



SUPPLY CHAIN MANAGEMENT

An introduction and practical toolset
for procurement practitioners

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Common Abbreviations and Defined Terms

This Section explains the common terms and abbreviations used in this Guidance. Defined terms are written using capital letters throughout the Guidance.

Abbreviation/term	Full terminology/definition
Bank	IBRD and/or IDA (whether acting on its own account or in its capacity as administrator of trust funds provided by other donors).
Bid	An offer, by a firm or joint venture, in response to a Request for Bids to provide the required Goods, Works or Non-consulting Services.
Bidder	A firm or joint venture that submits a Bid for Goods, Works, or Non-consulting Services in response to a Request for Bids.
Borrower	A Borrower or recipient of Investment Project Financing (IPF) and any other entity involved in the implementation of a project financed by IPF.
Consultant	A variety of private entities, joint ventures, or individuals that provide services of an advisory or professional nature. Where the Consultant is an individual they are not engaged as an employee.
Consulting Services	Covers a range of services that are of an advisory or professional nature and are provided by Consultants. These Services typically involve providing expert or strategic advice e.g., management consultants, policy consultants or communications consultants. Advisory and project related Consulting Services include, for example: feasibility studies, project management, engineering services, finance and accounting services, training and development.
Core Procurement Principles	The Bank's Core Procurement Principles as set out in Section III. C of the Bank Policy: Procurement in IPF and Other Operational Procurement Matters.
Environmental and Social Framework (ESF)	The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development and the requirements for managing environmental and social risks and impacts of investment projects. The framework comprises: <ul style="list-style-type: none"> ■ A Vision for Sustainable Development, which sets out the Bank's aspirations regarding environmental and social sustainability; ■ The World Bank Environmental and Social Policy, the Environmental and Social Directive, and the Directive on Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups, which set out the mandatory requirements that apply to the Bank; and ■ The Environmental and Social Standards, together with their Annexes, which set out mandatory requirements that apply to the Borrower.

Abbreviation/term	Full terminology/definition
Fraud and Corruption	The sanctionable practices of corruption, fraud, collusion, coercion and obstruction defined in the Anti-Corruption Guidelines and reflected in Annex IV, World Bank Procurement Regulations for Borrowers.
Goods	A category of procurement that includes: commodities, raw material, machinery, equipment, vehicles, Plant, and related services such as transportation, insurance, installation, commissioning, training, and initial maintenance.
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
In Writing	This means communicated or recorded in written form. It includes, for example: mail, e-mail, fax or communication through an electronic procurement system (provided that the electronic system is accessible, secure, ensures integrity and confidentiality, and has sufficient audit trail features).
Incoterms	The international commercial terms for goods published by the International Chamber of Commerce (ICC).
Inputs	Products or services that are being transformed to create an end result (a final product or service requested).
Investment Project Financing (IPF)	The Bank's financing of investment projects that aims to promote poverty reduction and sustainable development. IPF supports projects with defined development objectives, activities, and results, and disburses the proceeds of Bank financing against specific eligible expenditures.
KPI	Key performance indicator
Manufacturer	A business entity producing (manufacturing) goods
Most Advantageous Bid/Proposal	The Bid/Proposal that meets the qualification criteria and has been determined to be substantially responsive to the request for bids/request for proposals document; and is also the highest ranked Bid/Proposal.
Non-Consulting Services	Services which are not Consulting Services. Non-consulting Services are normally Bid and contracted on the basis of performance of measurable outputs, and for which performance standards can be clearly identified and consistently applied. Examples include: drilling, aerial photography, satellite imagery, mapping, and similar operations.
Output	The final requested product or service, which has been created by the transformation of inputs.
PESTLE	A PESTLE (Political, Economic, Social, Technology, Legislative and Environment) is an analysis tool for supporting assessment of each of these factors.
Plant	A category of procurement relating the provision of equipped facilities, such as those executed on the basis of design, supply, installation, commissioning, maintenance, modification, and protection.
Project Procurement Strategy for Development (PPSD)	A project-level strategy document, prepared by the Borrower, that describes how Procurement in IPF operations will support the development objectives of the project and deliver VfM.

Abbreviation/term	Full terminology/definition
Prequalification	The shortlisting process which can be used prior to inviting Request for Bids in the procurement of Goods, Works or Non-consulting Services.
Procurement Approach	Procurement approach is the overall design of “fit for purpose” procurement to award contracts that deliver the Project Development Objectives and Value for Money. This includes the procurement arrangements, procurement risk management, contract strategy, market engagement, requirements drafting and contract management (where appropriate).
Project Development Objectives	Project Development Objectives (PDOs) are set out in the approved Project Concept Note and are considered mandatory unless analysis demonstrates the need for adjustment.
Procurement Documents	A generic term used to cover all Procurement Documents issued by the Borrower soliciting applications/Bids/Proposals. Procurement Documents include prequalification document, initial selection document, Request for Bids document, Request for Proposal document, forms of contracts, and any addenda.
Procurement Objectives	Objectives derived from the analysis of the current approach and the supply market. Objectives should be prioritized to identify those that need to be addressed through the procurement strategy.
Procurement Process	The whole Procurement lifecycle that starts with the identification of a need and continues through planning, preparation of specifications/ requirements, budget considerations, selection, contract award, and contract management. It ends on the last day of the warranty period.
Procurement Regulations	The “World Bank Procurement Regulations for IPF Borrowers”.
Project Procurement Strategy for Development (PPSD)	A project-level strategy document, prepared by the Borrower, that describes how Procurement in IPF operations will support the development objectives of the project and deliver VfM.
Proposal	An offer, in response to a Request for Proposals, which may or may not include price, by one party to provide Goods, Works, Non-consulting Services or Consulting Services to another party.
Proposer	An individual entity or joint venture that submits a Proposal for Goods, Works, and Non-consulting Services in response to a Request for Proposals.
RFB	Request for Bids as a selection method.
RFP	Request for Proposals as a selection method.
RFQ	Request for Quotation as a selection method.
Section	A Section within this Guidance.
Standard Procurement Documents (SPDs)	Procurement documents issued by the Bank to be used by Borrowers for IPF financed projects. These include, GPN, SPN, EOI, REOI, Prequalification document, Initial Selection documents, RFB and RFP documents.
Supply Chain	A supply chain captures all Organizations and activities that are responsible for or can influence the process of delivering an outcome, e.g., the successful delivery and completion of a project.

Abbreviation/term	Full terminology/definition
Supply Chain Flows	Processes through which information is communicated across companies (information flows), through which products or services are created (product flows), and through which payments are issued (financial flows).
Supply Chain Management (SCM)	Supply Chain Management (SCM) refers to the activities needed to provide a final product or service, which involves the coordination of activities starting with the raw materials and ending with the delivery of the final product service to the end customer. At the end of the product's or asset's usable life, supply chains are also responsible for coordinating the recycling, remanufacturing (i.e., the rebuilding of a product to its original specifications using reused parts), or disposal of the final product.
SWOT	A SWOT (Strengths, Weaknesses, Opportunities and Threats) is analysis is a tool that can support the Borrower Capability assessment, Market Analysis and Procurement Risk Assessment.
VfM	Value for Money.
Works	A category of procurement that refers to construction, repair, rehabilitation, demolition, restoration, maintenance of civil work structure, and related services such as transportation insurance, installation, commissioning, and training.

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Introduction

Purpose

This Guidance is designed to provide Borrowers with a practical understanding of Supply Chain Management (SCM). The Guidance introduces SCM practice and describes how SCM relates to each stage of the procurement lifecycle to best improve supply chain resilience and reduce procurement risks to support a successful project outcome. The Guidance provides Borrowers with tools and approaches on “how to” incorporate best practice SCM, including mapping supply chains, identifying weaknesses, and advising on how best to increase supply chain resilience/security and supply. The Guidance is cognizant of the increasing complexity of global supply chains, associated vulnerabilities to shocks and crises, and the ensuing challenges in managing these supply chains.

This Guidance reflects emerging good practice in SCM with a particular focus on infrastructure supply chains, which is a rapidly evolving space. The Guidance follows the Bank’s Procurement Process, but equally could be used by Borrowers for projects across their entire portfolio. The application of the tools and approaches discussed in this Guidance should be proportionate to the risk and value of the project and cognizant of the resources that the Borrower has available (e.g., for low risk/low value projects it may be that minimal SCM is needed). When developing SCM specific requirements or obligations, it is important to understand the specific supply market, consider what the supplier can realistically control, and set requirements or obligations accordingly.

This Guidance is not intended to cover compliance with other relevant Bank policies (as they may relate to SCM issues), such as the [Environmental and Social Framework \(ESF\)](#). For reference, Annex I summarizes some relevant parts of the ESF where there are close linkages to SCM.

Background

The Bank’s [Procurement Framework](#), which took effect on July 1, 2016, had a notably positive impact on many key aspects of procurement performance under Bank-financed investment operations.¹ However, to address the increased global challenges facing Borrowers, a broader understanding of the supply chain is needed to improve supply chain resilience and manage associated risks to the successful completion of projects. This Guidance on SCM was thus developed by the World Bank with [Tobias Schoenherr](#) at the [Broad College of Business, Michigan State University](#), to provide practical tools to assess supply chains in projects for the public sector with a particular focus on infrastructure.

How to Use this Guidance

The Bank’s Procurement Regulations define the Procurement Process as:

“The process that starts with the identification of a need and continues through planning, preparation of specifications/ requirements, budget considerations, selection, contract award, and contract management. It ends on the last day of the warranty period.”

While the specific process pursued can differ depending on what is purchased, procurement financed by the Bank generally follows the steps outlined in Figure I. This generic procurement process will be used in this Guidance to describe the SCM issues that need to be considered at each stage.

This Guidance should be used in conjunction with the Bank’s Procurement Regulations for IPF Borrowers ([Procurement Regulations](#)) as well as related Bank publications, including the Project Procurement Strategy for Development (PPSD) ([Short Form Guidance](#), [Long Form Detailed Guidance](#)), Achieving VfM in Investment Projects Financed by the Bank ([Value for Money](#)), Use of Evaluation Criteria for Procurement of Goods, Works, and Non-consulting Services using RFB and RFP ([Evaluation Criteria](#)), [Sustainable Procurement](#), How to undertake a Competitive Dialogue Procurement Process ([Competitive Dialogue](#)), [Standard Procurement Documents](#), [Contract Management](#), and the [Beginners Guide to IPF Procurement](#).

FIGURE I The Bank’s procurement process



What is Supply Chain Management?

SCM refers to the coordination of activities needed to provide a final product or service. These activities start with the raw materials and end with the delivery of the final product or service to the end customer. At the end of the product or asset’s usable life, supply chains are also responsible for coordinating the recycling, remanufacturing (i.e., the rebuilding of a product to its original specifications

using reused parts), or disposal of the final product. The supply chain captures all Organizations and activities that are responsible for or can influence this process, including Suppliers/Contractors, logistics Organizations, and governmental agencies (e.g., customs).

Understanding and managing the supply chain is important for Borrowers procuring goods from Manufacturers that rely on input materials from other Suppliers. In other words, the Manufacturer the Borrower interacts with may in turn rely on several other Suppliers that enable them to manufacture the final output. SCM is not only important in a manufacturing context. It is, for example, important that the Borrower awarding a contract to an infrastructure Contractor also understands this full chain of events, so they can have confidence that supply chain activities are conducted effectively, efficiently, and safely. This Guidance is therefore not only applicable to the manufacturing context, but also to the infrastructure/construction context. The Guidance will therefore refer to supply chain Organizations from whom inputs are needed as “Suppliers/Contractors.”

Since supply chains have become more global and complex, breakdowns at any one point in the chain have the potential to jeopardize the successful completion of a Borrower’s project and/or present reputational risks for the Borrower. Supply chain disruptions have illustrated that if just one of the many Organizations in a supply chain responsible for a project delays the process or delivers poor quality, the entire project could suffer. Also, if a Borrower’s project creates environmental and social risks and/or is associated with breaches of requirements, even if they occur at a Supplier/Contractor not directly contracted by the Borrower, this could impact the Borrower’s/Bank’s reputation. It is thus not only the final product or service the Borrower should be concerned about, but also how it is made and how it gets there.

A Simple Illustration of a Supply Chain

Figure II is a simple illustration of what a supply chain for a construction project can look like. The number of Organizations involved can increase quite quickly as one moves higher up (i.e., from first-tier to fourth-tier suppliers) in the supply chain. The Supplier/Contractor who has a contract with the Borrower to provide products or services is called the first-tier Supplier/Main Contractor. The first-tier Supplier/Main Contractor then contracts with second-tier Suppliers/Subcontractors and so on. The Borrower does not have a contract with second-tier Suppliers/Subcontractors and beyond, but is nonetheless reliant on their products or services.

There are of course many more Suppliers/Subcontractors than pictured in Figure II, for instance, painting Subcontractors. In addition, the Suppliers/Contractors pictured as fourth-tier Organizations in Figure II may also have complex supply chains themselves. These supply chains, along with logistics service providers and other significant stakeholders such as governmental agencies, are not represented in Figure II.

