organizational Capacity” as an operative definition to best capture the ability to implement and maintain asset management as a whole.

Organizational Capacity = the Secure Harbor + CID Nexus + Personality/Time

Key aspects of Organizational Capacity that most significantly impacts successful asset management implementation includes: having and maintaining a Secure Harbor (safe place) that is ripe for continual improvement; establishing and maintaining an organization structure commensurate with the nexus of workforce capabilities, information systems, and decision making; and recognition of the personality of the organization that can exist within the bounds of one’s culture.

II. Background

Asset management can be simply stated as the risk-based approach to get the most reliability and most time from the things we possess. Moving to a culture that focuses on formal risk analysis, quantification of performance, and making long-term decisions requires a different type of thinking than many organizations have historically utilized. The move to a new way of doing business requires individuals, teams, and entire organizations to implement what is perceived as radical change in a short period of time.

Some relevant aspects of Cyert and March’s behavioral theory of the firm are “uncertainty avoidance” and “environmental negotiation”. Both reflect managers’ limited ability to deal with uncertainty and complexity. Uncertainty avoidance manifests itself through sub-optimization, the

use of slack (to decouple interrelated systems such as production and inventory), reliance on routines (e.g. always using the same supplier), and not sticking out one’s neck (Cyert and March, 1992). These manifestations are common pitfalls for successful asset management implementation at the managerial level.

Implementing changes required by asset management are also naturally disconcerting to individuals. It is a widely held view that a major reason of an individual doing nothing, the celebrated status quo solution, is fear (Kleindorfer, Kunreuther, and Schoemaker, 1993). Accepting a problem and implementing its resolution implies accepting responsibility for the solution. This can be a threatening experience, especially because the results with respect to asset management will by their nature be made public to peers. In addition to the fear of doing something wrong, individuals are also frozen by the fear of unintended consequences on others (Kahneman, 2011).

Historical Context

The term “asset management” can be traced to the 1990s in Australia and New Zealand, primarily in response to a major infrastructure failure in the electrical power grid (BAMI, 2015). The National Asset Management Steering Group (NAMS) was formed which was a combination of efforts between the Association of Local Government Engineering of New Zealand and the Institute of Public Works Engineering of Australia (IPWEA). The seminal document for the Australian-New Zealand methodology for asset management was first published in 2002 as the International Infrastructure Maintenance Manual (IIMM).

An international standard for asset management, ISO 55000, was formally adopted in January 2014. Initially a Publicly Available Specification (PAS 55) published by the British Standards Institution in 2004, PAS 55 was originally produced by a number of organizations under the leadership of the Institute of Asset Management (IAM). A substantial revision to PAS 55 was completed in 2008 by 50 participating organizations from 15 industry sectors in 10 countries. In 2010, an ISO Project Committee was formed and in January 2014 the new ISO standard was released.

Both PAS 55 and the IIMM were driven initially by strong support from central governments. In the United States, there was not a strong central government driver. The

majority of the roots of asset management in the United States can be traced to fiscal requirements by the Government Accounting Office (GOA) in 2004 as a result of major public infrastructure challenges. Several guidance documents, such as those published by the Buried Asset Management Institute and the Association of Metropolitan Sewerage Agencies' (AMSA) *Managing Public Infrastructure Assets* were developed to capture the "US method" of asset management.

In the United States, the General Accounting Standards Board (GASB) released statement 34, or GASB-34, in 1999 which for the first time required that infrastructure assets be included in financial statements in the public sector. Two approaches were authorized for use by GASB-34. The first was based on standard accounting depreciation methods (Depreciation Approach or Method 1) while the second (Modified Approach or Method 2) allowed for local and state entities to use actual maintenance expenditures in conjunction with condition assessments for reporting depreciation. For nearly a decade, GASB-34 was believed by many experts in the public sector to be the primary driver for asset management programs.

GASB-34 as a primary driver for making asset management commonplace in the US public sector did not fully materialize, primarily because the vast majority of local and state governments still use standard depreciation (Method 1 under GASB-34). However, several key aspects of GASB-34 can be found in the methodologies for developing and implementing asset programs today in both the public and private sector. These include:

1. Condition assessments must be performed every 3 years or the organization cannot use the Modified Method. A 3-year, rotating basis that covers all of the assets in an asset management program has become a form of an industry standard, although the majority of organizations do not use the Modified Method for financial reporting.
2. An initial cost threshold for capital assets or a network of capital assets is typically \$5000. Most local and state government financial offices use this number, or even \$1000 or \$3000; however, GASB-34 does not require a specific number and leaves this decision to the unit of local government. But \$5000 has slipped into the financial reporting logic and is commonly seen in the definition of an asset.
3. An allocation of between 2% and 4% of a facilities current replacement value is recommended for maintenance and repair. These levels correspond to a useful life of 25 to 50 years. While 25 years is not unreasonable for some types of mechanical and electrical equipment from a historical perspective, the current generation of electrical and instrument and controls (I&C) equipment reaches obsolescence much sooner. Many structures last more than 50 years. However, these rules of thumb have become the standard in many asset management programs, regardless of the M&R experience.

