

Strategy and Planning

Asset Management Decision-Making

Organization and People

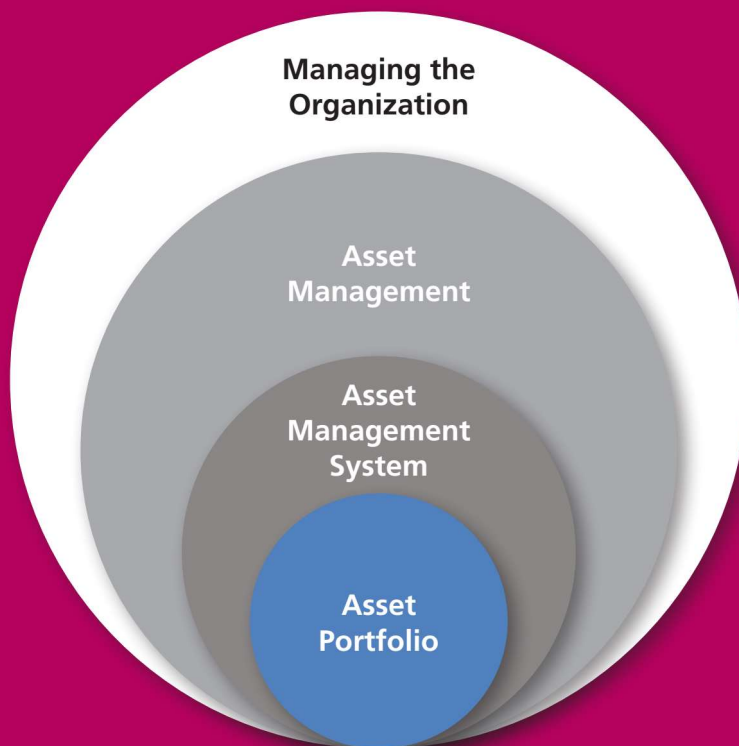
Asset Information

Organization and People

Procurement and Supply Chain Management

Risk and Review

Version 1 January 2024



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Development Team

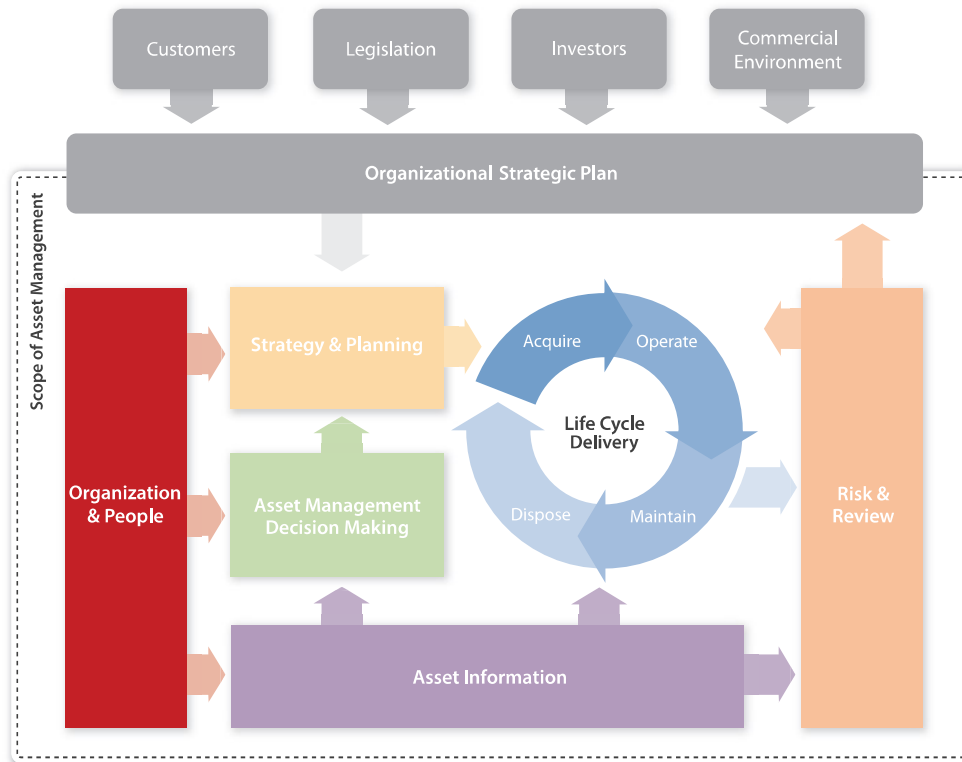
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David Sumpton (SSG Lead) – Fanshawe College and Western University, Canada
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The Scope of Asset Management