To illustrate how the supply chain may span farther back, consider the supply chain of a timber Supplier, illustrated in Figure III. The timber Supplier may be dependent on processing plants that treat the timber with different chemical preservatives and processes. These plants rely on sawmills, which cut the logs into required dimensions. Sawmills, in turn, rely on log yards, which obtain their material

FIGURE II A simple supply chain for a construction project

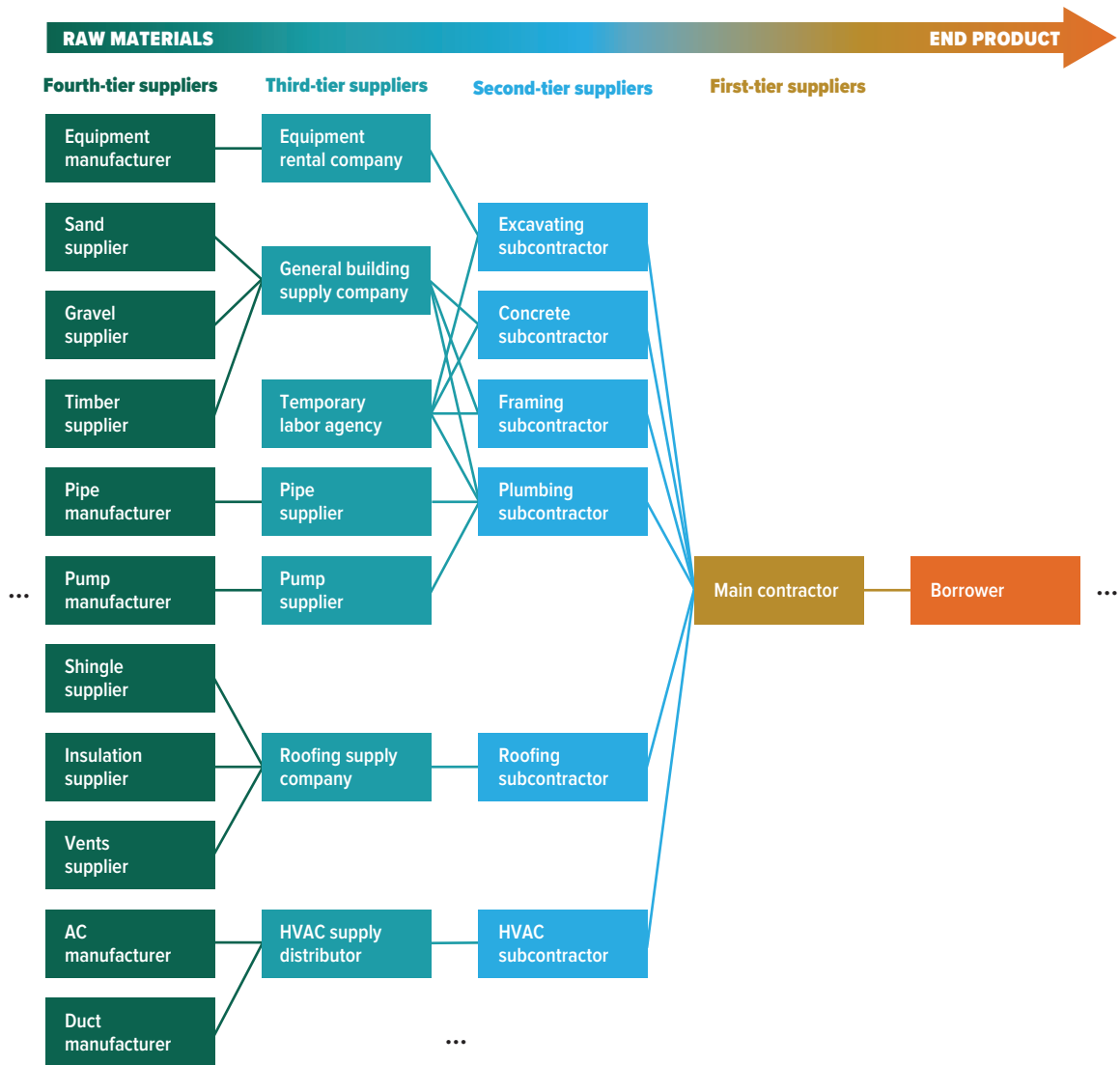
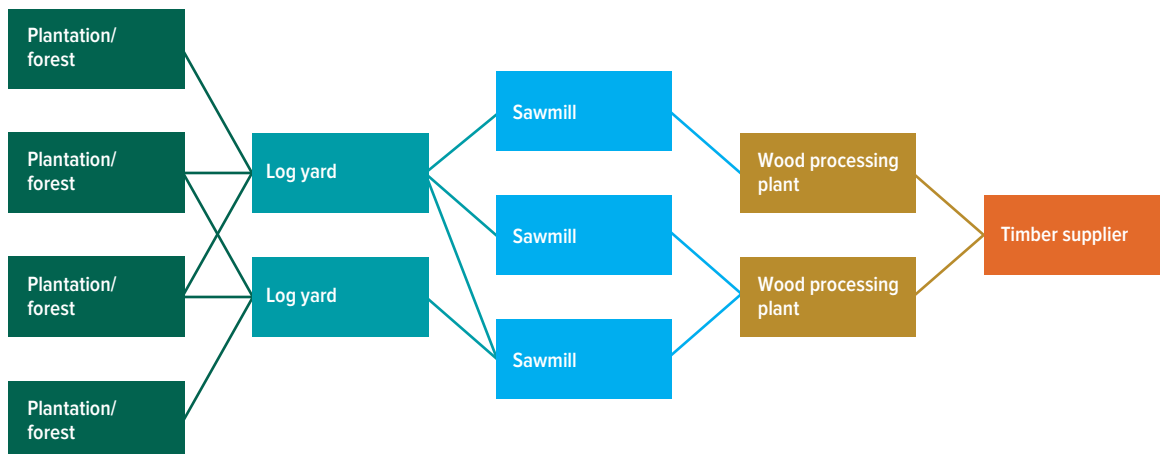


FIGURE III A simple supply chain for a timber supplier



from forests or plantations. Please note that Figure III does not identify the logistics providers that enable the transportation of the timber between the Organizations, or other service providers, such as agencies that can certify the sustainable harvesting of the timber.

While this illustrative supply chain may seem complex, this has become the reality in most industries. Over recent decades, Organizations have become much more specialized in their core activities (i.e., focusing on what they do best), and some have outsourced all remaining tasks to Suppliers/Contractors (for a brief history of SCM, please see Annex II). These Suppliers/Contractors have often done the same: focusing on what they do best and relying on other Organizations for the rest. These developments go hand-in-hand with increasing globalization, making it easier for Organizations to pursue specialization and outsource tasks globally.

All of this has led to each Organization only contributing a small but valuable part to the supply chain, which is why managing and coordinating the supply chain has become so important and much more complex. If just one of the Organizations in the supply chain fails, it can impact the performance of all Organizations that depend on this input. This can put the successful completion (e.g., on-time and on-budget) of the Borrower's project in danger.

When a Borrower engages with a Supplier/Contractor, it is not only the contracted Supplier/Contractor that needs to be assessed, but also their Suppliers/Subcontractors, and even further up in the supply chain, if possible. This is what SCM is concerned with: the management, or at least monitoring, of this dependence on higher-tier Suppliers/Subcontractors.

The longer the supply chain, the greater the risk of disruptions, since higher-tier Suppliers or Subcontractors are often more difficult to manage due to the degree of removal from the Borrower. See Example Box 1 for illustrative impacts of this principle.

EXAMPLE BOX 1: Supply chains: As strong as their weakest link

- A large capital project, such as the construction of a health care center or a school, whose opening may be delayed because critical components are missing.
- A medical imaging device that cannot be used because the computer programs required to read the images are missing, or because trained technicians are not available.
- Vaccines that cannot be administered because syringes are missing or unavailable.

The Importance of Supply Chain Management

This greater dependence on suppliers has made SCM more important than ever. Additional pressures and challenges that have contributed to this include:

- **Globalization:** Organizations often rely on a global supply base. An overseas Supplier/Contractor may be cheaper, produce better quality, or simply be the only source for the required input or

service. However, an overseas Supplier/Contractor may also increase the risk associated with the required input simply because the physical distance makes it more challenging to control and monitor the Supplier/Contractor and the associated supply chain. Borrowers should therefore aim to identify critical inputs and scrutinize the Supplier/Contractor's supply chain, specifically the geographic location of higher-tier Suppliers/Subcontractors and any risks that may be associated with for instance different legal systems in other countries, challenges associated with border crossings, or reliable infrastructure and transportation. One factor driving globalization, and enabling it to be better managed is information technology (IT). Coordination and interaction across multi-country supply chains can be facilitated with IT systems, enhancing visibility and transparency.

- **Supply shortages:** If a product or component does not arrive when it is needed, this may delay or even prevent the completion of the entire project. Supply shortages are often the reason for this delay, which can be triggered by challenges experienced by higher-tier Suppliers/Contractors or by unexpectedly high demand. For example, the COVID-19 pandemic that started in 2020 led to many supply shortages. Increasingly longer and more complex supply chains, coupled with Organizations' attempts to be "lean" and efficient (i.e., carrying as little inventory as possible), have been increasing the risk of supply shortages. Borrowers should therefore assess the Supplier/Contractor's supply chain to look for choke points that may lead to supply shortages, as well as the availability of inventory buffers to alleviate any shortages.
- **Geopolitical events and other disruptions:** Dispersed, worldwide supply chains are vulnerable to disruptions caused by geopolitical tensions and other events. Examples include trade sanctions, conflict, and the COVID-19 pandemic. Deliberate management of the supply chain is important to identify, mitigate, and manage such potential vulnerabilities.

Objectives of Supply Chain Management

Considering SCM principles as part of the Procurement Process can help Borrowers assess and mitigate supply chain related project risks, which is particularly important since challenges related to the supply chain are not expected to ease in the short term. Overall, SCM can help Borrowers to achieve the following objectives (for a more general overview of SCM functions and their objectives, please see Annex III):

- Making the supply chain more resilient (e.g., creating a supply chain that can withstand shocks and disruptions)
- Responding to supply chain disruptions (e.g., caused by COVID-19, natural catastrophes, delays at customs) and market distortions (e.g., a constrained global supply)
- Addressing transportation challenges and delays (e.g., posed by more complex logistics arrangements and higher costs)
- Managing increased delivery lead times (e.g., due to supply shortages or capacity limitations)

- Promoting environmental and social sustainability through the supply chain (e.g., by emphasizing adequate labor standards, including employment terms and conditions, and occupational health and safety, and the importance of managing environmental impacts)
- Monitoring project performance and completion according to specifications (e.g., on-time and on-budget performance, which can also be determined by the supply chain)

While traditional procurement practices may have solely focused on finding a Supplier/Contractor to deliver a product or service, the recognition of the real challenges associated with complex supply chains now makes it important to consider how the Supplier/Contractor's supply chain intends to deliver that product or service.^{2,3,4,5,6} The skills that may be required to conduct these activities are summarized in Annex IV.

Incorporating SCM into the Procurement Process

Overview

SCM should be considered throughout the Procurement Process, especially when developing the Procurement Strategy. Supply chain analysis and the development of an effective procurement approach up front, supported by appropriate due diligence, provide confidence that the necessary plans and approaches are in place to mitigate risks and take advantage of opportunities in the supply chain.

Constant supply chain monitoring and management should take place throughout the project, since no matter how perfect a plan may seem at the beginning, there can always be unforeseen disruptions and challenges.

Effective SCM therefore relies on a fit-for-purpose Procurement Process that incorporates appropriate SCM considerations throughout. Application of SCM tools and approaches should be proportional to the risk/value of the project.

SCM can deliver value at every stage of the Procurement Process (Figure I) because:

- Having knowledge about the supply chain's structure and dynamics is important for developing a robust procurement strategy and approach. This is where most value from considering the supply chain can be derived (covered in Section III).
- Considering supply chain dynamics is also important when deciding on the evaluation criteria for Suppliers/Contractors (covered in Section IV).
- SCM considerations are also important in the contract management stage. It is rare that everything goes according to plan, especially in complex global supply chains (see the complexities illustrated in Figures II and III), which is why it is so important to monitor the Supplier/Contractor's supply chain performance (covered in Section V).

This Section emphasizes the importance of incorporating SCM considerations into the Procurement Process, the value of supply chain analysis and due diligence, and the ability of Borrowers to influence Suppliers/ Contractors' actions regarding their supply chains.

Supply Chain Analysis

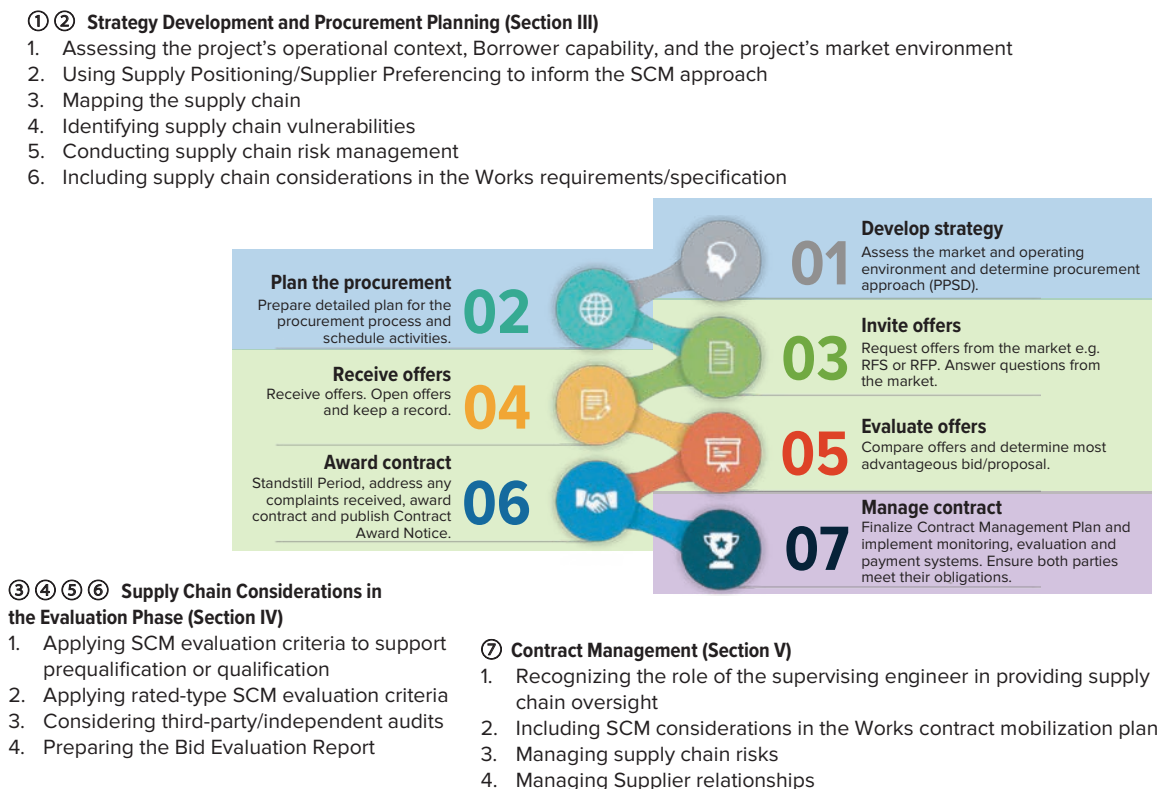
Supply chain analysis refers to the application of tools to identify opportunities, such as the discovery of alternate (better) Suppliers/Contractors, the design of more robust supply chains, or the identification of ways to better manage the supply chain. This Guidance will introduce Borrowers to a range of these tools, including supply chain mapping. Supply chain analysis also includes supply chain assessment and due diligence, which refers to processes for identifying, preventing, mitigating,⁷ or remedying issues in a supply chain that may lead to disruptions in supply, or any other risks that a supply chain may be exposed to (e.g., theft or damage during transit, delays at customs, natural disaster, conflict).

