Implementing airport strategic asset management for short-term gains and long-term benefits

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Abstract

The International Organisation for Standardisation (ISO) defines asset management as the coordinated activity of an organisation to realise value from assets. This simple and elegant definition might lead airport managers to conclude that the individual activities of their financial, planning, infrastructure development, properties development, and operations and maintenance departments constitute asset management. Before drawing that conclusion, airport executives should re-examine how much coordination within these departments currently takes place and explore what asset value means within their organisation. Also, airport executives should weigh the investment of a full-scale asset management programme implementation with short-term actions that can create immediate benefits for the organisation. This paper presents the current evolution of the asset management profession, specifically within the aviation industry, and suggests tactics to balance long-term programme development with immediate activities that prove value to the organisation. It also suggests balancing the priorities of different internal departments and increasing interaction for an improved physical environment.

Keywords

asset management plans, asset management strategy, risk, total cost of ownership, life-cycle analysis

INTRODUCTION

While airport executives and operators are tasked with providing safe facilities and infrastructure for travellers, air carriers and tenants, they are also responsible for being efficient and effective stewards of the airport's physical assets. Managing these physical assets throughout their life cycle happens through normal business functions: planning, design and construction, finance, accounting, operations and maintenance. For many large- and medium-hub airports, however, operational and capital investment decisions are siloed; overly dependent on historical practices, including spending; and reliant on inaccurate or unavailable data.

In the last 10–15 years, norms for managing assets that rely on a classic separation of asset life responsibility have not met the demands of the 21st-century airport. Recent struggles of the modern airport include passenger and cargo demand that exceeds airside and landside capacity; end-of-design-life, or premature, critical assets and infrastructure failures; the emergence of alternative development strategies and privatisation; expanding sustainability and environmental stewardship responsibility; and accelerated technology advancements.

With the onset and maturity of the asset management profession, airport executives are recognising the need for a holistic approach to their own asset management programmes. They need a programme that considers all forms of risk and derives value for the organisation — not just activity. With this recognition, airports are investing in asset management and related business systems, such as sustainability master plans and safety management plans. A survey of Airport Cooperative Research Program (ACRP) reports business practices that have developed in the last 10 years and that are indicative of airport owners and operators focusing on a changing business.[1,2,3]

What many airport executives struggle with is how and where to start implementing asset management strategies in their already-established business model. Should introducing strategies call for vastly overhauling the current organisational structure? Does asset management first require a huge investment in data and information systems to start producing benefits, or are there incremental, short-duration actions, or sprints, that an airport can take to realise benefits? Also, what is a good balance of achieving small, immediate successes but still linking them to an always-developing long-term strategy?

This paper presents considerations for airport executives as they explore whether using asset management principles is the right approach for solving facilities and infrastructure problems, and how to achieve immediate success while still aligning to a long-term vision.

ASSET MANAGEMENT GUIDANCE, RESOURCES, STUDIES AND TOOLS ABOUND

Airports considering adopting asset management principles have many sources of knowledge and experience, including guidelines, standards and best practices studies. ACRP Report 69 and International Organisation for Standardisation (ISO) 55000/1/2:2014 on asset

management[4,5,6] are the most comprehensive sources. The new ISO 41000 on Facility Management also presents guidance on how to integrate people, place and process within the built environment.[7] The Institute of Asset Management (IAM) and the International Facilities Management Association (IFMA) are organisations active in North America that provide education and knowledge most directly relevant to airport management.

The IAM has a particularly helpful asset management self-assessment methodology.[8] This assessment guideline and tool provides the organisation an asset management scorecard for maturity compliant with ISO 55001. According to the ISO technical committee monitoring adoption of ISO 55001:2014, eight airports worldwide have been certified to ISO 55001.[9] In North America, Atlanta Airlines Terminal Corp. is the only certified airport operator. A review of press releases and published airport plans reveals that ISO 55001-certified operators are not leaps and bounds ahead of many of their peer airports in being effective stewards of their assets. Those airports can, however, demonstrate and document the establishment of an asset management business system and the requisite integration of cross-functional and proactive asset management processes and procedures.