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Group 1

1. Asset Management Policy
2. Asset Management Strategy & Objectives
3. Demand Analysis
4. Strategic Planning
5. Asset Management Planning

Group 2

6. Capital Investment Decision-Making
7. Operations & Maintenance Decision-Making
8. Life Cycle Value Realization
9. Resourcing Strategy
10. Shutdowns & Outage Strategy

Group 3

11. Technical Standards & Legislation
12. Asset Creation & Acquisition
13. Systems Engineering
14. Configuration Management
15. Maintenance Delivery
16. Reliability Engineering
17. Asset Operations
18. Resource Management
19. Shutdown & Outage Management
20. Fault & Incident Response
21. Asset Decommissioning & Disposal

Group 4

22. Asset Information Strategy
23. Asset Information Standards
24. Asset Information Systems
25. Data & Information Management

Group 5

26. Procurement & Supply Chain Management
27. Asset Management Leadership
28. Organizational Structure
29. Organizational Culture
30. Competence Management

Group 6

31. Risk Assessment & Management
32. Contingency Planning & Resilience Analysis
33. Sustainable Development
34. Management of Change
35. Assets Performance & Health Management
36. Asset Management System Monitoring
37. Management Review, Audit & Assurance
38. Asset Costing & Valuation
39. Stakeholder Engagement

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1 Introduction

1.1 Introduction to Subject Specific Guidelines

The Subject Specific Guidelines explain the 39 subject areas identified in “Asset Management – an Anatomy”, published by the Institute of Asset Management. The subject areas are acknowledged by the Global Forum for Maintenance and Asset Management as the “Asset Management Landscape”.

The ISO 55000 set of standards describe ‘what’ should be done to be competent in asset management. The SSGs are intended to develop the next level of detail for each Subject, including a consolidated view of good practice drawn from experienced practitioners across many sectors. They are intended as guidance for asset managers and leaders to apply as appropriate for their own organizations, on ‘how’ asset management might be done.

Industries and organizations differ in scale and sophistication and are at different stages of asset management; some may be relatively mature, while others are at the beginning of the journey. There is flexibility for each organization to adopt its own practical approaches and solutions that are economic, viable, understandable, and usable. The underlying requirement for continual improvement should drive progress.

1.2 The SSGs in Context

The SSGs are a core element within the IAM Body of Knowledge and are peer reviewed and assessed by the IAM Expert Panel. They align fully with the IAM’s values and beliefs in developing excellence in the asset management discipline and providing support to those who seek to achieve that level of excellence. When reading the SSGs, the reader should have a view of the complexity and maturity of their organization and interpret the guidance in that context. For further reading, the IAM website provides members with a wide range of knowledge and professional development resources.



2 Scope of Subject Specific Guideline

2.1 Scope

This document provides guidance for the following element of asset management:

26: Procurement and Supply Chain Management

Group 1 Strategy & Planning

1. Asset Management Policy
2. Asset Management Strategy & Objectives
3. Demand Analysis
4. Strategic Planning
5. Asset Management Planning

Group 3 Life Cycle Delivery

11. Technical Standards & Legislation
12. Asset Creation & Acquisition
13. Systems Engineering
14. Configuration Management
15. Maintenance Delivery
16. Reliability Engineering
17. Asset Operations
18. Resource Management
19. Shutdown & Outage Management
20. Fault & Incident Response
21. Asset Decommissioning & Disposal