Supply chain analysis should be conducted throughout the Procurement Process, as part of strategy development prior to the identification of potential Suppliers/Contractors, and carried out throughout the contract until the successful completion of the project. The remainder of this Guidance will introduce Borrowers to a range of effective SCM practices across the Procurement Process, which are summarized in Figure IV.

Supply chain analysis includes activities such as:

- Mapping and monitoring the supply chain
- Assessing and prioritizing risks

FIGURE IV SCM considerations at key stages in the procurement process



- Responding to identified risks and engaging with Suppliers/Contractors
- Supporting transparency and continuous improvement

Creating Leverage

Leverage refers to the Borrower's power and ability to influence the Supplier/Contractor's actions and activities during the business relationship.⁸ This leverage is not always present. Borrowers can create leverage during the Procurement Process by conducting supply chain analysis and due diligence at each stage, and then using that information to set requirements, obligations, and objectives. This can, for example, be done through specific contract language to address risks identified in the Supplier/Contractor's supply chain.

While the Bank's [Standard Procurement Documents](#) (SPDs) include general provisions (which may be relevant for SCM) such as requirements on labor and occupational health and safety, the different Sections of this Guidance will provide further detail on what else may be prudent to be included in the contract. Establishing this leverage can help to make sure that the engagement continues after the contract has been awarded (e.g., by having established a strong working relationship or having set clear expectations).

For the purpose of this Guidance, the seven steps illustrated in the Bank's Procurement Process can be grouped into three broad phases (as outlined in Figure IV). Borrowers can develop leverage in each of these phases in the following ways:

- In strategy development and procurement planning, Borrowers can develop a detailed understanding of supply chain structures and their associated dynamics. This can help to determine how a supply market should be approached, enabling Borrowers to indicate to Suppliers/Contractors their priorities and requirements. This approach can serve as the foundation for future leverage in the relationship.
- The way Suppliers/Contractors are evaluated should be influenced by the information obtained in the strategy development and procurement planning stage. Leverage at this stage can be developed, for example, by using appropriate rated-type SCM criteria.
- At the contract award stage, leverage can be created by including contract clauses that hold the Supplier/Contractor accountable for addressing the Borrowers' supply chain concerns and priorities. Contract language can also address reporting requirements, and performance incentives linked to key performance indicators and payment can be included.
- In the contract management phase, Borrowers can use the leverage created in the prior stages to better manage unforeseen events and disruptions. The leverage can, for instance, help Borrowers better monitor the Suppliers/Contractors' performance and intervene if necessary. It is important to be proactive and forward-looking throughout the entire Procurement Process, and to include appropriate obligations and measures in the contract that facilitate effective management.

Strategy Development and Procurement Planning

Overview

Activities conducted as part of strategy development and procurement planning can help Borrowers develop a better understanding of potential Suppliers/Contractors' supply chains, including any inherent risks or potential challenges. This provides an opportunity to address supply chain issues in the interactions with Suppliers/Contractors as part of the Procurement Process. Specifically, the following activities can help Borrowers incorporate SCM into their strategy development and procurement planning:

- Assessing the project's operational context, Borrower capability, and the project's market environment
- Using Supply Positioning/Supplier Preferencing to inform the SCM approach
- Mapping the supply chain
- Identifying supply chain vulnerabilities
- Conducting supply chain risk management
- Including supply chain considerations in the Works requirements/specification

While these activities can be conducted in the sequence outlined above, as new information emerges, it may be worth revisiting previous activities to validate findings.

Related advice for this stage is provided in the Guidance document for Project Procurement Strategy for Development (PPSD; [Short Form Guidance](#) and [Long Form Detailed Guidance](#)). Relevant page references to the Long Form Detailed Guidance will be provided as appropriate. The PPSD Procurement Guidance supports the capture of the right information to enable the selection of the best Procurement Approach, but the tools included also provide an opportunity for Borrowers to think more broadly about SCM considerations. For example, as illustrated in this Section, when conducting market analysis and developing the risk management plan, SCM implications may emerge.

Assessing the Project's Operational Context, Borrower Capability, and the Project's Market Environment

A project's operational context, the Borrower's capability, and the project's market environment are interrelated dimensions of capability and risk. This includes potential environmental and social impacts of any project that are related to SCM. Assessing these dimensions can therefore provide Borrowers with valuable insight about how to best approach the management of the project's supply chain. This assessment can be conducted in parallel with the development of the PPSD, which also asks Borrowers to consider the project's operational context, Borrower capability, and the project's market environment ([PPSD Procurement Guidance](#), Section IV).

The Project's Operational Context

Developing insight about the project's operational context (e.g., the governance, economic, sustainability, and technological aspects of the industry and/or supply chain in which the project is embedded) enables Borrowers to gain a better understanding of the industry and its supply chains (the [PPSD Procurement Guidance](#) addresses the operational context on pages 11 and 12). The operational context may influence the motivation of Bidders/Proposers, the degree of leverage Borrowers have over Suppliers/Contractors, and the ultimate success of the investment project.

Practical Toolbox A offers a checklist that Borrowers could use to develop a better understanding of a project's operational context in which an industry, its Organizations, and its associated supply chains are operating. Operational context information can be obtained via Internet searches, discussions with subject matter experts and stakeholders, or analysis undertaken with the Bank or other Organizations, such as the United Nations, which publishes for example [global operational context reports](#) and [guidance for collecting contextual country information](#).

PRACTICAL TOOLBOX A: SCM implications of the operational context

The following template provides examples of the kind of information that can help Borrowers analyze a project's operational context. Specific operational context considerations include industry regulations, industry/supply chain transparency, industry pressures, environmental and social risks and impacts, fraud and corruption, disruption risks, supply chain resilience, and supply chain complexity/specialization.

This exercise can help Borrowers consider potential actions/remedies that could be deployed. For example, when there is a lack of industry regulations and supply chain transparency, this can be addressed with more thorough supply chain analysis and due diligence up-front. To obtain this insight, Borrowers can for instance request specific information from Suppliers/Contractors about their own operational context. Areas of concern can also be addressed with specific contract language.

The [PPSD Procurement Guidance](#) offers further advice on related aspects and how they can be assessed (pages 11 and 12).

(continues)

PRACTICAL TOOLBOX A: SCM implications of the operational context (continued)

TABLE I SCM implications of operational context characteristics

Operational Context	Potential Sources of Information	Assessment	Context Characteristics that Increase the Importance of SCM	Possible Borrower Actions/Remedies
Industry regulations	Laws, standards, or reporting requirements	<input type="checkbox"/> Highly regulated <input type="checkbox"/> Somewhat regulated <input type="checkbox"/> Not regulated	Lack of or no strict industry regulations that govern the actions of Organizations operating in the sector (for example, healthcare is highly regulated, making SCM easier)	Specify exact performance requirements in contracts, enhanced monitoring
Industry/ supply chain transparency	Information available on organizational and industry practices and performance	<input type="checkbox"/> Highly transparent <input type="checkbox"/> Somewhat transparent <input type="checkbox"/> Not transparent	Only limited information is available about the industry and/or the Organizations in the supply chain	Request the Supplier/ Contractor to share relevant information (for example, on production processes, environmental and social practices)
Industry pressures	Industry competitiveness, sensitivity to the economic environment	<input type="checkbox"/> Many pressures <input type="checkbox"/> Some pressures <input type="checkbox"/> No pressures	Significant industry pressures restrict the actions of Organizations in the supply chain	Closely monitor the industry (for example, trends, news articles on major players in the industry) to assess these pressures and how they may influence project outcomes; include potential obligations in the contract
Environmental and social risks	Likelihood of project activities not complying with environmental and/ or social standards, laws, regulations, or lenders' policy requirements	<input type="checkbox"/> High risk <input type="checkbox"/> Medium risk <input type="checkbox"/> Low risk	Organizations in the industry are known or are likely to represent a high risk of environmental and/ or social breaches of requirements/ obligations	Stipulate appropriate requirements in contracts; limit procurement to Suppliers/ Contractors that can demonstrate rigorous risk management processes that reduce these risks

(continues)

PRACTICAL TOOLBOX A: SCM implications of the operational context (continued)

TABLE I SCM implications of operational context characteristics (continued)

Operational Context	Potential Sources of Information	Assessment	Context Characteristics that Increase the Importance of SCM	Possible Borrower Actions/Remedies
Fraud and corruption	The Bank's Country Policy and Institutional Assessment (CPIA)	<input type="checkbox"/> High risk <input type="checkbox"/> Medium risk <input type="checkbox"/> Low risk	Organizations in the industry are known or are likely to represent a high risk of fraud and corruption	Emphasize the Bank's Anti-Corruption Guidelines and Annex IV of the Procurement Regulations (apply to all IPF operations)
Disruption risks	Industry disruptions and challenges reported in the past or reports/ case studies into how the industry has responded to disruption	<input type="checkbox"/> High risk <input type="checkbox"/> Medium risk <input type="checkbox"/> Low risk	Supply chains in the industry are prone/ known to disruptions (e.g., frequent incidents in the recent past)	Conduct supply chain risk analysis and management; monitor any risks that may impact the supply chain
Supply chain complexity/ specialization	Number of supply chain tiers, their dependency on each other, their degree of specialization, availability of alternate Suppliers/ Contractors	<input type="checkbox"/> High complexity <input type="checkbox"/> Medium complexity <input type="checkbox"/> Low complexity	Supply chains in the industry are complex (e.g., consisting of specialized Organizations)	Map the supply chain in as much detail as possible, including possible choke points, and monitor them closely; include performance requirements addressing potential risks in the contract

Borrower SCM Capability

At this stage it is also prudent for Borrowers to assess their own SCM capability (related content is provide in the [PPSD Procurement Guidance](#) on page 13). The objective is to review the Borrower's past performance in managing supply chain risks, including practices and approaches that were effective in the past, and to leverage this insight in preparing for the current project. Illustrative factors that can be used to assess a Borrower's own SCM capabilities, together with associated SCM implications, are provided in Practical Toolbox B.

PRACTICAL TOOLBOX B: SCM capability factors

Thinking through the following SCM capability factors and implications can help Borrowers to identify deficiencies or gaps in their SCM capabilities. These can then be addressed through targeted capacity building, or by supplementing or supporting the project team.

TABLE II SCM capability factors

SCM Capability Factor	Questions for Developing SCM Insight
Previous experience/track record (good and bad) in implementing similar projects and SCM issues encountered	<p>What has worked well in the past, and what has not?</p> <p>What can we learn from these past experiences, and what SCM resources or insights were missing in retrospect?</p> <p>How did the approach in which the supply chain was managed influence performance?</p>
Subject matter/SCM experts and professional advisors/consultants	<p>Who in our team possesses SCM knowledge that may be useful?</p> <p>Can we complement our SCM capability with outside resources?</p>
Analytical capabilities	Are advanced analytical capabilities needed to develop contractual SCM requirements and specifications?
Project planning and implementation	Do we have sufficient resources to address SCM issues in project planning and implementation?

The Project's Market Environment

When undertaking market research and analysis, as outlined in the [PPSD Procurement Guidance](#) (pages 14–27), Borrowers can also think more broadly about how the project's market environment may create opportunities and/or challenges for effective SCM. For example, taking a supply chain perspective when assessing the project's market environment can help identify risks inherent to the supply chain so they can be addressed, mitigated, or managed.

Information for market research and analysis can be found through Internet research, industry associations, requests for information sent to Suppliers/Contractors, the experience of others within the Borrower's team (for example, the supervising engineers of previous construction projects), and a Borrower's own knowledge from prior experiences. Practical Toolbox C provides an illustrative template with which initial supply chain characteristics can be captured as part of the market environment assessment. The template also includes an illustrative example that may be found for the steel industry. Please note that this information is illustrative, may change over time, and may depend on the Borrower's location. The information provided in Practical Toolbox C is also illustrative of what may be obtained by doing a simple Internet search. For more sophisticated analysis, industry associations and market research firms can be approached that can provide ready-to-use and comprehensive industry market environment reports.

PRACTICAL TOOLBOX C: Supply chain characteristics identified through market research and analysis

A simple Internet search for information about the steel industry may reveal the following information. Such information may be sought when steel is a major component for a Borrower's project.

- Overall description/characteristics of the supply chain: the supply chain for steel is well established, and relies on Suppliers having made significant investment in their plant and capabilities
- Potential vulnerabilities or choke points: material shortages, constrained capacity of steel mills, increasing prices, tariffs, potential lack of domestic supply
- Geographical scope of the supply chain: while there may be local production capability, most steel is produced in China, Japan, India, and the United States
- Unique technical capabilities of the supply chain: specialized steel producers offer integrated services (alleviating the need to engage other Suppliers), which can include heat treatment, testing, and special cutting options
- Competitiveness of the supply chain: highly competitive, several large producers

Sustainable Public Procurement

Sustainable public procurement (SPP) is:

“a process whereby public organizations meet their needs for goods, services, works, and utilities in a way that achieves value for money on a whole lifecycle basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst minimizing damage to the environment.”⁹

The Bank is developing updated Guidance on Sustainable Procurement that will be available later in 2023.