Some of these airports report various levels of maturity and capabilities, such as incomplete asset inventory and needs for proactive, or predictive, operation and maintenance of their most critical asset systems.[10,11] ISO 55000 defines asset management as 'the coordinated activities of an organisation to realise value from assets' and an asset management system that as a 'set of interrelated or interacting elements to establish asset management policy, asset management objectives and processes to achieve those objectives'.

AIRPORT FINANCIAL AND BUSINESS BENEFITS OF ASSET MANAGEMENT

The principle of realising value from assets is a financial and business performance declaration that tends to get side-lined when the stewards of assets focus primarily on operational performance. A comprehensive asset management programme links an airport's operational and financial performance measures. An airport can maximise its assets' value at the lowest cost possible, improving aeronautical and non-aeronautical income through minimising operating costs to airlines, reducing or mitigating risks, impacting the traveller experience, and more.[12]

Airport performance can be expressed as the ratio of net income to total asset value, or return on assets (ROA).[13] Asset managers are responsible for knowing the current and future value of capital assets. Asset management, in conjunction with planning and operations and maintenance (O&M), forecasts asset needs and cost. Finance tracks and controls net income.

Airport managers can benchmark ROA and use it as an indicator of asset life-cycle (acquire, use and dispose) health. Passenger enplanement growth, operational complexities and technology advances impact ROA. Examining ROA across peer airports and one's airport over time can signal investment and operational improvement needs. Coupling income and asset cost tends to focus airport planners and executives towards operational efficiency and design innovations.

Asset management planning must translate asset performance and condition

data into O&M and financial strategies. Asset management plans establish asset performance goals, create continuous improvement tactics, and forecast operational and financial needs. Budgeting and improved long-term financial forecasting of both capital (CapEx) and operational (OpEx) spending is indicative of a mature asset management programme. Guidance for asset managers on financial forecasting using levels of service, condition and similar means has just recently emerged.[14,15]

UNDERSTANDING IF AN AIRPORT'S CURRENT ORGANISATION ALIGNS WITH ASSET MANAGEMENT STANDARDS

Even after understanding these resources and benefits, questions remain. So, what? Cannot most organisations claim they are already performing asset management? An honest self-examination would lead an airport owner to say there are benefits from re-inventing asset stewardship and, no, we do not have asset management acumen. The reason is not that they do not have a policy, that they cannot claim to realise value from assets or that they do not have an inventory of all assets. The reason tends to be tied to uncertainty and the inability to answer salient questions about business objectives, such as:

- Is financial performance optimised by knowing the asset total cost of ownership and improving the return on asset investment?
- Are operations and maintenance functions effective and efficient, and how are they realised?
- Is cost balanced against risk and performance for asset investment decisions?
- Is criticality understood?
- Are there hidden risks?
- How is continuous improvement promoted and measured?
- Are sustainability goals reasonable, actionable and measurable?
- Are the cost and operational impacts of meeting regulatory mandates known, including Federal Aviation Administration (FAA) airport certification?
- Can customer satisfaction be linked to asset performance?

A mature asset management business system is a people- and process-driven system that is informed by data, dictates action and activities, and ultimately supports decision-making (Figure 1). The specific asset data, activities and decisions needed by an airport asset management programme are variable and dependent on organisational goals as well as financial and other resource constraints.

AIRPORT STRATEGIC ASSET MANAGEMENT ADOPTION CONSIDERATIONS

Where should airport owners or operators begin their strategic asset management journey?

The answer is usually that they should begin with an assessment of overall compliance with best practices and standards, usually called a maturity assessment, or a large data collection and assessment exercise. While an overall assessment of asset management maturity is a valuable exercise and relevant and reliable data is essential, it may be more effective to first assess the organisation's most pressing short-term needs and choose to solve a set of problems that will create immediate benefits and savings using asset management objectives and cross-functional coordination and