Group 5 Organization & People

26. **Procurement & Supply Chain Management**
27. Asset Management Leadership
28. Organizational Structure
29. Organizational Culture
30. Competence Management

Group 2 Asset Management Decision-Making

6. Capital Investment Decision-Making
7. Operations & Maintenance Decision-Making
8. Life Cycle Value Realization
9. Resourcing Strategy
10. Shutdowns & Outage Strategy

Group 4 Asset Information

22. Asset Information Strategy
23. Asset Information Standards
24. Asset Information Systems
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Group 6 Risk & Review

31. Risk Assessment & Management
32. Contingency Planning & Resilience Analysis
33. Sustainable Development
34. Management of Change
35. Assets Performance & Health Management
36. Asset Management System Monitoring
37. Management Review, Audit & Assurance
38. Asset Costing & Valuation
39. Stakeholder Engagement

2.2 Procurement and Supply Chain Management: Definitions

Asset Management – an anatomy (3rd edition page 22) defines Procurement and Supply Chain Management (PSCM) as: “The processes used by an organization to ensure that all of its outsourced asset management activities are aligned with the asset management objectives of the organization and to monitor the outcomes of these activities against these objectives.” (Anatomy of Asset Management, Version 3, 2015)

The Asset Management Landscape (2nd edition page 21) states the “Resourcing Strategy ... determines the activities and processes ... to procure and use people, plant, tools and materials to deliver the asset management objectives and asset management plans.” (Asset Management Landscape 2nd edition, 2014)

“Procurement is the overarching function that describes the activities and processes to acquire goods and services. ... it involves the activities involved in establishing fundamental requirements, sourcing activities such as market research and vendor evaluation and negotiation of contracts. Purchasing is a subset of the wider procurement process, referring to the process of ordering and receiving goods and services.” (Purchasing_Insight, 2021)

“Procurement is the business function that ensures identification, sourcing, access and management of external resources that an organization needs or may need to successfully fulfill its strategic objectives. It exists to explore supply market opportunities and to implement resourcing strategies that deliver the best possible supply outcomes to the organization, its stakeholders and customers.” (CIPS, Procurement and Supply in Practice, 2021)

“Supply Chain Management (SCM) is the handling of the flow of goods and services from the raw manufacturing of the product through to the consumption by the consumer. This process requires an organization to have a network of suppliers (that serve as links in the chain) to move the product through each stage.” (CIPS, Supply Chain Management, 2021)

“Logistics Management is a component of supply chain management. It is used to meet customer demands through effective planning, control and implementation of the movement of goods. Transportation of goods can be made via air, sea or road freight and even pipelines.” (CIPS, Logistics Management, 2021)

2.3 Audience for this Guideline

This guideline applies to organizations that arrange for suppliers to engineer, furnish, install, operate, maintain, or dispose of assets; and those who may be suppliers of such services. In this context, the term ‘asset’ includes:

- Physical assets, including information technology systems and software
- Related intangible assets such as patents, leases, licenses, usage rights, contracts, service level agreements
- Any related financing activities.

This guideline is for you if you do any of the following:

- Lead a comprehensive tendering process
- Define a public-private partnership
- Issue purchase orders; and verify whether purchased goods and services are received
- Manage suppliers of capital assets and related goods and services
- Define and monitor maintenance arrangements and service level agreements
- Design, build, or create assets as a general contractor, subcontractor, or professional services firm
- Re-sell or otherwise dispose of assets
- Manage facilities such as buildings, machinery, and information technology
- Hire companies and individuals to provide professional asset management services
- Write business cases to support investments in new projects or continuing operations, especially where the investments entail ‘make or buy’ and

‘buy’ decisions

- Secure Project or operations financing for any goods and services supplied from outside the organization

2.4 Scope: Details

ISO 55001 sets out a framework for asset management leadership, planning, support, operations, performance evaluation, and improvement. Paragraph 8.3 defines the requirements for “outsourcing” as follows:

- “When the organization outsources any activities that can have an impact on the achievement of its asset management objectives, it shall assess the associated risks. The organization shall ensure that outsourced processes and activities are controlled.
- The organization shall determine and document how these activities will be controlled and integrated into the organization’s asset management system.
- The organization shall determine:
 - The processes and activities that are to be outsourced, including the scope and boundaries of the outsourced processes and activities and their interfaces with the organization’s own processes and activities
 - The responsibilities and authorities within the organization for managing the outsourced processes and activities
 - The processes and scope for the sharing of knowledge and information between the organization and its contracted service providers”

The Sections in this SSG include:

- Scope of Subject Specific Guideline
- Principles of Procurement and Supply Chain Management
- Develop the PSCM Strategy
- Develop the Strategic Sourcing Plan
- Procurement Processes and Contracts
- Maintain Supplier Relations
- Metrics for Sustainability
- Information Systems
- Financial Commitments and Project Financing
- Intellectual Property
- PSCM and the Asset Lifecycle
- Appendix: Budgeting and Accounting Concepts
- Appendix: Project Financing Terminology

- Appendix: Structured Procurement Process
- Appendix: Contract Interpretation

2.5 Out of Scope

- This guideline is not a regulation or a set of rules. While general principles are illustrated, this guideline does not establish a legal standard of care or conduct and does not include or constitute legal or professional advice. Readers are accountable for their own decisions, actions, or omissions.
- This guideline does not replace or update the practices, regulations, certification requirements, etc., of governments, industry groups, and other professional organizations.
- The authors, the IAM, and its agents cannot be held liable if information in this guideline is misinterpreted, misapplied, or is not relevant to the reader's situation. The information is provided for illustrative purposes only, to guide the reader in their own research activities.
- Readers are requested to review legal and regulatory considerations particular to their situations and places of business. This is especially the case for structured procurement practices and processes, contracts and contract management activities, and intellectual property ownership.
- Operations research, simulation, and mathematical modeling techniques are excluded from this guide. We leave it to readers to consult published works and work with researchers and modelers as appropriate.
- Section 3.3 includes a general discussion of the World Trade Organization and related matters; however, trade agreements are out of scope.

For inquiries on PSCM functional roles and expectations, we refer readers to the Global Standard for Procurement and Supply published by the Chartered Institute of Procurement and Supply (CIPS). CIPS articulates a Competency Framework that helps leaders and teams define their roles and bring value to their organizations (CIPS, Global Standard for Procurement and Supply, 4th edition, 2021).

3 Principles of Procurement and Supply Chain Management

3.1 PSCM Process Summary

The role of PSCM leaders is to help an organization meet its strategic goals and differentiate itself from others who might provide similar products and services to the market. Therefore, this guideline defines a robust procurement process, as shown in the form of a V-Diagram with requirements on the left and delivery on the right. The process begins

with the identification of a business need and ends when the need is fulfilled; each of the eight steps is explained in detail. These activities must happen in the context of the organization’s AM policy, objectives, and decision-making processes; therefore, the reader should refer to Asset Management – an anatomy and consult other Subject Specific Guidelines as appropriate.