Given the role that supply chains play in supporting delivery of SPP objectives, SCM becomes increasingly important the greater the environmental and social risk. Different sectors have different sustainability risks and opportunities given the nature of competition in the market, the inherent scale and severity of environmental impact, supply chain complexity, local and national laws and controls, and availability of standards and evaluation techniques in the sector. For example, the supply chains of some products or materials may represent higher risk of environmental or social harm.¹⁰

In general, the risk of child labor, forced labor, or worker safety issues is heightened if some of the following characteristics apply to the nature of the workforce:¹¹

- Production based on work that is generally low-skilled with an easily replaceable workforce
- A sector with a high presence of migrant workers or workers from marginalized communities
- Production that possibly involves work in hazardous conditions
- Labor contracts arranged through recruiters, agents, or other intermediaries

- Inadequate labor laws and regulations, or lack of enforcement
- Presence of cheap labor and a high number of vulnerable workers
- Lack of business or government transparency or accountability

A Borrower's ability to influence Suppliers/Contractors to successfully manage environmental and social risks will ultimately depend on, amongst other things, the capability of the Supplier/Contractor, the importance of the project to the Supplier/Contractor, the sphere of control the Supplier/Contractor has, and the extent to which the Supplier/Contractor can influence their own supply chain.

Borrowers can encourage Suppliers/Contractors to provide information obtained through their own supply chain assessment and due diligence, gathered, for instance, via supply chain mapping. Borrowers may have discovered potential risks through these assessments, which they can communicate to Suppliers/Contractors, together with ideas or suggestions on how to address them. Since supply chains can be so complex with often limited visibility, such information sharing and communication is important for the effective management of environmental and social sustainability.^{12,13}

For example, if the Borrower identifies potential environmental and social risks in the projects' supply chains and determines that systems and verification practices should be put in place, then Suppliers/Contractors can be requested to describe how these practices would be implemented as part of their Bid/Proposal. In addition, Suppliers/Contractors could be contractually required to identify key labor risks including child labor, forced labor, and worker safety risks, not only for themselves, but also for their Suppliers/Subcontractors. Evidence could also be requested about procedures and mitigation measures that are in place to address these concerns. One way in which this can be done is through Bidder declarations, as illustrated in Example Box 2.

EXAMPLE BOX 2: Addressing child labor, forced labor, and worker safety¹⁴

The Borrower should address potential risks of child labor, forced labor, and serious worker safety issues that may arise in the project's supply chain. What makes the monitoring of such risks difficult is that most of these are "invisible" to the Borrower because worksites may be distant and/or the Borrower does not interact with these workers directly.

When the likelihood of child labor, forced labor, or worker safety issues is high, Borrowers can require the Supplier/Contractor to sign additional Bidder declarations as part of the bidding process. Among other things, Bidder declarations may request information on whether the Suppliers/Contractors, or any of their Suppliers/Subcontractors, have been suspended or terminated for breach of child labor, forced labor, or worker safety obligations in the past (for example, during the last five years). If a Bidder's answers to these questions is affirmative, further information can be requested, including what processes and practices have been put in place to meet obligations.

(continues)

EXAMPLE BOX 2: Addressing child labor, forced labor, and worker safety *(continued)*

Appropriate requirements can also be included in the contract. This can include specifying, for example, that the Supplier/Contractor must include additional declarations in contracts with their Suppliers/Subcontractors. If child labor, forced labor, or worker safety issues are identified, the Borrower can require that the Supplier/Contractor take appropriate steps to remedy them.

Borrowers can further request that the Bidder provides information on their Suppliers and Subcontractors regarding the total number of workers employed, including a breakdown of the number of workers hired directly and indirectly through labor agencies or Subcontractors. These actions may help in assessing and addressing labor-related risks.

When a Borrower undertakes National Procurement, Practical Toolbox D offers some considerations for developing contractual clauses.

PRACTICAL TOOLBOX D: Considerations when developing contractual clauses for construction projects procured under National Procurement (using the Borrower's own procurement documents)^{15,16}

Considerations when developing contractual clauses could include the following:

- Require the Contractor to identify and mitigate environmental and social risks in its supply chain, together with the requirement that the Contractor notifies the supervising engineer immediately if significant issues arise
- Require the Contractor to produce an Environmental and Social Supply Chain Due Diligence Report that identifies the main environmental and social risks in its supply chain, highlighting the main products and countries involved, as well as steps to be taken to mitigate the risks in the short, medium, and long term
- Require the Contractor to update the Environmental and Social Supply Chain Due Diligence Report throughout the duration of the contract, including the performance of Subcontractors on environmental and social issues
- Confirm the right of the supervising engineer to assess the Environmental and Social Supply Chain Due Diligence Report and the annual progress of the Contractor to prevent and mitigate environmental and social risks in its supply chain
- Require the Contractor to provide information to demonstrate its approach in managing environmental and social risks among Subcontractors; this may include, for example, examination of labor conditions or labor audits, ongoing supply chain monitoring, updates to action plans put in place within the supply chain, information about working/employment practices, evidence of risk management and monitoring processes, or information about workforce recruitment practices

(continues)

PRACTICAL TOOLBOX D: Considerations when developing contractual clauses for construction projects procured under National Procurement (using the Borrower's own procurement documents) *(continued)*

- Confirm the right of the supervising engineer to require the Contractor to submit, agree to, and deliver an action plan to remedy any identified issues associated with its Subcontractors
- Confirm the right of the supervising engineer to gather information about issues regarding the Contractor and its Subcontractors from third parties, including other customers, trade unions, researchers, or experts, and to use that information to exercise other rights under the contract
- Confirm the right of the supervising engineer to approve all Subcontractors who carry out activities within the supply chain of the Contractor's contract, or any changes to such Subcontractors
- Require the Contractor to collaborate with the supervising engineer to assess risks and design due diligence processes, and to report regularly on their own due diligence

Note: An Environmental and Social Supply Chain Due Diligence Report includes a Contractor's supply chain due diligence policies and practices. The format and length of these reports vary widely, but they should include policies and approaches to environmental and social risk assessment and prevention, including measurement, auditing, and control processes.

Output of the Supply Chain's Operational Context and Market Environment Assessment

The output of the supply chain's operational context and market environment assessment can provide an initial overview and characterization of the key supply chains involved, together with some preliminary insight into how the supply chains could be managed. This insight can be refined through additional information obtained in later stages of the Procurement Process (approaches for how to do so will be described in subsequent Sections of this Guidance, illustrating, for instance, the value of this information for risk management).

Illustrative Examples

The following are examples of SCM in the context of construction projects for water, sanitation, and waste management (water treatment plants, sewage systems); transportation (metro systems, rail, road, public transport); energy and extractives (hydropower, wind power); and health and agriculture. Specifically, Example Box 3 provides an illustration of the general market and operating environment for construction projects and associated SCM implications. In addition to these considerations, large construction projects will need to consider the terms and conditions of the FIDIC Red Book (2017), as well as the prescribed role of the supervising engineer in managing the main Contractor (large construction projects using the FIDIC Red Book will have a supervising engineer in place)—this context is briefly summarized in Example Box 4. Example Box 5 provides a similar illustration for the agri-food sector.

EXAMPLE BOX 3: The market and operating environment for construction projects^{17,18,19,20,21,22,23}

Due to the inherent supply chain complexity and the use of multiple Subcontractors, construction projects are often characterized by high-risk/high-cost contracts. Specifically, construction projects frequently require Contractors to deliver unique solutions that meet the Borrower's specific needs (e.g., necessitating specialized engineering knowledge), making standardization difficult and increasing the importance of effective coordination through SCM.

A further contributing factor that makes the management of the construction supply chain challenging is that it is usually made up of several different supply chains, including:

- Materials supply chains, responsible for the provision of inputs (raw) materials needed for the construction project;
- Labor supply chains, responsible for the provision of workers; and
- Equipment/goods supply chains, responsible for the provision of earth moving and other plant or construction equipment.

Integrating so many different Organizations increases complexity. As such, early conversations with Contractors can reveal choke points or bottlenecks typical of certain supply chains (for instance, shortage of lumber or significant price increases for aluminum), and thus enable the Borrower to plan accordingly.

Due to the number of Subcontractors, many Contractors have sought to establish relationships with Subcontractors, enabling better control, management, and oversight. Framework contracts (that is, longer-term agreements that avoid having to negotiate standard terms and conditions²⁴) and partnering agreements (the adoption of management processes that facilitate cooperation²⁵) have also become popular as they encourage the involvement of select Subcontractors in the project conception and design stages. This can facilitate greater quality, speedier completion, and lower cost, as recommendations for design changes from Subcontractors can be considered at an early stage of project design.

Support and knowledge is provided by the Bank's [Global Water Security and Sanitation Partnership](#), which focuses in particular on water-related sustainable development goals (SDGs). The partnership supports client governments to achieve the water-related SDGs through the generation of innovative global knowledge and the provision of country-level support.

In addition to these general characteristics of the operational context for construction projects, the following challenges have been exacerbated by the COVID-19 pandemic:

- Material shortages and price increases for products such as timber and steel
- Significantly increased rates for global container shipments
- Labor and skills shortages

(continues)

EXAMPLE BOX 3: The market and operating environment for construction projects *(continued)*

Implications for Borrowers

Construction project supply chains can be complex, with the main Contractors being responsible for managing the risks of supply chain failures, even if it is the fault of a Subcontractor. This should be specified in the contract and is a means to transfer the supply chain risk to the Contractor. In addition, general supply chain practices can be applied, including:

- Mapping supply chains to identify critical points of vulnerability
- Developing strategies to mitigate/manage identified risks. This could include:
 - Updating inventory policies and planning for critical materials (for instance, planning to stockpile certain key materials allows construction projects to be managed with a lower risk for disruptions), and
 - Looking at alternative sources of supply, increasing the supply base, onshoring
- Monitoring logistics constraints and costs
- Engaging Suppliers/Contractors on supply chain issues early
- Applying due diligence to Suppliers/Contractors that extends to how they manage their own supply chains (for example, the financial viability of Subcontractors)
- Reporting and frequent information sharing with Suppliers/Contractors to identify issues early
- Practicing Supplier Relationship Management to build closer, more effective relationships with key Suppliers/Contractors

EXAMPLE BOX 4: The FIDIC red book (2017) and the role of the supervising engineer

Large construction contracts financed by the Bank generally use the standard conditions of the [FIDIC \(International Federation of Consulting Engineers\) Red Book](#) (2017), with some additions and modifications as appropriate to be consistent with the Bank's procurement requirements. The Red Book includes "Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer."

Under the FIDIC Red Book (2017), the Borrower [Employer] is required to appoint a supervising engineer to administer the contract. The supervising engineer is thus central to the management of the contract, since they can serve as the Borrower's agent, supervisor, and certifier in accordance with the contract. The reason for engaging such a supervising engineer is that Borrowers are generally not experts in all of the technical, commercial, and legal considerations of a construction project. The supervising engineer thus acts as an adviser and consultant to the Borrower. The supervising engineer interacts with a main Contractor who is responsible for arranging the work with their Subcontractors.

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EXAMPLE BOX 4: The FIDIC red book (2017) and the role of the supervising engineer *(continued)*

Aspects related to SCM are included in clause 5.2, which governs the nomination of Subcontractors. While the supervising engineer can nominate Subcontractors, if the Contractor has reasonable objections, the Contractor is under no obligation to use the Subcontractor (clause 5.2.2). Objections can be based on the Subcontractor's lack of competence, resources, or financial strength.

In hiring a supervising engineer, Borrowers should assess how familiar the supervising engineer is with the supply chains that need to be managed as part of the project. Having this familiarity may provide the supervising engineer insight into any risks associated with supply disruptions or possible choke points for such supply chains. This can facilitate closer monitoring and regular updates to avoid issues.

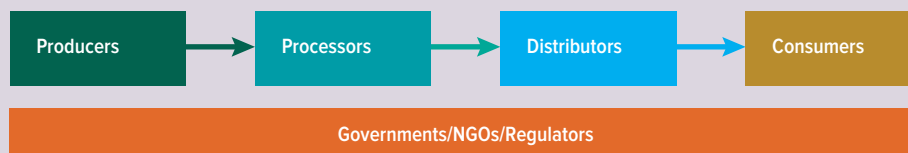
EXAMPLE BOX 5: The Market and Operating Environment for the Agri-Food Industry^{26,27,28}

Global events have led to unprecedented stress on the global agricultural supply chain. Proactively monitoring this supply chain by being aware of its vulnerabilities is therefore of utmost importance.

The basic agricultural supply chain consists of five major entities (Figure V):

- The producers that research, grow, and trade food commodities
- The processors that process, manufacture, and market food products
- The distributors that market and sell the food (including wholesalers and retailers)
- The consumers that buy and consume the food
- Governments, Non-Governmental Organizations (NGOs), and regulators that monitor and regulate the agricultural supply chain

FIGURE V The agri-food supply chain



The operational context and market for the agri-food industry has experienced several challenges in recent years, including:

- Ecological and climate risks to crops: Climate change, rising temperatures, and severe weather events—including droughts and floods—disrupt harvest patterns and lead to

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EXAMPLE BOX 5: The Market and Operating Environment for the Agri-Food Industry *(continued)*

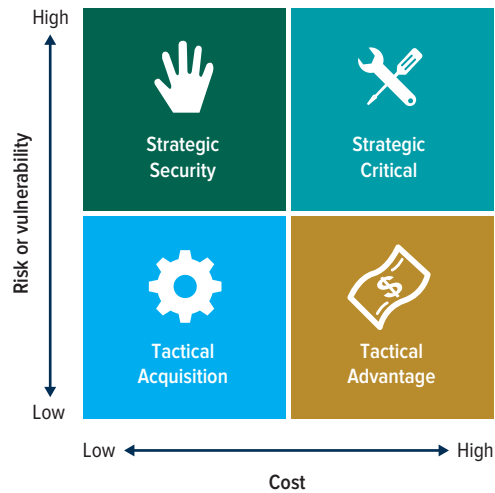
increased price volatility, creating uncertainty for farmers. Recommended mitigation measures include:

- Localized planning,
 - Investing in water delivery and irrigation systems and non-traditional water sources,
 - Improving roads to connect farmers to more markets,
 - Developing more resistant crops, and
 - Upgrading crop-storage facilities to prevent spoilage.
- Concentration and consolidation in agri-food production, manufacturing, and distribution: In some agribusiness sectors like meatpacking, a small number of facilities account for a large share of regional or national food processing capacity. Therefore, even a temporary shutdown of one or more of these facilities can threaten the food supply. Example mitigation measures could include promoting competition and local agri-food businesses, as well as government interventions in case of disruptions.
 - Labor needs: The agricultural sector is having difficulty attracting workers, attributable to the often seasonal nature of the jobs, combined with strenuous working conditions. This issue could be addressed, in part, with government-supported, skills-based apprenticeship opportunities in local communities and investment in workforce development programs.
 - Transportation bottlenecks: Delays can be caused by aging infrastructure (e.g., inland waterways lock closures due to breakdowns), ocean port congestions, shipping container shortages and costs, and truck driver shortages. Allocating funding to improve and expand infrastructure can help to remedy these issues.
 - Trade disruptions: This challenge is exacerbated by the reliance on critical agricultural inputs sourced from foreign Suppliers, and reliance on only a few foreign market destinations. Recommended mitigation strategies include supporting opportunities for small exporters, and exploring regulatory changes.