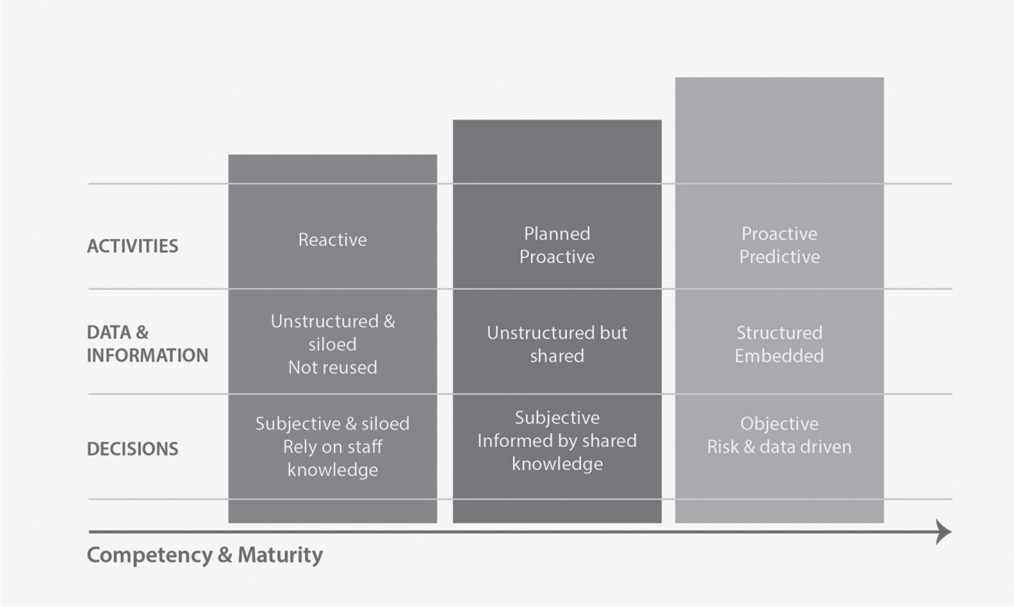

Figure 1 Airport asset stewardship considerations and competency continuums

planning. Airports in the early stages of adopting a knowledge-driven and proactive asset management programme should consider this technique to demonstrate value to executives and across the different business functions.

Table 1 is a representative list of these immediate savings opportunities, indicative of what could be low-cost, quick-return demonstrations of asset management and sustainability.

Immediate wins such as these, coupled with an organisation-specific strategic plan and road map, sets the stage for the successful transformation of business practices. Asset management system adoption is a journey. Success comes from the progression of continuous improvement with data, decision support processes, asset performance optimisation and increased awareness of risk.

The patented application of the ISO model suggests developing a policy, then a strategic plan and then asset management plans. In practice, most executives dealing with competing priorities will first look for proof of value before committing to a holistic asset management system. As reported, ISO 55001-certified airports describe their asset management implementations as an ongoing, incremental adoption focused on continuous improvement to improve performance for assets that pose the largest risk to operations and continued growth of the airport.[16] The evaluation may be based on group knowledge of operators and maintainers rather than financial and functional performance data. The key is to compile the best available asset information (eg inventory and condition), determine risk, and develop a mitigation strategy and management plan in collaboration with all airport stakeholders and to align with the airport business plan or master plan. This initial plan will give executives, operators and maintainers a framework for continuous improvement.

Those improvements include levels of service related to the risk assessment,

Table 1 Indicative immediate savings and improvement opportunities

Perform energy audit/retro-commissioning for existing facilities
Eliminate duplication in services contracts
Eliminate redundant information systems
Review and find reimbursable maintenance expenditures from tenants
Examine and improve pump efficiency for pumps greater than 20 HP
Conduct energy/efficiency analysis for targeted highest energy-consuming assets
Analyse services contracts and develop a plan to assure performance-based contracting
Establish a senior energy manager/utility manager
Evaluate and optimise a construction contract attic stock
Leverage a terminal renovation programme to improve building efficiency
Conduct O&M optimisation analysis of high-cost facilities
Revamp performance goals for technical services and trades
Analyse and optimise preventive maintenance programmes
Assess custodial staffing model and metrics relative to facility use patterns
Align front-end contract documents with TCO and asset onboarding objectives
Establish a standard for asset onboarding/booking with finance
Utilise a derivative depreciation method for asset systems
Synchronise the sustainability master plan and asset improvement priorities
Establish asset inventory and condition assessment standards
Leverage operations and maintenance staff to perform condition assessment processes
Establish a change management and communication programme
Require construction/revitalisation programmes to update the asset inventory
Require tenants with maintenance responsibility to report efforts to airport management
Leverage asset management in operational readiness and commissioning standards
Establish a centralised maintenance control position with performance metrics