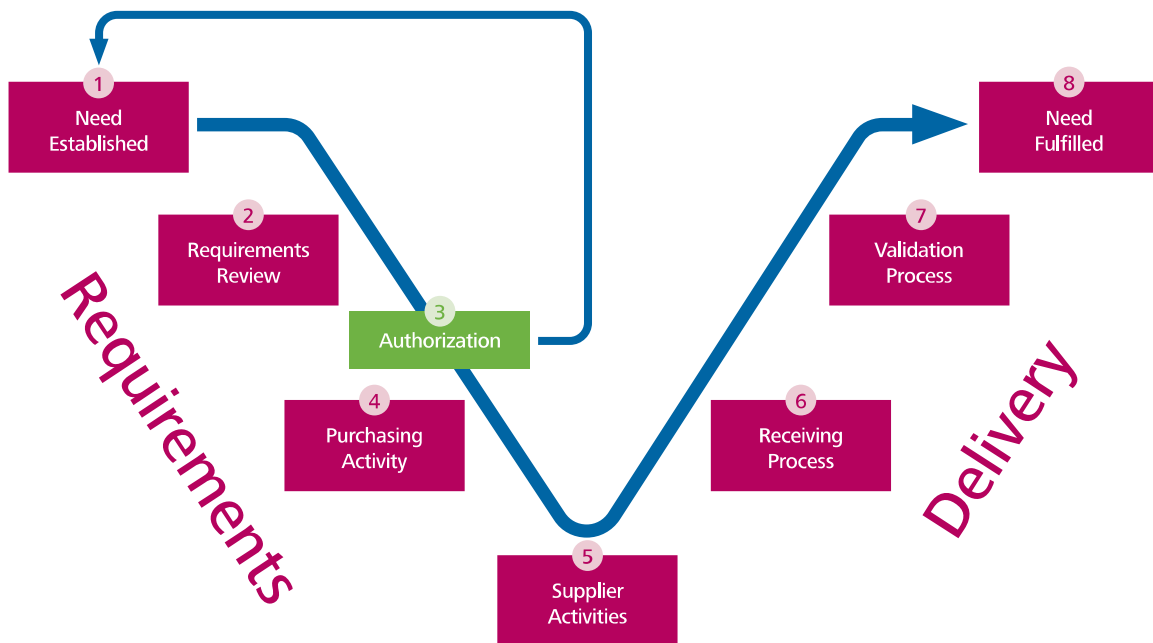


Figure 1: Procurement Process

1. Need Established: A ‘need’ can be anything from a spare part, a consumable item or a service, a requirement to outsource a specific activity, to a full production facility. The need must be clearly motivated and defensible against scrutiny; the degree of motivation is usually commensurate with the estimated level of spend to be incurred.

For high-cost and high-risk needs, a fully prepared business case is essential, including elements such as why it is needed, why it must be

purchased, how it is intended to be fulfilled, how it will be funded, and other considerations, such as why the need cannot be fulfilled internally. The business case is usually completed by the internal department sponsoring the project, likely with concurrence from the technical and marketing departments, and approved by the finance department. With low-cost and low-risk needs, the requirement can often be articulated in a simple purchase request.

A new dimension of 'need' is in procuring assets that minimize the organization's total carbon footprint. In today's world, needs must also be defined by how little they impact the environment. This may be through the circular economy, in how they are constructed (using carbon minimizing techniques), or procuring products that can be repaired, refurbished, or recycled. Material may also be leased instead of purchased so that the original manufacturer can rebuild and reuse them.

2. **Requirements Review:** Once a need is established, the project sponsor must confirm the detailed business requirements; a product life cycle analysis described in Section 4.3.4 would support this part of the review. The sponsor must also develop the performance expectations and technical specifications; an asset life cycle analysis, as described in Section 4.3.3, would support this part of the review. The level of spending usually drives the required level of performance and specification detail.

With high-cost and high-risk needs, it may be essential to follow a 'tendering process' where requirements are first defined in detail, including expected adjustments as the asset is turned into service and how the operation should run once the need is fulfilled. Where necessary, this could also identify routes to market and other potential suppliers outside the current supply chain.

With low-cost needs, the review must be focused on the specification to ensure that when the service or item is supplied, it meets requirements now and in the future. This is especially essential for spares purchases, where incorrect parts or future unavailability could significantly compromise operations.

3. **Authorization:** Most organizations have a 'schedule of authorities' stating which internal department and which level of management may approve particular purchases. This protects the business and individuals from exceeding their formal authorities and making commitments that could compromise the organization financially and otherwise. Individuals authorizing purchases must also consider currently approved budgets and traditional spending levels in that activity.

Expected purchases must fit within affordability parameters, or else the project sponsor must arrange for suitable budget updates. For complex projects, authorizations of different purchases may be required at various stages of the project.