Using Supply Positioning/Supplier Preferencing to Inform the SCM Approach

The application of the tools and approaches introduced in this Guidance should be proportionate to the risk and value of the project, and cognizant of the resources that the Borrower has available (e.g., for low risk/low value projects it may be that minimal SCM is needed). Not every supply chain requires the same level of supply chain analysis and due diligence. The Supply Positioning Model (Figure VI) is a useful tool not only for preparing the PPSD and developing the most appropriate sourcing approach (pages 15 and 16 in the [PPSD Procurement Guidance](#)), it can also provide guidance for determining the level of supply chain analysis and due diligence that is needed. Specifically, it can help Borrowers to:

- Determine the appropriate level of analysis, focus, and supply chain due diligence needed for each contract within the project; and
- Estimate how much time and effort Borrowers should consider applying to each supply chain.

FIGURE VI Supply positioning model

Borrowers should focus their effort and resources for carrying out supply chain analysis and due diligence on their strategic projects (both *strategic security* and *strategic critical*), whereas tactical projects (both *tactical acquisition* and *tactical advantage*) likely need only limited supply chain analysis and due diligence. Practical Toolbox E provides guidance on the level of supply chain analysis and due diligence that may be appropriate for strategic (*strategic security* and *strategic critical*), and tactical (*tactical acquisition* and *tactical advantage*) projects.

This assessment can also provide insight into the relative power of Borrowers and Suppliers/Contractors, which can inform Borrowers on how to design the Procurement Process to maximize competition. This assessment can also provide information about the supply base, including whether capability is concentrated on a few Suppliers/Contractors who, in turn, have larger bargaining power.

PRACTICAL TOOLBOX E: Strategic vs. tactical Supply Positioning and supply chain due diligence

Strategic Projects

- Project characteristics: High cost, specialized, and/or strategically important inputs; limited number of Suppliers/Contractors
- Focus: Security of supply
- SCM implications: Due to the critical nature of the project, the Borrower should conduct heightened supply chain analysis and due diligence. This can be in the form of:
 - Contractual provisions that hold Suppliers/Contractors accountable for supply chain disruptions, for example, as included in the Bank's SPDs. Large Works contracts financed by the Bank generally use the standard conditions of the FIDIC Red Book (2017), with some additions and modifications as appropriate to be consistent with the Bank's procurement requirements.

(continues)

PRACTICAL TOOLBOX E: Strategic vs. tactical Supply Positioning and supply chain due diligence *(continued)*

- Requests to the Supplier/Contractor for detailed supply chain information and vulnerability points/mitigation actions.
- Rigorous market analysis and detailed supply chain mapping with the objective to reduce vulnerability and risk: Borrowers should have a thorough understanding of the market and the supply chain, including a supply chain map (covered in the next sub-Section), thus being confident about their SCM decisions; Borrowers should also be confident that they have adequate information.
- Emphasis on developing a collaborative and trusting relationship with the Supplier/Contractor: This can be achieved by frequent exchange of relevant project information; listening to the Supplier/Contractor's questions, suggestions, and concerns; and site visits.

Tactical Projects

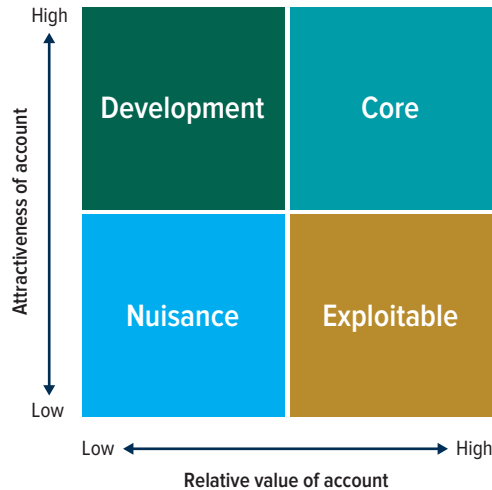
- Project characteristics: Low-risk inputs; routine purchases; many potential Suppliers/Contractors
- Focus: Improving value through leverage tactics; purchasing efficiency
- SCM implications: Due to the low-risk nature of the inputs and potential ease of substitutes and alternate Suppliers/Contractors, limited supply chain analysis and due diligence is needed; this could be in the form of:
 - Contractual provisions that hold Suppliers/Contractors accountable for supply chain disruptions.
 - High-level market analysis with the objective to reduce any critical vulnerabilities and risk.
 - Undertaking supply chain mapping if there are known challenges (e.g., supply disruption).

Supply Positioning can be combined with Supplier Preferencing, which enables Borrowers to identify the likely approach Suppliers/Contractors will take in working with Borrowers based on their position in the model (see related guidance in the [PPSD Procurement Guidance](#) on pages 26 and 27). In Supplier Preferencing, Borrowers assess how Suppliers/Contractors likely evaluate them along two dimensions (Figure VII):

- Attractiveness of the account: This dimension captures how attractive the Borrower is to the Supplier/Contractor, which can be determined based on how easy it is for the Supplier/Contractor to work with the Borrower. Factors can include the level of information sharing, collaboration, prompt payment, and low levels of bureaucracy.
- Relative value of the account: This dimension not only captures the contract value, but also the potential for future business the Borrower may provide (i.e., whether the account can be further developed).

The Borrower's position in the Supplier Preferencing matrix can determine how cooperative and open Suppliers/Contractors are, and how likely they are to provide information—which impacts what a Borrower would then potentially have to do themselves (that is, if Suppliers/Contractors are not

FIGURE VII Supplier Preferencing matrix



forthcoming with information). Suppliers/Contractors are expected to be forthcoming with information if they place the Borrower in the *development* or the *core* quadrant, essentially when the Borrower is attractive. Suppliers/Contractors are not expected to be that forthcoming with information if they place the Borrower in the *nuisance* or the *exploitable* quadrant, meaning the Borrower is unattractive as a customer. Practical Toolbox F summarizes these implications of Supplier Preferencing on supply chain information sharing.

PRACTICAL TOOLBOX F: Supplier Preferencing and SCM implications

TABLE III Implications of the Supplier Preferencing matrix

Segment	Description	Responsiveness	SCM Implications
High Borrower attractiveness (development and core)	The Supplier/Contractor pays a lot of attention to the Borrower; in both the development and the core quadrants, the Supplier/Contractor nurtures the relationship to retain and/or grow the account	The Supplier/ Contractor aims to exceed the Borrower’s expectations	The Borrower is likely able to obtain a great amount of supply chain information from the Supplier/Contractor directly, without having to resort to outside, independent research; the Supplier/Contractor will be motivated to manage the supply chain to meet the needs of the Borrower

(continues)

PRACTICAL TOOLBOX F: Supplier Preferencing and SCM implications (continued)

TABLE III Implications of the Supplier Preferencing matrix

Segment	Description	Responsiveness	SCM Implications
Low Borrower attractiveness (nuisance and exploitable)	The Supplier/ Contractor's business with the Borrower is minimal (nuisance), or high value but unattractive (exploitable), with the Supplier/Contractor aiming to withdraw from the relationship (nuisance) or to maximize profits (exploitable)	The Supplier/ Contractor provides minimal or no attention to the Borrower	The Supplier/Contractor may be unresponsive to the Borrower's requests for supply chain information or only provide very minimal information; supply chain analysis and due diligence by the Borrower should be high

Mapping the Supply Chain

SCM involves developing a good understanding of the final deliverable (that is, the outcome of the project) and what it takes to get it accomplished. This can be achieved by developing a supply chain map. With this information, potential risks can be identified, and mitigation techniques can be implemented.

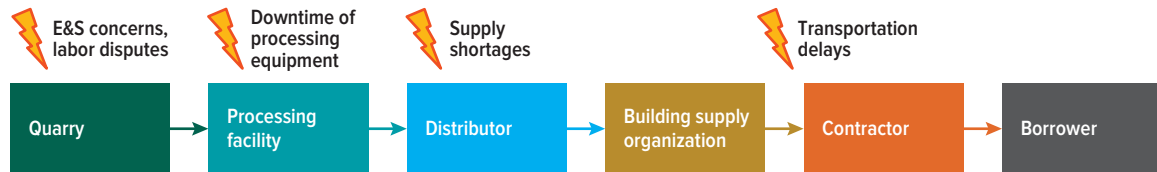
- A supply chain map can increase knowledge about the different inputs that are needed and from where they are coming. For example, a supply chain map for a construction project would include all the materials (concrete, timber, gravel, etc.) and where they are sourced from, equipment (excavators, cranes, shovels, etc.), construction plans (floor plans, building specifications, etc.), and workers (engineers, builders, electricians, etc.), including where the workforce is sourced from.
- This information can help to identify critical inputs that will form the basis for a cost estimate in the bill of quantities. While specific costs will be determined later as part of the bidding process, the information collected at this stage can help develop an understanding of the potential costs and margins at each stage of the supply chain.
- Ideally, the supply chain map will trace the supply chain back to the source of the raw materials. This can help to determine any risks in acquiring these inputs.

Aligned with one of the Bank's Core Procurement Principles, "fit for purpose," the effort expended to develop a supply chain map should be proportionate to the complexity, risk, and value of the procurement. The approaches discussed earlier in this Guidance, especially the insight obtained through Supply Positioning and Supplier Preferencing, can help determine the level of effort needed.

Even for a simple construction material input such as gravel, the supply chain can be quite complex, since it may involve the Contractor procuring the gravel from a building supply Organization, which is procuring the gravel from a distributor, which in turn is procuring it from a processing facility, which itself is procuring the raw aggregate from the quarry. The interdependencies of these tiers can be

captured in a supply chain map as shown in Figure VIII. The failure of just one of these entities could jeopardize the entire project, which makes mapping and managing the supply chain so important.

FIGURE VIII Illustrative gravel supply chain map and potential risks



Developing a supply chain map enables better SCM, since interdependencies can be discovered, and choke points or bottlenecks (illustrated by lightning bolts in Figure VIII) in the supply chain can be identified and managed. For example, if gravel is needed in large amounts and the capacity at processing facilities is currently very constrained, the Contractor could be asked how they would be managing this potential risk (e.g., by carrying inventory or having secured capacity).

Environmental and social risks can also be identified through supply chain mapping. These concerns can then be addressed in bidding documents or through negotiations with Suppliers/Contractors. They can also be dealt with in the contract by, for instance, including appropriate key performance indicators (KPIs). Example Box 6 provides an illustration of insights gained from mapping the gravel supply chain. With this knowledge of possible risks, remedies can be identified that prevent disruptions.

EXAMPLE BOX 6: Managing risk in the gravel supply chain

If the processing facility has limited capacity, continuous availability of processed gravel cannot be guaranteed. The Contractor can address this issue by building an inventory of gravel, securing in the contract that a certain amount of capacity will always be available, or by multi-sourcing.

It may also be discovered that there are no quarries in reasonable proximity, such as in the case of small island nations in the Asia-Pacific, which would mean that aggregate has to be shipped from far away. The associated logistics expenses, weather risks, and transit time would need to be considered when planning the project, as well as the environmental impacts (for instance, in terms of carbon emissions needed to transport the aggregate thousands of kilometers).

In addition, supply chain mapping may reveal safety violations or Suppliers' use of child/forced labor. Particular emphasis should be placed on identifying ways whereby the Borrower could require gravel suppliers to the Contractors to implement measures to address these labor issues.

Mapping the supply chain also includes considering how the material moves through the supply chain. For example, heavy trucks may not be available to transport the gravel from the building supply Organization to the job site, or the roads to the job site may be in poor condition so that only lighter trucks can be used. This could increase project cost and time.

These illustrative examples merely considered the supply of gravel. There are, however, many more inputs needed for a successful construction project, with their own supply chains and their own risks. This highlights the importance for the Borrower and the main Contractor to manage these supply chain interdependencies. Example Box 7 illustrates some of these additional considerations. The extent to which supply chain mapping is conducted should be proportional to the context, risk, value, and complexity of the procurement, with Supply Positioning and Supplier Preferencing offering insight in this regard.

EXAMPLE BOX 7: Illustration of interdependencies in the gravel supply chain

Once the gravel is delivered to the construction site, equipment must be available to move and compact the material. If this equipment is not owned by the Contractor, it may have its own supply chain. For instance, the Contractor might rent the compacting equipment from a national rental Organization, which may need to move the equipment from a distant part of the country to the regional rental facility.

In addition, there may be many interdependencies between the input materials, necessitating the coordination of their respective supply chains. Insight on how to do so can be derived from their supply chain maps and potential choke points and risks. For example, if drainage pipes are required as part of the foundation, and they are not available, the gravel cannot be poured, and the project may need to be halted.

Practical Toolbox G provides some advice on how to get started with supply chain mapping.

PRACTICAL TOOLBOX G: Getting started with supply chain mapping

Step 1: Information gathering

There is a tremendous amount of information that can be obtained relatively easily to help Borrowers map their supply chains. Information can be gathered through desk research and prior project reports, and by talking with Suppliers/Contractors and specialists. In construction projects, the Borrower's supervising engineer also plays a central role in providing expertise and insight. Table IV provides an illustrative overview of information sources, how to gather this information, and some examples.