Solomon, Oldach, and Benson (2016) have documented the unintended harm on organizational maintenance and reliability outcomes by the proliferation of regulatory and accounting influences on asset management systems. The same regulatory and accounting influences also often stifle the asset management in its implementation.

Asset Management Defined

According to ISO 55000, an asset is something 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, 2014).

Asset management translates the organization's objectives into asset-related decisions, plans and activities, using a risk based approach. An organization's top management, employees and stakeholders should implement planning, control activities (e.g. policies, processes or monitoring actions) and monitoring activities, to exploit opportunities and to reduce risks to an acceptable level. Asset management involves the balancing of costs, opportunities and risks against the desired performance of assets to achieve the organizational objectives. The balancing might need to be considered over different timeframes. (ISO-55000, 2014)

The Buried Asset Management references seven questions that asset management was intended to answer: What do we own; What is it worth?; What is its useful life?; What condition is it in?; Do we need to renew or replace it?; When do we need to renew and replace it?; and How do we pay for it? (BAMI, 2015). The USEPA has consolidated this into five questions: What do I own?; Where is it?; What is its condition?; What is its useful life?; and What is its value? (USEPA 2008).

As can be noted, the first three questions of asset management are most concerned with asset identification, characteristics, and tracking. The latter questions are intended to address the issues associated with asset health, diagnostics, and prognostics. These latter questions are closely associated with a combination of risk management, reliability engineering, and financial management to optimize and maximize asset life and value.

Role of Business Process

According to ISO 55000 (2014), an asset management system is a set of interrelated and interacting elements of an organization, whose function is to establish the asset management policy and asset management objectives, and the processes, needed to achieve those objectives (see 3.4.3). In this context, the elements of the asset management system should be viewed as a set of tools, including policies, plans, business processes and information systems, which are integrated to give

assurance that the asset management activities will be delivered.

Asset management requires accurate asset information, but an asset management system is more than a management information system. Asset management interacts with many functions of an organization. The assets themselves can also support more than one function and more than one functional unit within the organization. The asset management system provides a means for coordinating contributions from and interaction between these functional units within an organization (ISO 55000, 2014).

In support of the business processes associated an asset management system, ISO 55000 cites operational planning & control and management of change as key components. Specifically, the organization shall plan, implement and control the processes needed to meet requirements by: establishing criteria for the required processes; implementing the control of the processes in accordance with the criteria; keeping documented information to the extent necessary to have confidence and evidence that the processes have been carried out as planned; and treating and monitoring risks. In terms of change management and related processes, risks associated with any planned change, permanent or temporary, that can have an impact on achieving the asset management objectives, shall be assessed before the change is implemented. The organization shall control planned changes and review the unintended consequences of changes, taking action to mitigate any adverse effects, as necessary.

III. Implementation Factors

According to ISO 55001 and 55002, the organization shall establish, implement, maintain and continually improve an asset management system, including the processes needed and their interactions, in accordance with the requirements of this International Standard. Aspects of implementation include: leadership; policy; resources; planning; and support (ISO 55000, 2014). While ISO accurately describes many of the key aspects associated with effective implementation, it does not provide specific priority on one aspect over another.

The authors have found that successful implementations must be attacked from two levels. If only one level is utilized the implementation will not be sustainable. The first from a sequential point of view is the strategic level, where executive level commitment and adequate funding are crucial aspects. The second is at the operational level where short-term wins, communication, and training are the most important aspects.

In terms of executive level commitment, the commitment is more than just establishing an asset management talking point or including it as one of a number of corporate initiatives from the executive suite. For an implementation

to be effective, the executive leadership must be personally engaged, active, and visible. Asset Management must be a topic at the top of every senior management meeting and communication. Asset management must be THE initiative to guide the organization.

Funding must also be adequate for long-term organization change, and not just a line item in the budget. In other words, funding for asset management must be made fully and it must be there in the hard times. When tactical but important equipment fails, the asset management budget cannot be cut because it is less tangible. It must be underscored as necessary by remaining fully funded This also sends the message that organizational change will remain even the tough times.