4. **Purchasing Activity:** This can follow many routes, depending on the sophistication of the procurement processes and the level of risk associated with the procured item or service. This can range from a single purchase order to a fully detailed tendering process and Public Private Partnerships. This stage aims to issue a purchase order or create a contract with a supplier for a defined scope of supply at a defined cost and schedule.
5. **Supplier Activity:** Suppliers will normally prepare and supply the goods and services in accordance with the purchase order or contract. Where an item is to be custom manufactured or developed, this activity might entail visits to the supplier's premises and requests from the supplier to attend Factory Acceptance Tests. Supplier activity also includes the logistical activities to deliver the product or service to where it is needed.

Asset management activities often entail on-site engineering and construction activities, where the primary contractor manages the site until the structure is completed and commissioned. Should any party identify the potential for changes to scope, schedule, costs, or expected benefits to be delivered, a change request process should be invoked for all parties to formally assess details and agree on any new commitments.

6. **Receiving Process:** When goods and/or services are received, a receiving process must be applied to confirm that the desired items are received and ready for the subsequent validation process. The receiving process includes a level of inspection relating to quantities and quality of the build or work supplied. The process may also entail an 'installation coordination' role: securing any additional commitments from the organization and its suppliers and performing any necessary minor scope adjustments and revisions as part of normal activities to bring assets into service.

Where new physical assets are delivered, this may require an asset registration for the new assets and/or an update of the financial asset register to ensure they are tracked and recorded correctly. In the case of spares procurement, this would also require updates of the stock management system to ensure that stock counts and stock values are correct.

7. **Validation Process:** This process evaluates the extent to which the supplied goods or services have met the performance expectations and technical specifications defined in the requirements review. This is usually a technical review process to ensure the specification is met and the required functionality is provided. Formal Site Acceptance Tests may be carried out, with or without the supplier, to confirm details. For complex construction activities, the validation process may be invoked at key milestones as the work unfolds. The onus rests with contractors and sponsors to execute their activities as defined in contracts and any partnership agreements.
8. **Need fulfilled:** The internal department which requested the need, such as the technical department, will usually 'sign off' that business requirements are met, with concurrence by internal project sponsor departments such as the marketing department. Following this sign-off, the procurement process can be formally closed, for example, by confirming that Service Level Agreements are in place, paying suppliers, and discharging contracts.

If needs cannot be adequately met, a change request process might be invoked to review and approve further specifications, cost, and schedule updates. If the scope must be significantly changed, bidders may be requested to submit new proposals through the requirements review process. It is to be expected that adjustments may occur throughout the whole procurement process.

3.2 PSCM Internal Environment: Managing Organizational Priorities

Within an organization, its vision, mission, values, and strategies are well understood and adhered to by most individuals. Organizations are usually organized internally by functional role, and internal

departments tend to focus on their own objectives. The PSCM internal environment is complex; it sits at the junction of other disciplines. Requirements may be specified by the technical department, approved by the finance department, and delivered by the logistics department. PSCM must define and execute the Strategic Sourcing Plan, manage the procurement process, engage with suppliers, and effectively respond to the pressures of the external environment. Balancing multiple internal priorities and avoiding compromises that only partially meet desired outcomes is essential.

Internal departmental priorities

- **Finance:** The immediate goal is to improve Return on Investment (ROI); without compromising quality or service levels, also reduce capital and operating expenditures, work-in-progress, and holding costs. The broader and sometimes conflicting goal is to minimize the total cost of ownership while maximizing benefits delivered over the entire asset life, which can be years or decades after the initial procurement process has closed. Finance must also source the most appropriate types of financing and align sources of funds to uses of funds in the most economical way. For example, suppliers may offer to finance asset purchases or lease them; these strategies have pros and cons.