Various types of information can be gathered that not only provide insight into the basic structure of a supply chain (that is, how work is divided across the tiers), but also offer valuable knowledge on some of the following:

- The geographic location of Suppliers/Contractors (either within the country or globally), which may have implications for logistics (if Suppliers/Contractors are farther away) or applicable laws (if Suppliers/Contractors are located in countries with less stringent labor or environmental protections)

(continues)

PRACTICAL TOOLBOX G: Getting started with supply chain mapping (continued)

TABLE IV Information gathering

Source	How to Gather Information	Examples
Desk research	This can involve searches on the Internet, and the review of white papers, analyst reports, industry magazines, and resources provided by professional associations	To get started with mapping the timber supply chain, the term “timber supply chain” can be entered into an Internet search engine; the results will help familiarize Borrowers with this supply chain
Prior project reports	Reports on prior (related) projects can be evaluated to identify challenges encountered; causes for these challenges could be mapped to specific supply chain Organizations or tiers	Borrowers can look back at whether similar projects had been conducted in their country or elsewhere in the Bank’s financing portfolio (using the Bank’s Projects & Operations Database), and then solicit the project reports or even speak with project managers and supervising engineers about their experience, in particular how they managed the supply chain, what challenges they may have faced, and how they addressed these
Specialists/ supervising engineers	Subject matter experts and technical specialists can be relied on: they will likely have a good understanding of markets and their Suppliers/ Contractors; in construction projects, the supervising engineer serves in this role	Those involved in the development of the project and its specifications could be relied on for their insight about the supply chain; similar information may be obtained from speaking with industry group representatives
Suppliers/ Contractors/ Consultants	Borrowers can seek information from (first-tier) Suppliers/Contractors about their supply chains; this could include, for example, their own due diligence practices	Asking questions of Suppliers/ Contractors through early market engagement: Suppliers/Contractors can be encouraged to provide this information by sharing consolidated data (without revealing confidential information), which may help Suppliers/ Contractors in their risk management efforts; having a good relationship with the Supplier/Contractor will also make them more willing to share this data

(continues)

PRACTICAL TOOLBOX G: Getting started with supply chain mapping (continued)

- The number of Suppliers/Contractors at each tier, which can determine the location in the Supply Positioning matrix and likely alternatives in case of supply chain failure
- The capabilities of each supply chain tier, that is to say, what value each tier provides, which can also give an indication of how dependent other tiers are on this output
- The capacities of each supply chain tier, that is, whether there have been supply shortages or higher-than-usual demand for certain tiers, which can have implications for Supply Positioning
- The depth of the supply chain, meaning how many tiers there are in a typical supply chain, which is an indication of the complexity and potential interdependencies of Organizations

Step 2: Determining the level of detail

The amount of time and effort should be proportionate to the risk/value of the project. Questions that can guide Borrowers to determine the level of information needed are provided in Table V.

TABLE V Determining the level of detail

Question	Consideration
What is the level of influence we have over higher-tier Suppliers/Contractors?	Influence generally decreases the farther one moves up the supply chain, so aiming to control higher-tier Suppliers/Contractors may not be feasible or practical; Borrowers should aim to collect detailed information on at least first- and second-tier Suppliers/Contractors
What are the risks associated with each supply chain tier?	If there is only limited risk associated with a supply chain tier, information gathering can be less intensive versus a high risk tier
How important is each supply chain tier?	If a supply chain tier provides specialized knowledge that is otherwise not readily available, their importance increases, thus warranting a greater level of detail; this is exacerbated when only a small number of suppliers with this specialized knowledge exists in this tier
How regulated is the supply chain?	Supply chains with more intensive regulations, such as the medical supply chain, require less comprehensive analysis

An indicator that information gathering and analysis can stop is when new information does not add significant value to the insight or does not seem to likely influence Borrowers' decision-making.

(continues)

PRACTICAL TOOLBOX G: Getting started with supply chain mapping (continued)

Step 3: Mapping and analyzing the supply chain

With this information, Borrowers should be able to map and identify each key step and dependency in the supply chain. This should facilitate identification of inherent risks, for which mitigation approaches can be developed. Mapping the various interdependencies should also provide valuable information for project planning and execution, ensuring that the project stays on budget and on time.

Step 4: Determining the most effective Procurement Approach

Developing a thorough understanding of the supply chains through their mapping also enables Borrowers to determine whether there are more appropriate Procurement Approaches that would create more value. Greater value can be in the form of lower cost, greater quality, faster delivery, or lower risk.

Identifying Supply Chain Vulnerabilities

Supply chain maps allow Borrowers to identify likely points of vulnerability, that is, key weaknesses in the supply chain that could jeopardize the project. Knowing these potential supply chain vulnerabilities can help Borrowers focus their monitoring on the most vulnerable parts of the supply chain, develop supply risk mitigation approaches should those vulnerabilities cause a disruption, and/or address the vulnerability by strengthening that part of the supply chain.

Example Box 8 illustrates how the information obtained through supply chain mapping can help Borrowers identify vulnerabilities. By thinking about these supply chain characteristics, Borrowers can develop a better understanding of the dependencies and possible choke points and risks.

Borrowers should note that, in most instances, it is not possible to obtain complete information on all aspects of the supply chain. However, even limited insights, based on what information is available, are better than none.

EXAMPLE BOX 8: Identifying supply chain vulnerabilities

Supply chain maps effectively identify points of vulnerability. The following is an overview of supply chain characteristics that may make the supply chain more or less vulnerable to disruptions, coupled with illustrative examples.

- **The number of tiers in a supply chain:** The vulnerability of a supply chain increases with the number of tiers, due to the practical inability to control and obtain insight into such

(continues)

EXAMPLE BOX 8: Identifying supply chain vulnerabilities *(continued)*

complex supply chains. While in most instances it is impossible to obtain a complete picture of complex supply chains, Borrowers can regularly scan newspapers and other media that may provide information on disruptions that could potentially impact the industry and/or the supply chain, for instance, a ship blocking the Suez Canal, COVID-19 lockdowns, trade sanctions, or micro-chip/semiconductor shortages. Advanced technologies and analytics can also be used to obtain such insights.

- **The criticality of each supply chain tier:** Where a Supplier/Contractor is the only Organization (i.e., a sole Supplier) or one of the few Organizations that can provide the input, the vulnerability of the supply chain increases. Vulnerability can be reduced by respecifying or redesigning the required input (for example, via value engineering or value analysis) so that more Suppliers/Contractors are able to provide the component, thereby reducing supply chain vulnerability. The COVID-19 pandemic, for example, disrupted almost every supply chain, demonstrating to many Organizations the benefits of dual- or multi-sourcing. Vulnerabilities were also discovered in the aftermath of the 2011 earthquake and subsequent tsunami in Japan, which also highlighted the risks of single-sourcing. For example, several automotive firms were not able to deliver cars in a certain paint color (Tuxedo Black and Royal Red), since the sole Supplier of those color pigments had been impacted by the tsunami. It is important to learn from these experiences and design the supply chain to reduce risks to avoid further disruptions. In this case, Organizations started to dual source pigments, and, more broadly, design their other supply chains with resilience in mind. Toyota, for instance, credits the lessons learned from the 2011 earthquake to the firm being able to reduce the impact of the semiconductor shortages in 2021.²⁹
- **Supplier/Contractor relationships with their Suppliers/Subcontractors:** Strong business relationships can go a long way to dealing with supply chain vulnerabilities. If a vulnerability causes disruption for a Supplier/Contractor, a strong relationship can help the Borrower receive preferential treatment. For example, once the Supplier/Contractor recovers from the disruption and production resumes, the Borrower may be the first to receive shipments. The semiconductor shortage that started in 2021 was, for instance, addressed by companies strengthening their Supplier relationships, which can be done via greater information sharing in the form of the synchronized capacity planning, increasing planning reliability, and transparency.
- **Information visibility:** Information is power. Vulnerabilities can be better managed and mitigated with better data. This can be in the form of tracking and tracing shipments, early warning systems, and frequent status reports. Contracts with Suppliers/Contractors should set out requirements on what data should be made available and when, and set out clearly the Borrower's right to conduct inspections or audits. Commercial software solutions that provide this visibility are also available.

If a project involves several supply chains, the approach outlined in Practical Toolbox H can be applied to prioritize supply chain analysis and due diligence.

PRACTICAL TOOLBOX H: Prioritizing SCM based on supply chain vulnerability

Borrowers may determine the relative importance of each supply chain by using the evaluation matrix in Table VI to assess their vulnerability. The five dimensions set out can be assessed on a 5-point scale, with these values being totaled for a combined score. The supply chain with the highest number would appear to be the most vulnerable and therefore the most deserving of scrutiny using this simple method. Different vulnerability ratings (e.g., high, medium, low) can also be assigned. In this example, the supply chain for medical equipment is in need of most immediate attention.

Please note that using a 5-point scale allows Borrowers to make a subjective assessment, as specifying an actual value—for instance for the number of tiers—may not be possible. Borrowers should use their best judgment, integrating the information they were able to gather with their own experience and assessment, to decide on the appropriate score.

TABLE VI Supply chain vulnerability evaluation matrix

Supply Chain	Number of Tiers 1-Very Few 5-Many	Average Tier Criticality 1-Very Low 5-Very High	Geographic Location 1-Close 5-Far Away	Supplier Relationship 1-Excellent 5-Poor	Information Availability 1-Excellent 5-Poor	Sum	Vulnerability
Hospital construction	4	2	1	3	2	12	Medium
Medical equipment	4	4	3	3	5	19	High
Information technology	3	2	2	2	2	11	Medium
...

Vulnerabilities can also be assessed with SWOT (strengths and weaknesses, and opportunities and threats) and PESTLE (Political, Economic, Social, Technological, Legal, and Environmental) analyses, which are discussed in the [PPSD Procurement Guidance](#) (pages 12 through 14). Borrowers may expand this assessment to include supply chain considerations. Annex VI provides Guidance on how to conduct such SWOT and PESTLE analyses within the supply chain context.

Conducting Supply Chain Risk Management

Globalization, specialization and outsourcing, lean operations, rapid speeds of change, geopolitical challenges, and increasingly complex supply chains all make risk management a critical element of SCM. Risks can come in all shapes and sizes, including quality defects, supply shortages, legal issues, natural disasters, exchange rate fluctuations, port congestions, regulatory compliance, and terrorism. What makes risk management both challenging and important is that disruptions can occur any time and at any place in the supply chain.

Identifying and minimizing risk and managing any impacts on the project should the risk occur, are central aspects of the Procurement Process. Taking an SCM perspective, Borrowers should aim to expand this view beyond first-tier Suppliers/Contractors, if possible, and identify and assess potential risks posed by second-tier Suppliers/Subcontractors, if feasible.

While it may be easier for Borrowers to influence the behaviors of Suppliers/Contractors through direct interaction and contract management, it is much more challenging to do so across their entire supply chain. Borrowers may wish to bring together key Organizations in their supply chain at regular intervals to share key messages and discuss learnings.

Borrowers should also consider how they might influence their first-tier Supplier/main Contractor to cascade behaviors throughout their own supply chains. This can also be done more formally, by, for example, including in the contract with the first-tier Supplier/main Contractor the requirement that they need to assess their Suppliers/ Subcontractors (i.e., the Borrower's second tier) with the same environmental and social requirements that the Borrower assesses the Supplier/main Contractor against (for example, terms and conditions of work and safe working practices). This effectively drives the Borrower's requirements through the supply chain and is a practice that was applied in the 2012 London Olympics.³⁰

A Supply Chain Risk Management Process

Supply chain risk management can best be viewed as a process that starts with the identification of all possible risks, followed by their prioritization, their mitigation and management, and their communication to appropriate stakeholders.

A critical step in risk mitigation and management is for Borrowers to assign responsibility to risk owners in their team/Project Implementation Unit (PIU), who are then held accountable for monitoring, mitigating, and managing allocated risks. It is important that risk owners (and any other people responsible for the risk) know what is expected of them and there is no ambiguity regarding the identified risk, management strategy, and mitigation actions.

Once risks have been mitigated or managed, it is important to learn from these experiences to refine risk management approaches. The four stages should therefore be treated as a continuous cycle, with activities reinforcing and informing one another. This circular process view of supply chain risk management is shown in Figure IX and can be conducted in parallel to the Borrower's procurement risk analysis as described in Section V of the [PPSD Procurement Guidance](#).

FIGURE IX A supply chain risk management process

Step 1: Risk Identification

Risks can be unexpected and varied, which is why there is no definitive list that can capture all possible choke points and risks. The taxonomy provided in Table VII can provide a starting point for Borrowers to identify and categorize potential choke points and risks that are most relevant to their project. The taxonomy uses seven broad risk categories that are further divided into specific risk types.

While there is no “best” template for risk classification, the one presented in Table VII (which was adapted from a CAPS Research Study)³¹ can serve as a potential starting point. To illustrate another risk classification that is possible, please see Example Box 9. These two frameworks can be adapted by Borrowers to best meet the unique characteristics of their project and its context.

While such taxonomies may seem daunting given the variety of risks included, Borrowers should note that this is just one framework that can be adapted to suit a project’s needs.

The ability of the Borrower to address these risks depends largely on the Borrower’s level of influence over its Suppliers/Contractors. It is important for the Borrower to understand their supply market, consider how important (and attractive) the procurement is to Suppliers/Contractors (using Supplier Preferencing), as well as the extent to which Suppliers/Contractors can effectively manage the risks identified.

In challenging operating environments, such as those affected by [fragility, conflict, and violence](#), Borrowers may consider engaging specialist support that can boost their capacity, and/or request hands-on expanded implementation support (HEIS) from the Bank.

Where a remedy is not possible, the Borrower should consider identifying alternate Suppliers/Contractors that can demonstrate that they can meet the relevant requirements.