Short-term wins are required at the operational level. Asset management has must be real at the operational level for an implementation to be successful. As one utility executive once said, we cannot just continue to plan while the house is burning down. Success breeds success in terms of the staff morale factor. Front-line management support (and strategic funding) will also not persist for years if success is not shown for the resource investment.

Communication and training are also important at the operational level. Front-line staff needs to know what they are doing, why they are doing it, and the benefits for them - not just organization benefits or the boss said so. Implementation success is also dependent on real and practical training – not just paper or mass training. And asset management training must be specific and must be at right time. The focus on the content must enable decision making under asset management principles. Bloom's Taxonomy, described in a subsequent section, provides an excellent guideline for training and hierarchy of learning.

Organizational Capacity

Despite these almost universal understandings some corporations still fail to get their Asset Management programs off the ground or are struggling and grasping at straws to make them sustainable. Repeatable success using similar, cookie-cutter implementation tasks and approaches have proven elusive, even within the same industry or at different locations within the same company. A deeper challenge must be addressed that just having the right manuals, set of plays, or support have been unable to solve. The authors maintain that the common equation for success lies in choosing an approach that matches Organizational Capacity. Organizational Capacity is defined as the Secure Harbor + the CID Nexus + Personality/Time. The Secure Harbor includes having and maintaining a secure or safe place where continuous improvement can thrive. The CID Nexus envelops the nexus of capability, information, and decisions. How well do you understand your workforce capabilities, information systems, and decision making structure? Each entity will

have its own distinct personality that is separate from short term moods and organizational cultures. How successful and sustainable your Asset Management Program will be directly relates to how well you understand and pair your approach to one's Organizational Capacity.

Organizational Capacity = the Secure Harbor + CID Nexus + Personality/Time

Secure Harbor

Most companies, if asked, would state that continually improving, or the lean concept of continuous improvement, is important or maybe even foundational to their operating structure. This is not always the case. Today companies must continue to grow or they will quickly become passed up by a competitor who is trying (and failing, and trying again) new ways to become leaner, more efficient, and more cost effective. For a site to continually improve an atmosphere must exist that encourages and rewards ingenuity, creativity, and outside the box problem solving

A Secure Harbor is just that atmosphere. This is a place where new ideas can be tried and ingenuity is praised, even if that particular ingenuity was not the walk-off home run you were looking for. Starting a harbor from scratch can be painful. Luckily most organizations will not have to start from scratch, they will only need to locate the harbor that they have in place and began to secure it. A good way to gauge if your site/company has a Secure Harbor in place and how mature it might be is to think about the level of comfort a site has with the following quote:

"A person who never made a mistake never tried anything new."

-Albert Einstein

Capability, Information, Decision Nexus

An often unnoticed or occasionally exclusive, and therefore not properly considered, nexus exists between a site's decision making structure, in-place information systems (decision support structure), and workforce capabilities. Transparency across the CID (Capability, Information, and Decision) Nexus is powerful and is the key to overcoming hurdles in your Asset Management implementation

The importance of understanding the context of how an organization's capabilities, information support systems, and written or tribal decision making structure fit together and effect an asset management program implementation is similar to understanding the context in terms of most other forms of structured continual improvement.

At least three elements should be considered in reviewing a site's capability: current foundational skills and those to be taught to the majority of the participants; the level and degree of theoretical understanding, or knowledge, that is appropriate; and the degree to which management does or

should understand varying approaches to managing in-game situations.

Members of most organizations prefer a focus on basic skills improvement. In many ways, this is appropriate when the choice is either hands on improvement aimed at short-term job success or stale classroom lectures aimed at long-term goals. However, understanding the context of the organization is ultimately the key determinate in finding an effective balance.

Bloom's Taxonomy provides a helpful guide to aligning the structure of an asset management programs balance between short-term skills improvement and longer term understanding. Bloom's levels are: remembering, understanding, applying, analyzing, evaluating, and creating.

The context of the organization directly influences the type of decisions that must be made, the risk profile of those decisions, the information and timeframes required, its organization structure, and the characteristics of individuals it hires. The combination of the skills and knowledge of staff in conjunction with leaderships' ability to manage real-time situations are the determining factors is an organization mastering its context. It is a major determinate in understanding organizational capacity.

The analogy is developing a program to improve a baseball team. The greatest level of interest by the players is for skill performance. Individual skills are foundational elements, so justifiably any improvement program must focus on these. However, sole focus of skills will not produce enough understanding for advanced application or evaluation of complex situations. An improvement must also focus, to some degree, on knowledge and theoretical understanding. Time must also be spent with the coaching staff on game strategies – how to make a line-up, how to adjust the game for alternative weather conditions, bunting, and stealing vs power hitting. The ability to formulate a team improvement program in the context of all three dimensions is a strong indicator of success.