Note: O&M, operations and maintenance; TCO, total cost of ownership.

strategies to fill gaps in data and information, maintenance strategies, measurable and attainable asset and work performance goals, resource plan and financial forecasts, and contingency plans. This first iteration of an asset management plan likely will lack good historical data, and assessment of condition and risk will be subjective. What it does rapidly demonstrate is the value of decisions made through collective thinking and informed by an understanding of risk. This initial plan should have specific, measurable, actionable, relevant and timely (S.M.A.R.T.)[17] goals and should be used to develop a business case for better data, organisational improvements and next-generation technology.

Beginning with the best available information is not to suggest improvement in the completeness, and quality of data is not important. While data is the underpinning of highly effective and coordinated decision-making (Figure 2), there is a diminishing return when there is too much emphasis on data. The first cost (collection or conversion) and total cost (first cost plus administration and renewal) of facilities, infrastructure and materials data can be overwhelming and detract

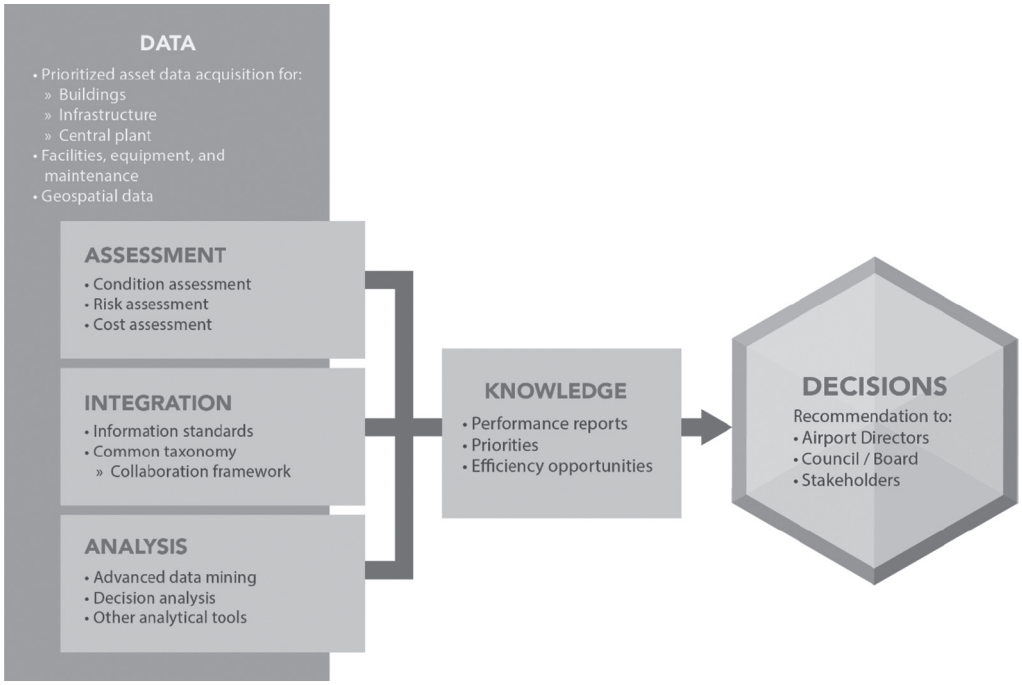

Figure 2 Asset management data, governance and analytics for knowledge-based decision support

from or devalue the asset management programme. Data governance is essential to effective asset management.

COORDINATION BETWEEN ASSET MANAGEMENT; OPERATIONS AND MAINTENANCE; AND PLANNING, DESIGN AND CONSTRUCTION DEPARTMENTS

A key coordination function that has not been effectively managed historically is between the O&M departments and planning, design and construction (PDC) departments within many airports. This work and data coordination activity is an opportunity for short-term impact that is aligned to a long-term asset management strategy. PDC departments often gather requirements from O&M departments to inform capital investment, and many organisations have some form of business case analysis and prioritisation models for capital investments decisions. A consequence of poor data and/or ineffective coordination, however, occurs when the PDC department assesses the asset condition from its own resources and develops cost estimates from this data. Instead, the asset management function in the airport should work with the O&M department to collect accurate asset data, with appropriately skilled assessors, and exploit existing asset and maintenance data for use in capital and operational investment decisions.