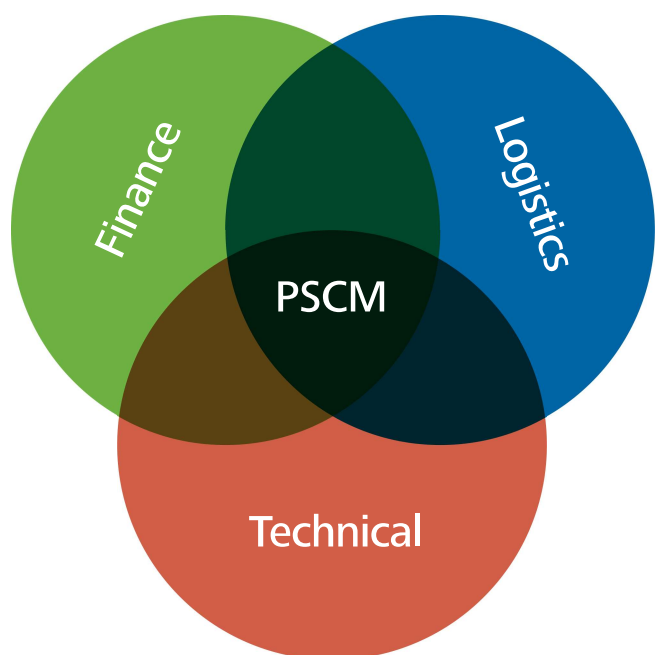


Figure 2: PSCM Internal Environment

- **Logistics:** The drive is to reduce stock inventories, decrease stock holding, reduce storage footprint, and ensure transport network efficiencies. Transport networks could be multimodal, covering road, rail, shipping, and air cargo transport, and must guarantee the availability of required items within required timeframes without incurring additional storage charges or delay. Ensuring timely delivery of heavy materials and equipment to large construction sites with limited storage facilities is likely one of the more challenging logistics activities.
- **Technical:** The goal is to provide the most efficient installation or process that meets customer needs with high reliability and efficiency while ensuring public safety. This is done through design and specification of requirements for equipment, components, raw materials, people, and of course, the entire design/build for large, fixed installations. The risk from a procurement perspective is that activities may result in ever newer and diverse pieces of equipment, resulting in higher capital costs, operating overheads, upgrade, and spares requirements.

Similarly, the landed cost, or the total cost to get an item to the recipient's door, includes shipping, taxes, and customs duties which can significantly increase expected costs. The technical department also approves the spares holding requirements; without adequate due diligence, the level of spares holding may be increased to unaffordable levels. This must be carefully managed to mitigate the risks and costs of stockouts, equipment downtime, service interruptions, and early or premature asset replacement. Large and complex projects require coordination of engineering, construction, and procurement activities throughout asset planning, acquisition, and initial operations activities.

- **PSCM:** The drive is often to reduce the costs of purchasing items through a clearly defined and managed supply chain with clear specifications for the items being procured. PSCM must balance the needs for quality and performance benefits, which tend to increase costs. Items must be ethically sourced and, once combined into assets, contribute positively towards the organization's sustainability goals. Ideally, PSCM

can consolidate all requirements for asset purchases, operations, maintenance, spares, upgrades, and eventual disposal. This supports making hard trade-off decisions and enables tangible improvements across the entire organization. Consolidating current and future requirements helps optimize costs and benefits over the entire asset life cycle.

Managing internal priorities

While each internal department can be said to be at the center of all activities, they are also all connected, with the common goal of achieving the organization's vision, mission, and strategies. Departmental and organizational priorities and activities can be readily aligned through processes such as the following.

- Simple process for the purchase of simple commodities and consumables.
- More complex process for items where specifications need to be clearly defined.
- Rigorous process for capital asset planning, budgeting, and forecasting.
- Planning and approval of expenditures for future maintenance and asset upgrades.
- Procurement of strategic items over the entire asset life, such as the stocking of spares for plant and new equipment.
- Governance practices to ensure purchase decisions are defined, suitably approved, and auditable.
- Monitoring practices to ensure procurement policies and processes are followed and to ensure sourcing, procurement, and purchasing activities are ethical and seen to be ethical.
- Planning, approval, and execution of environmental policies.
- Staffing and 'human resource' processes to ensure suitable and sufficient people are available, including employees and external contractors.

PSCM owns the overall process of ensuring the entire supply chain can deliver as needed, where needed, and when needed. For guidance on developing the required competencies and skills in the PSCM team, we refer the reader to the publicly-available Competency Framework published by the Chartered Institute of Procurement and Supply (CIPS, Global Standard for Procurement and Supply, 4th edition, 2021).