Typically business processes, rules, and policies are the first guides for an organization's decision processes. These guides serve as a form of preplanning by the organization in anticipation of its possible futures. However, such business processes, rules, and policies seldom anticipate all problem situations that arise. A staff member becomes quickly overloaded (Kleindorfer, Kunreuther, and Schoemaker, 1993).

Two generic strategies, either to reduce the need for information or to increase capacity to process information, can be pursued by the organization. Creating "slack" in the resource chain, either by acquiring more equipment, personal, or slowing production, is the natural manifestation of an organization reducing the need for information since optimal resources cannot be carefully coordinated.

Planning, scheduling, and sharing of information comes at a cost. Depending on the nature of the industry and the

associated decisions that must be made, there is a balance between the amount of resource slack that can be tolerated and the associated additional resources required for sharing information. Sharing information is further complicated by the possibilities and wisdom of creating vertical, lateral, or a combination of information sharing systems (Galbraith, 1974).

A strong argument exists that there is a nexus between decision making, organization structure, and decision support (information management) systems. Traditional thinking is that organizational structure should be constructed around decision making, and in turn the organization structure should drive the decision support system. However, depending on the situation there is a valid argument that that the types of decisions and the decision support system should drive the organization structure.

This nexus of decision type, organization structure, and decision support system is fundamental. Its integrated consideration is missing from the current standard guidance on asset management planning and implementation. The most common manifestation is the purchase and misguided attempted implementation of expensive Enterprise Asset Management Systems (EAMS) followed by the blind collection of comprehensive data that is poorly aligned with organization structure and the nature of the decisions that an organization is required to make.

Personality/Time

There is a difference between an organization's culture and their personality.

Mood- short term challenges, not permanent. Yearly budget challenges, demand spikes for product, rare event, etc. causes the organizational mood to change

Personality – how one operates, weathers the “moods” that may come and go throughout the year(s), the default mode that an organization usually comes back.

Culture - bounds that each plant within an organization live between, often pervasive across entire company, should be fairly easy to pick up on

Organizational mood and personality can impact an implementation. Some events that shape the mood of an organization are: financial challenges, compliance problems, health and safety issues, merger and acquisitions, and reorganization or senior management turnover. There are several different personalities that can emerge in a plant or organization:

A) *Planning Personality*

Pros

- Appreciate lifecycle aspects of asset management

- Will put the time into workshops and x-functional activity

Cons

- May struggle in the pilot position, even if the mood of that year is one of economic prosperity
- Too much ready, aim, aim, aim
- Often do not produce enough short-term results

B) *Outgoing Personality*

Pros

- Like awards and recognition, so want to be the best
- Want others to follow, so being out front or first desired

Cons

- Short attention spans
- Quick to move to next new thing once initial recognition success
- Often more interested in the narrative, not the measures

C) *Efficient Personality*

Pros

- Measureable results
- Appreciate short-term wins needed for on-going senior support

Cons

- Do not appreciate lifecycle aspects
- Will not spend time mapping long-term process improvements
- Will not put the time into workshops and cross-functional activity

D) *Reactive Personality*

Pros

- Appreciate the practical aspects
- Often good team work amongst the best fire fighters

Cons

- Lack of true leadership causes emergency actions and tactical thinking to be the only way to keep the ship afloat
- A lot of over-confidence (recoverability and risk management)

- Will not see the value in data or data maintenance
- Will not fully appreciate lifecycle considerations

Increasingly over the last decade it has become common place during the best change initiatives to consider the culture of the organization undergoing change. When a change initiative fails people point to an immature culture. However, two key aspects are missing from that assessment: an organization's personality and mood. Culture will set the boundaries in which an organization's personality exists but it only set's limits on it and does not define it. There is a broad range of plant personalities that can live with the confines of one company's culture. It is important for implementers to get an understanding of the mood of the organization and to get a pulse on its personality. Once all three are understood the approach must be adjusted accordingly. Organizational moods may change from the time you initiate your implementation to half-way through-be cognizant of this.

V Conclusions

Asset Management represents an emerging challenge to maintenance and reliability professionals. Despite a myriad of information available to professionals on the subject of Asset Management many implementations still seem to struggle to get off the ground or to become sustainable. The authors of this paper have discovered that success lies in an entity's "Organizational Capacity."

**Organizational Capacity = The Secure Harbor + CID
Nexus + Personality/Time**

A successful Asset Management implementation will match a site or business' Organizational Capacity.

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