With effective asset O&M strategies, practices and asset management plans, condition knowledge could be a routine determination and not a recurring planning cost. Exceptions exist, such as pavement condition assessment prescribed by the FAA and other asset systems with regulated life safety ramifications.

Also, if these do not exist already, asset management can facilitate communication linkages between PDC and O&M

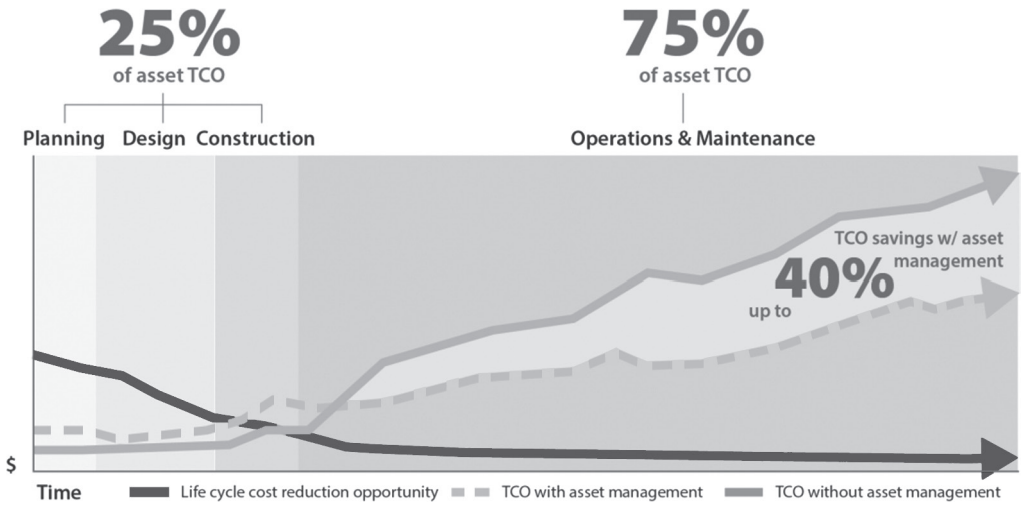

Figure 3 Indicative total cost of ownership (TCO) with and without asset management system in place

departments to inform future design and renovation projects. Because these two departments are historically siloed in organisations, critical information does not always get communicated to PDC about design improvements, material selections and other factors that could improve maintainability.

Likewise, asset owners must be concerned with the total cost of a new asset, while a PDC team may be focused on asset acquisition. Therefore, the PDC team is only concerned with the project, or initial, cost. Properly aligned organisations leverage knowledge of an asset manager and O&M knowledge to consider life-cycle costs during PDC. Results vary with asset class and complexity of the asset, but conservatively, logic and empirical data from many sources, including National Research Council,[18] conclude that 65–90 per cent of total cost is post-construction cost and that more than 80 per cent of the factors influencing total cost of ownership are design and construction related. Said differently, reliability and functional performance of an asset are designed and built, while O&M activities are primarily focused on sustaining asset performance through its design life. Therefore, a focus on interventions that reduces life-cycle costs during PDC produces greater impact during O&M (Figure 3).

An asset management best practice is to harness organisational alignment to analyse and make PDC decisions based on total cost of ownership by considering several factors: utility or fuel cost; operations, maintenance and repair costs; replacement cost; residual values (resale, salvage, disposal); and debt service/financing cost.