Step 2: Risk Prioritization

Once risks have been identified, they can be prioritized according to the likelihood that they will occur and the potential severity of their impact. The likelihood of occurrence assesses how probable it is that a risk will occur, while the severity of impact assesses how disruptive the risk

TABLE VII A taxonomy of risks³²

Risk Category	Risk Type	Description
Supplier/ Contractor performance	Financial	Risk associated with the financial health of the Supplier/Contractor, which could result in bankruptcy, causing supply interruptions and other losses
	Quality	Risk associated with the quality of products and/or services provided by a Supplier/Contractor
	Delivery	Risk of the Supplier/Contractor failing to deliver the product/ service on time
	Capacity	Risk of the Supplier/Contractor not having sufficient capacity to satisfy demand
	Integrity	Risks associated with corrupt, fraudulent, collusive, coercive, or obstructive practices by the Supplier/Contractor
	Reputation	Risk associated with negative effects on the brand or reputation of the Borrower and/or the Bank caused by Supplier/Contractor practices and/or actions
Environmental and Social	Social	Risk associated with activities in the supply chain such as engagement of workers, safe working conditions, social impacts on local communities due to labor influx, engagement with stakeholders, and impacts associated with use of land.
	Environmental	Risk associated with activities in the supply chain such as hazardous waste, pollution, carbon emission, actions that cause conversion or degradation of natural or critical habitats.
	Health and safety	Risk associated with Suppliers/Contractors not following relevant occupational health and safety requirements, including the handling of hazardous conditions and substances, ineffective safety training, incomplete records of incidents and accidents, lack of preparedness to respond to incidents, and lack of remedies for adverse impacts
Supply market	Category	Risk associated with a specific supply category, caused, for instance, by highly complex and fragmented supply chains
	Raw material	Risk associated with specific raw materials, which can include global shortages and competition from other industries
	Logistics	Risk associated with the transportation and storage of products across the supply chain
Technology	Cybersecurity	Risk associated with the theft of or damage to the Borrower's or Suppliers/Contractors' hardware, software, or information, including possible disruption to their operations
	Intellectual property	Risk involving a potential loss of intellectual property

(continues)

TABLE VII A taxonomy of risks (continued)

Risk Category	Risk Type	Description
Geopolitical	Country	Risk arising due to sanctions resulting from UN Security Council resolutions, which may render the contract with the Supplier/ Contractor ineligible for Bank financing
	Labor	Risk associated with labor disputes that could disrupt the production and delivery of products and services
	Legal	Risk that exposes the Borrower to potential legal actions or disputes in international trade
	Domestic	Risk associated with changes in policy in the domestic market of a Borrower that can affect its ability or costs of sourcing, such as changes in tariffs, trade restrictions, and trade sanctions
Macroeconomic	Currency	Risk associated with currency volatility that might negatively affect an Organization's profitability (sometimes also termed foreign exchange risk)
	Inflation/volatility	Risk associated with inflationary pressure or swift changes in the price of raw materials and labor in source countries
Natural disasters		Risk associated with disruptions affecting the operation of Suppliers/Contractors or the flow of products, due to major natural catastrophes such as earthquakes, tsunamis, tornados, hurricanes, fires, and floods

EXAMPLE BOX 9: An illustrative risk classification³³

The risk classification in Table VIII is based on the eight key areas suggested for structuring risks in the [PPSD Procurement Guidance](#). To illustrate what these risks can look like in the construction industry, examples from within this context are provided. These are industry-level risks, which can be complemented by risks for specific projects that are being considered.

TABLE VIII Construction industry risk classification across eight categories

Risk area	Illustrative Risks
Market complexity and competitiveness	Fragmented industry (many competing Organizations without any Organization dominating the industry); more volatile than other industries; for routine construction, low barriers to entry, allowing small Organizations to compete for smaller Works (limited economies of scale); more complex construction projects, such as hydro-power, bridges, rail and metros are more consolidated with fewer Organizations able to compete (costs of bidding are high)

(continues)

EXAMPLE BOX 9: An illustrative risk classification *(continued)***TABLE VIII** Construction industry risk classification across eight categories *(continued)*

Risk area	Illustrative Risks
Delivery and supply security	Frequent customer complaints due to over-budget and over-time performance; lengthy claim processes
Suppliers and Supplier relationships	Many insolvencies; preference is often given to the lowest-price bidder, making competition based on quality and reliability challenging; digital technologies can enable better collaboration
Main Contractor	Main Contractor's lack of deep expertise in the specific type of project, with no alternate main Contractors with better expertise available
Cost trends	Continuous cost pressure; increased emphasis on total cost of ownership
Technical innovation and the rate of change	Lower degree of digitalization compared to most other industries; trends toward modularization, off-site production automation, and on-site assembly automation; lighter-weight materials—such as light-gauge steel frames and cross-laminated timber—can enable simpler factory production of modules
Sustainability (environmental, economic, social)	Large share of informal labor; reliance on temporary labor and Subcontractors; higher risk of forced/exploited labor; lack of environmental obligations in some regions where raw materials are sourced, low attention to occupational health and safety
Business and operating environment	Slow industry growth; risk aversion (stifling innovation); low profitability; high level of economic uncertainty; cyclical demand; unique requirements limiting standardization; logistics challenges due to weight and complexity of parts; lack of skilled labor; heavily regulated in most countries; projects involve many steps with scattered accountability, complicating coordination; risks are often passed to other parts of the supply chain instead of being addressed; Organizations make money from claims rather than from good delivery

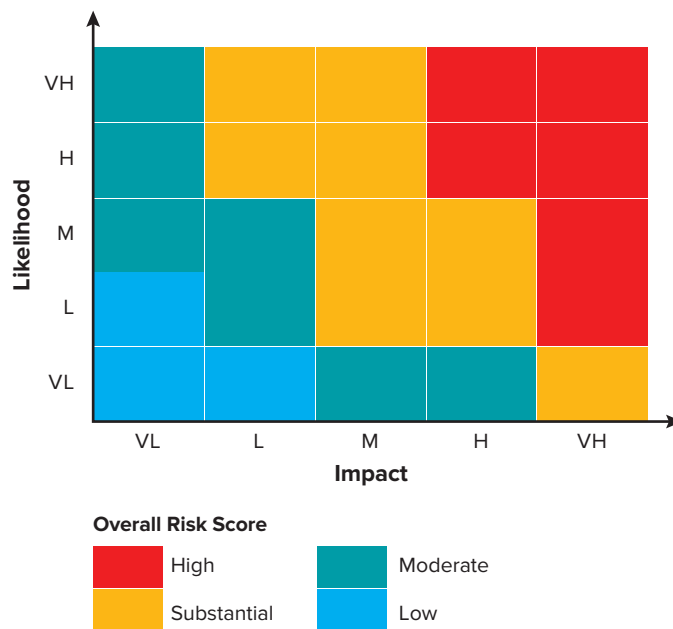
will be if it materializes. This assessment is inherently subjective, but Borrowers can use their prior experience as well as the information gathered as part of the Procurement Process to inform their analysis.

Prioritization can be done using a scale like the one below, which uses five scoring categories:

- 1 = Very Low (VL)
- 2 = Low (L)
- 3 = Medium (M)
- 4 = High (H)
- 5 = Very High (VH)

Based on the likelihood of occurrence and severity of impact classifications, Borrowers can plot each risk on a risk criticality matrix (see also page 30 of the [PPSD Procurement Guidance](#)). With this approach, risks can be classified into four main groupings (Figure X). This matrix is also sometimes called a heat map, with the red area indicating a high overall risk score and the blue area a low overall risk score. An example of risk prioritization within the context of the construction industry is provided in Example Box 10, and some further illustrative questions to assess risks in construction supply chains are provided in Practical Toolbox I.

FIGURE X Assessing risk on a heat map



EXAMPLE BOX 10: Illustrative risk prioritization

Since every construction project is different and a risk prioritization exercise is inherently subjective, the following example is provided to demonstrate the mechanics of the approach. Let us consider three risks, which a Borrower’s supervising engineer may assess as follows:

- ① Risk of poor labor conditions
 - Likelihood: Country specific information indicates that there are a lot of migrant workers engaged through labor intermediaries, thus rendering the likelihood of this risk occurring as Very High.

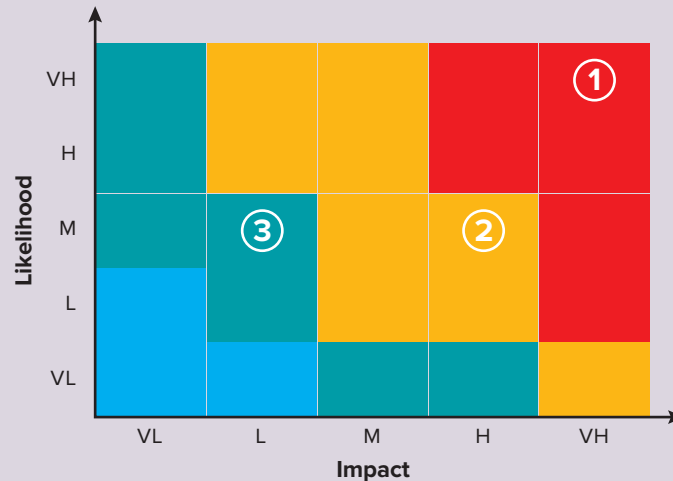
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EXAMPLE BOX 10: Illustrative risk prioritization (continued)

- Impact: If it is found that migrant workers don't have the same terms and conditions as regular employees, and/or circumstances of forced labor may have occurred as part of the construction project, this could have significant legal and reputational consequences for the Borrower, the supervising engineer, and the Bank; therefore, the impact is assessed to be Very High.
- ② Risk of cost overruns
- Likelihood: The industry is known for cost overruns (since Contractors are typically selected based on price), with the Borrower's supervising engineer potentially having had experience with similar prior projects; however, the Borrower's supervising engineer intends to closely monitor costs incurred by the Contractor, leading the Borrower's supervising engineer to assess the likelihood as Medium.
 - Impact: Since only a limited amount of funding is available, should the project be significantly over budget, the consequences will be substantial, leading the Borrower's supervising engineer to assess the impact as High.
- ③ Risk of poor quality
- Likelihood: Since the industry is fragmented and many different Subcontractors may be working on the project, the likelihood of poor quality is assessed by the Borrower's supervising engineer as Medium.
 - Impact: The Borrower's supervising engineer can think back to what quality problems were incurred in prior projects, and what impact they had (e.g., how easily they were corrected); based on this assessment, the Borrower's supervising engineer assesses the impact as Low.

Based on this assessment, the three risks can be plotted in the risk management analysis matrix as shown in Figure XI. Per the matrix, the risk of poor labor conditions (①) was classified as highest, with cost overruns (②) representing a substantial risk, and quality problems (③) a moderate risk. This understanding can help in assigning priority levels for each risk, with risk of poor labor conditions having highest priority, cost overruns having a medium priority, and poor quality a low priority. Plotting risks on the matrix is especially valuable when more risks are considered, since the most critical ones (those in the red field) can be easily identified.

(continues)

EXAMPLE BOX 10: Illustrative risk prioritization *(continued)***FIGURE XI** Mapping risks on the risk management analysis matrix**PRACTICAL TOOLBOX I: Illustrative questions to assess risks in construction supply chains³⁴**

These questions were framed within the context of a construction project, also considering that raw materials or workers may be sourced from overseas. The questions can be adapted to other project contexts. In addition, while these questions are included here in the sub-Section on Supply Chain Risk Management, they can also be asked during the market and operating environment assessment as part of the PPSD Procurement Guidance, reinforcing that the activities outlined in this Section should not be treated as a linear process, but as activities that can be done in parallel.

- Are there qualified engineers that could supervise the project? Do these supervising engineers have insight into the specific supply chains needed to deliver the project?
- Are raw materials readily available domestically, or will they need to be transported from overseas?
- What is the state of the transportation infrastructure? Can raw materials/equipment be easily and safely transported to the project location?
- What regulations (e.g., building regulations) and/or standards must be adhered to?
- Are there sufficient local workers to undertake the project, or are there skills shortages in certain areas?

(continues)

PRACTICAL TOOLBOX I: Illustrative questions to assess risks in construction supply chains *(continued)*

- Do Suppliers/Contractors have local knowledge, taking into consideration issues like ways of working, codes of conduct, health and safety, business practices, or other aspects that they may be unfamiliar with?
- Are stakeholders familiar with any technology being proposed by Suppliers/Contractors, or will specialists be required (for instance, to operate sophisticated medical equipment)?
- Are there cultural and/or language barriers to consider that may negatively impact the supply chain or the project itself?
- Are there tools in place or proposed to foster better relationships and communication?
- Is there a contingency plan for dealing with unexpected or planned issues? Is this plan reviewed and updated regularly?
- What impact would a failure of higher-tier Suppliers/Subcontractors have on the project? Who could replace them, and on short notice?

Step 3: Risk Mitigation and Management

Borrowers can use the positioning of the risk on the heat map to determine whether and how these risks should be addressed. Typical actions for each of the four categories include:

- **High overall risk score:** These are the most pressing risks that Borrowers should address through ongoing risk assessments and the development of contingency plans (for instance through the identification of alternate sources, higher inventory levels, Supplier/Contractor inspections, and audits).
- **Substantial overall risk score:** These are important risks to be addressed. Actions include periodic risk assessments, ongoing monitoring, and the development of contingency plans.
- **Moderate overall risk score:** These risks should be managed via routine procedures where possible. The use of internal reporting mechanisms is a common approach, and Borrowers may decide to accept these low-priority risks.
- **Low overall risk score:** These are the least critical risks, which can be accepted as being part of doing business, or monitored and assessed on an as-needed basis.

Similar to the procurement risk management process as part of the [PPSD Procurement Guidance](#), the outcome of the supply chain risk management process can lead to four main types of strategies:

- **Avoid:** The current supply chain design being considered is not pursued since it introduces risks that are too severe. For example, when the risk of forced labor is high, an alternate supply chain design can be identified with Suppliers/Contractors that have stringent workforce protection policies.
- **Minimize:** The supply chain design is implemented, but the Borrower seeks to mitigate associated risks via improved monitoring or the modification of processes and procedures. For example, the Borrower requires reporting and/or conducts inspections or audits on a regular basis.