PDC, tenants and O&M should consider soft or indirect cost and benefits of design decisions, such as customer experience, ease of accessibility of systems to O&M and complexity of operations. Different business priorities drive asset ownership versus acquisition. Each typically views the built environment from its own perspective — either through an acquisition view or an ownership view (Figure 4). Acquisition is a short-term, project-based activity that is concerned with first cost. The planning horizon for asset development and acquisition is months and years. Conversely, ownership

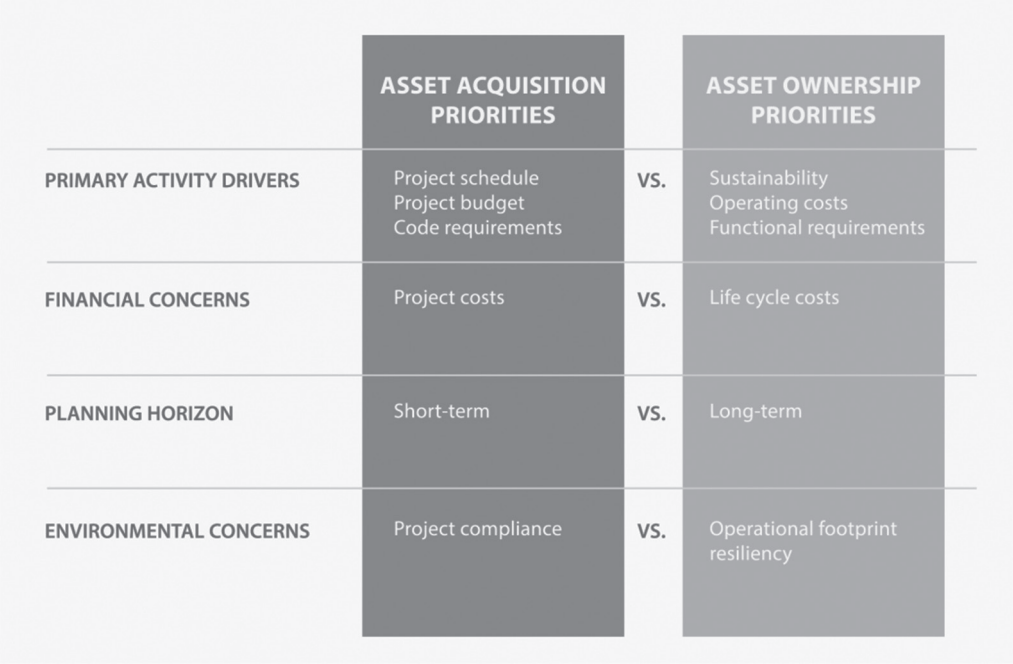

Figure 4 Seemingly conflicting interest of developer versus owners; asset managers have the responsibility to bridge the gap

activities sustain performance and control operating costs, assess and optimise life-cycle cost; are measured in 5- to 10-year horizons; and are concerned with resiliency, assess environmental risks and manage regulatory requirements. An airport's asset management programme should serve to bridge the gaps between these two priorities, while supporting operational readiness, activation and transition to ownership (also known as operational readiness and airport transfer), and assessing the design for risk (eg functional, operational, financial, life safety).

PDC and O&M coordination can be enhanced by design and construction management tools such as Building Information Modelling (BIM). BIM has been proven to improve collaboration between designers and constructors. The ancillary promise of BIM to serve the owner's asset life cycle decisions and streamline asset transition to O&M, however, is suspect. Information systems, including BIM, are too often seen as a solution unto themselves. For BIM to support asset life-cycle value, data standards, business rules, training and governance need to serve both development and O&M needs. As the primary design and construction platform, BIM use is governed by the project contract and specifications. When the specifications propagate O&M data standards and processes, BIM can serve asset management objectives.[19] Used well, BIM drives value at the point of asset creation when development decisions have the most impact on total cost.

LONG-TERM AIRPORT STRATEGIC ASSET MANAGEMENT CONSIDERATIONS

Apart from short-term actions that prove the benefit of asset management tactics within an organisation, the adoption of a strategic asset management business paradigm will require process and work

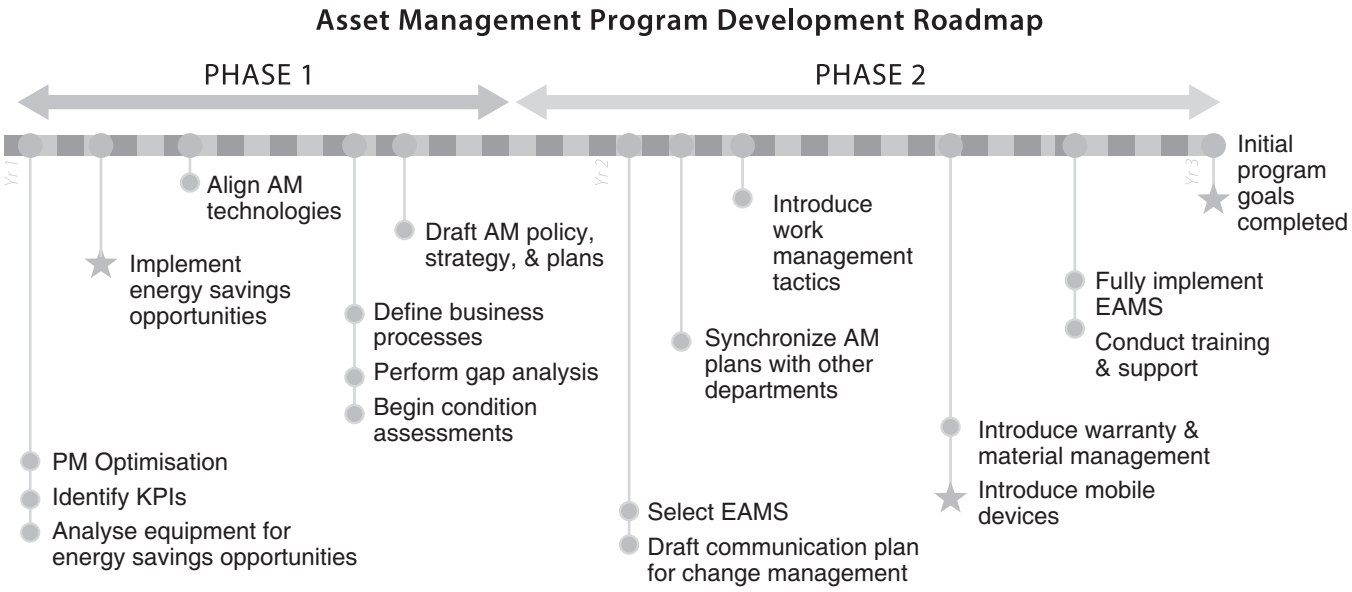

Figure 5 Notional asset management programme development road map shows short- and long-term actions

Note: AM, asset management; EAMS, enterprise asset management system; KPI, key performance indicator; PM, preventive maintenance.

function alterations or behaviour change. Change is not accomplished by simply adjusting a process in one unit or another; instead, it must be cross-functional. Most importantly, every organisation should have an implementation approach fitted to its situation. The plan should be S.M.A.R.T., which also requires engaged leadership, accountability and patience. Focusing on communicating the vision, mission, objectives and plan for execution of a long-term asset management strategy should be done at various levels within the organisation. Actions, milestones, goals and achievements should be clearly laid out with coinciding resource requirements (Figure 5).

Change should be tackled incrementally, and progress graded continuously. Investment in asset management returns are measurable and show sustained value only through the coordinated efforts of the entire organisation, as defined by ISO 55000. Coordination between executives, finance, planning, development, public safety and O&M is imperative to:

- make asset management plans dynamic and address risk as the main purpose;
- align metrics across all phases of ownership;
- establish actionable and impactful key performance indicator goals for asset and work performance;
- base asset decisions on business objectives; and
- use total cost of ownership as a foundational planning and management measure.

An airport's strategy for asset management should echo the goals and objectives of the overall airport business strategy. All asset data, risk register and criticality assignments, management plans and reporting must be in sync with the airport's business goals and objectives. The asset management programme must appropriately use performance measures that are accurately aligned to business objectives (Figure 6). O&M should reference asset performance metrics relative to business process and activities, and the

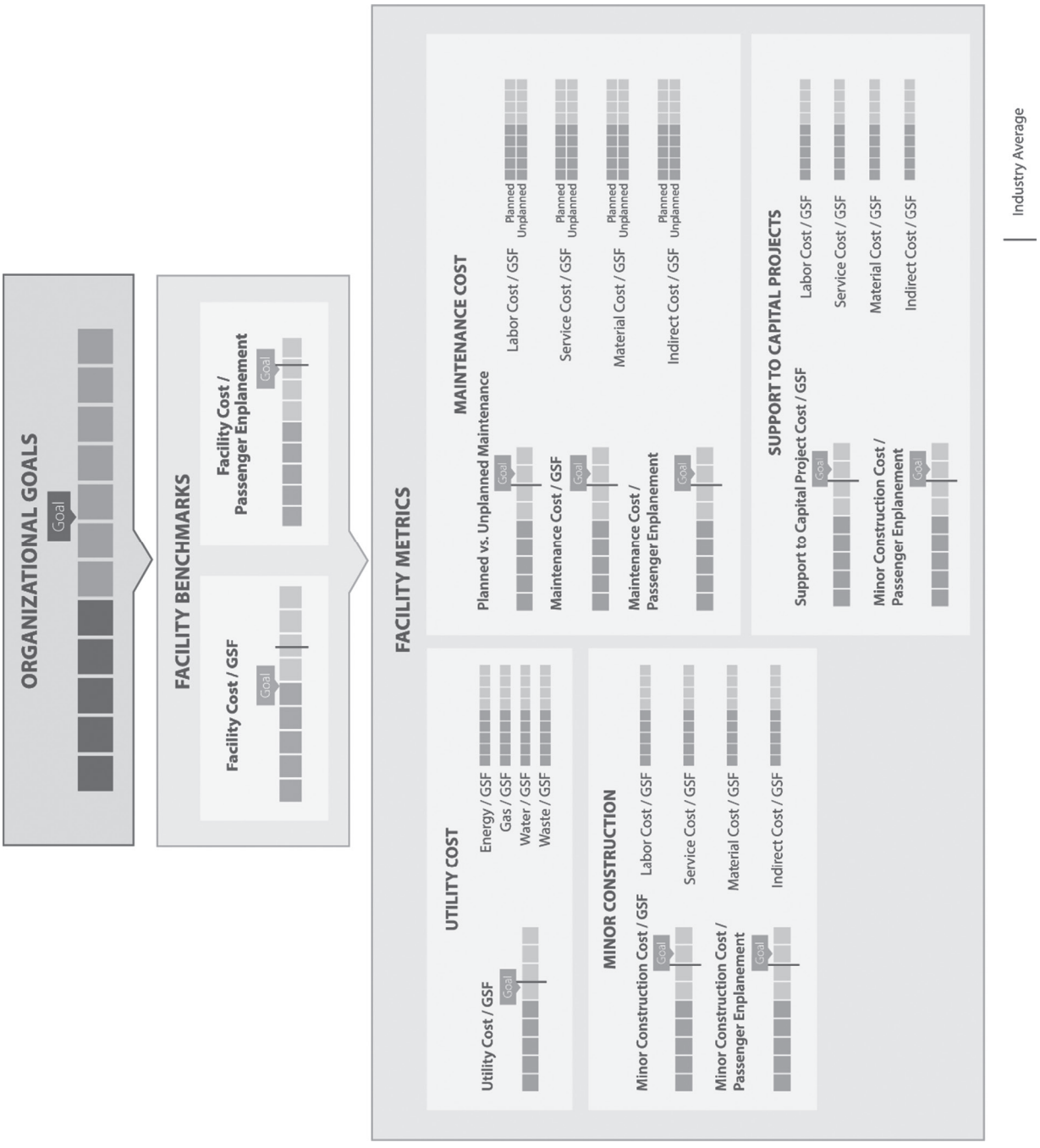

Figure 6 Indicative asset management report that links performance and cost to airport strategic goals
GSF, gross square feet.

CEO (chief executive officer) and CFO (chief financial officer) should refer to asset operating and capital expenses, cost per emplaned passenger, lease and property contracts, and financial risk.

CONCLUSION

An airport's asset management programme is a continuous improvement journey that must be sold to all airport stakeholders to be implemented successfully. Done effectively, an asset management system can produce better financial planning, reduce risk to airport operations and improve reliability of airport assets.

Champions for such a programme are challenged with balancing short-term actions to prove value and return with fostering a long-term programme vision. Airport executives wishing to advance their own asset management programmes should understand the broad influence a programme such as this could have on their organisation and structure their priorities accordingly.

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