- **Spread or transfer:** The supply chain design is implemented, but risk is reduced via diversification, subcontracting, outsourcing, joint ventures, hedging, or insurance. For example, the Borrower may want to purchase scarce components themselves, and then provide them to the Supplier/Contractor when needed (giving the Borrower more control, but also greater liability if they fail to deliver on quality issues).
- **Accept:** The supply chain design is implemented, and any risks associated with it are accepted. For example, the effort needed to prevent every small quality defect would outweigh the impact of the defect; hence Borrowers accept this risk, since the defect can be corrected easily and inexpensively without any harm to stakeholders.

How risk mitigation and management can look like for the three identified risks from Example Box 10 is illustrated in Example Box 11.

EXAMPLE BOX 11: Illustrative risk mitigation and management

Risk mitigation and management approaches for the three identified risks from Example Box 10 may include the following:

- ① Risk of poor worker conditions
 - Minimize: Insert contract language on good working conditions and/or bidder declarations for forced labor not only for the Contractor, but also for all Subcontractors; reporting, formal visits, and unannounced site visits to the Contractor and its Subcontractors
 - Avoid: If the Borrower finds that they are unable to require Suppliers to address forced labor issues in the supply chain due to lack of control and influence, the Borrower should consider looking for alternate Suppliers/Contractors that are able to do so
- ② Risk of cost overruns
 - Minimize: Insert contract language that is very specific as to when cost increases are allowed; require sign-off by the Borrower for any cost increase requested
- ③ Risk of poor quality
 - Minimize: Insert contract language specifying criteria for good quality work; inspections by the Borrower, the supervising engineer, and/or technical specialists on-site to monitor quality

Step 4: Risk Communication and Learning

It is important to learn from past successes and failures, which is what makes risk communication and learning a critical step in the supply chain risk management process.

Practical Toolbox J provides a template for recording this information. This can be shared with others managing similar projects, allowing risk management approaches to be refined, and increasing the risk management expertise of the Borrower.

PRACTICAL TOOLBOX J: A template for recording risk experiences

A large part of supply chain risk management relies on Borrowers' experiences of prior events and how they were managed. Table IX provides a template with which this information can be captured. It is important to record both risks that occurred (even if they were not managed well) and near-misses (i.e., when an impending risk did not materialize or it was prevented).

TABLE IX Post-hoc risk assessment

Name of the risk event:
Date and duration of the risk:
Description of the event (including impact and severity):
Description of actions undertaken once the risk was identified:
Description of potential or actual causes:
Risk owner (who was responsible):
What went well?
What improvements are possible?

Capturing the Information in a Risk Management Plan

Borrowers can capture the insight developed as part of the supply chain risk management process, which relies on bringing earlier analysis together, into a risk management plan, which is very similar to the one presented in the [PPSD Procurement Guidance](#). This offers a transparent way to review and compare all identified risks, prioritize them, and develop action plans if warranted.

The example in Practical Toolbox K offers an illustration on how such a risk management plan can be populated. There is no right or wrong way in doing so, the important part is that it is done. The template enables a structured way to think about potential risks, classify them, and determine possible mitigation strategies. Based on the subjective assessment below, the first risk identified (quality problems at a second-tier Supplier) would be the most critical risk to address.

PRACTICAL TOOLBOX K: A supply chain risk management plan

The risks identified in the first stage of the supply chain risk management process (*risk identification*) are listed in the first column (risk description). The second stage (*risk prioritization*) can identify the potential disruption, its likelihood of occurrence, and its severity of impact. The likelihood of occurrence and the severity of impact are assessed on a five-point scale (with

(continues)

Supply chain risk management is one of the most important SCM activities in the strategy development and procurement planning stage, since it directly informs the formulation of the contract and the Procurement Approach. Practical Toolbox L includes a set of questions that Borrowers can ask themselves to determine how risks can be addressed in the next phases of the Procurement Process.

PRACTICAL TOOLBOX L: Risk checklist at the procurement planning stage³⁵

The checklist can help Borrowers to determine how risks can be addressed in the next phases of the Procurement Process. This checklist should be adapted to the Borrower's unique project and context.

TABLE XI Procurement planning risk checklist

Internal Company Policies of Bidders/Proposers	Yes / No	Comments
Have all relevant risks been identified?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Can these risks be managed or mitigated?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are these risks likely to be clear to Bidders/Proposers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Can the award criteria take account of these risks?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
What evidence will Bidders/Proposers be asked to provide?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Is the evidence required proportionate to the risks?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Can the terms and conditions of the contract address these risks?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Do the terms and conditions pass unnecessary risks to the Supplier/Contractor?	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Including Supply Chain Considerations in the Works Requirements/Specification

The Bank's SPDs include general provisions related to SCM. While the Bank does not allow a Borrower to adjust standard contract terms in SPDs, additional supply chain considerations can be addressed in the Works requirements/specification. Including such SCM considerations can be a critical element that influences the success of the relationship between the parties and how future SCM challenges are managed. Borrowers should therefore consider the Project Development Objectives and the VfM principles when drafting the Works requirements/specification (and the final contract), and design them with a "fit for purpose" mindset, that is to say, one that is proportionate to the complexity, risk, and value of the procurement.

Where appropriate, Borrowers should include in the Works requirements/specification additional SCM expectations for Suppliers/Contractors, which can spell out further SCM requirements that go above and beyond the SCM requirements in the SPDs. The extent to which Procurement Documents include SCM Works requirements/specification depends on the type and structure of the project.

For construction contracts, which are governed by the FIDIC Red Book (2017), the Borrower can also nominate specialist Subcontractors and Suppliers as and when they are required, which is a consideration that should be thought about at this stage. Once the Contractor has accepted the nomination, they become responsible for the actions of the Subcontractor.³⁶ Contract conditions on these matters are also included in the Bank's SPDs, including General Conditions, Particular Conditions, and Contract Forms.

If the Borrower intends to set clear SCM expectations for Supplier/Contractor behavior and performance in the contract (e.g., ethical behavior, monitoring of Subcontractors, performance incentives, KPIs), then ambiguous wording should be avoided, leaving no room for interpretation by Suppliers/Contractors. The SCM Works requirements/specification should be informed by the output of the PPSD Procurement Guidance and procurement planning to mitigate identified risks and support the successful achievement of project objectives. Example Box 12 provides an illustration of aspects that Borrowers may want to include in the Works requirements/specification.

EXAMPLE BOX 12: Illustrative SCM considerations that can be included in works requirements/specification

The steps undertaken as part of strategy development and procurement planning can provide valuable insight into what Borrowers may want to include in Works requirements/specification to protect against disruptions and risks. This could include, amongst other things:

- Reporting requirements (e.g., labor issues, environmental claims)
- Commitments to holding a certain level of buffer (safety) inventory
- Commitment of the Supplier/Contractor to have back-up supply sources in place
- Job/skills creation targets (e.g., training, number of apprenticeships created)
- Commitments to using small, local businesses in the supply chain

Since material/product supply chains can be very long and complex, Works requirements/specification may also include considerations relating to the chain of custody, logistics, and Incoterms® [note: these matters are fully addressed when a Borrower uses the Bank's SPDs, but may not be included in a Borrower's own documents when National Procurement is undertaken].

Chain of Custody

The Chain of Custody (CoC) concept within SCM refers to a system that provides assurance of supply security and traceability of a given material or product. This is achieved by acquiring information about how the materials or products are transferred, monitored, and controlled throughout the entire supply chain or significant parts of it. Establishing a CoC can enable materials or products to be traced from their point of origin. A related concept is Supply Chain Traceability, which is the ability to identify, track, and trace elements of a product or substance as it moves along the supply chain from raw materials to finished products.

A CoC audit generally involves verifying that procedures and policies are implemented throughout the supply chain, which includes staff training, the use of compliance documents, and the adherence to international and local regulations/standards. It can start with a desktop review, followed by on-site audits of Suppliers/Contractors and continuous monitoring. It may involve acquiring documentation such as a mine origin certificate, transport documentation, export and import records, and factory receipts.

The CoC concept has been applied extensively within the paper, pulp, and wood products industries for many decades, enabling Borrowers to have increased confidence that independently certified products are sourced from sustainably managed forests.

A CoC in the wood products supply chain, for instance, starts with the forest where the trees are harvested (the sustainable management of these forests can also be independently certified). The aim of the CoC certification is to ensure that sustainably grown and harvested wood is not mixed with non-compliant wood in the supply chain from the sawmill to the processor. The final product receives a certificate with which consumers can have increased confidence about the origin of the product.

The CoC of a product provides Borrowers with a potentially complete supply chain map. However, in the short/medium term, establishing such full transparency is challenging. Borrowers should therefore work to establish visibility and accountability as much as possible, and proportionate to the complexity, risk, and value of the procurement.

Conducting a CoC assessment of a product is generally outside the scope of a Borrower's expertise, which is why specialized CoC firms can be hired for this purpose. When completing the PPSD, Borrowers should consider whether the engagement of such a firm would be worth the investment. In some countries it may be required by law for certain high-risk commodities.

The International Standards Organization (ISO) also developed general terminology and models for establishing a CoC ([ISO 22095:2020](#)), providing clear definitions of the different CoC models and the corresponding requirements. Example Box 13 summarizes this standard.

EXAMPLE BOX 13: ISO'S 22095:2000 CoC standard³⁷

The International Standards Organization (ISO) developed general terminology and models for establishing a CoC ([ISO 22095:2020](#)), providing unambiguous definitions of different CoC models and the corresponding requirements, which are independent of sectors, materials, products, and issues addressed. Specifically, the standard defines a CoC framework as providing:

- A consistent, generic approach to CoC design, implementation, and management
- Harmonized terminology
- General requirements for different CoC models
- General guidance on the application of the defined CoC models, including initial guidance on the circumstances under which each CoC model might be appropriate

(continues)

EXAMPLE BOX 13: ISO'S 22095:2000 CoC standard (continued)

Suppliers/Contractors can get [certified against the standard](#), which is done by independent certification bodies. A valid certification indicates the conformity of the Supplier/Contractor to the standard. As such, the standard can enhance the transparency of specific claims regarding materials or products and thereby support the reliability of these claims. However, it is not intended to be used on its own to make or verify such claims.

Borrowers can request Suppliers/Contractors to be ISO 22095:2000 certified as a prequalifying criterion. However, this is a relatively new certification, which means that Suppliers/Contractors in developing and emerging countries may not yet have had the resources to invest in obtaining this certification. Suppliers/Contractors can, however, be asked to provide a traceability protocol, describing the insight that they have into their supply chain.

Logistics Considerations

Logistics is the practice of planning the movement of goods from origin to destination. Logistics matters have become much more critical, complex, and hence more costly due to the COVID-19 pandemic and spiraling energy prices. Global logistical challenges include constrained capacity (such as container shortages), shipping rate increases, fuel surcharges, geopolitical issues such as trade tensions, and cybersecurity attacks. Considering logistics aspects is therefore a critical element of successful SCM. Practical Toolbox M provides illustrative strategies of how logistics risks can be mitigated.

PRACTICAL TOOLBOX M: Logistics risk mitigation strategies³⁸

Contractual Obligations

- Extend shipping pricing agreements beyond six months to lock-in current pricing (a form of hedging)
- Implement index-based price adjustments
- Make sure Suppliers have robust contingency plans to respond to logistical disruptions

Other Mitigation Options

- Work closely with core partners to mitigate cost increases
- Secure capacity where necessary
- Prioritize cargo and establish charters to protect service
- Identify alternate shipping routes, modes, and carriers
- Hedge fuel prices by forward purchasing

Logistics considerations also include determining when and where the responsibility for managing the shipment of goods transfers from one Organization to the other. This can be addressed with the specification of Incoterms. The desired Incoterm should be clearly specified in the contract, and Borrowers should check that Suppliers/Contractors do the same with their own Suppliers/Subcontractors.

Incoterms®

Incoterms are a set of widely used terms of sale that set out internationally recognized rules which define the responsibilities of sellers and buyers. This includes specifying who is responsible for paying for and managing the shipment, insurance, documentation, customs clearance, and other logistical activities. It is therefore important that Borrowers fully understand the implications of the Incoterm that is used and what that means, and who is accountable (and ultimately liable) for each logistics activity.

In determining the appropriate Incoterm, Borrowers can ask themselves the following questions:

- From what stage onward do I want to manage the logistics, and what stages do I want the Supplier/Contractor to manage?
- What risks are associated with the management of the logistics I am responsible for, and which risks are carried by the Supplier/Contractor?
- Which charges am I responsible for as part of the logistics journey, and what is the Supplier/Contractor responsible for?

It is important to understand that the Incoterms by themselves are not a contract, and they also do not cover issues such as tariffs, force majeure, intellectual property rights, or remedies sought for a breach of contract. Incoterms also do not address the transfer of property, title, or ownership of the goods sold.

Incoterms are divided into Rules for any Mode or Modes of Transport (EXW, FCA, CPT, CIP, DAP, DUP, DDP), and Rules for Sea and Inland Waterway Transport (FAS, FOC, CFR, CIF). The four maritime Incoterms are intended for when the Supplier/Contractor places the goods on board (or in FAS, alongside) a vessel at a sea or river port, which is also when the risk of loss or damage to the goods is transferred to the Borrower. The seven multi-modal Incoterms are intended for when the Supplier/Contractor or carrier hands the goods to the Borrower at a place that is not on board (or in FAS, alongside) a vessel.

Table XII lists the eleven Incoterms, their meanings, and the place at which the risk transfers from the Supplier to the Borrower. Table XIII provides an overview of how the obligations and charges along the shipment's journey are divided between Suppliers/Contractors and Borrowers. Table XIII is not intended to be used alone, and should always be used in conjunction of the [Incoterms 2020 rule book](#) (ISBN: 978-92-842-0510-3).

Borrowers that want to apply the Incoterms to their contract should make sure that this is made clear in the contract.

For example, "CIP Nairobi Incoterms, 2020" means that the Supplier/Contractor is responsible for the carriage (shipment and insurance) of the goods to Nairobi, with the risk and responsibility then transferring to the Borrower once the goods are delivered to the carrier. In case of an international

TABLE XII Incoterms abbreviations, meaning, and place of risk transfer

Abbreviation	Meaning	Place of Risk Transfer
EXW	Ex Works	At Borrower's disposal
FCA	Free Carrier	On Borrower's transport
FAS	Free Alongside Ship	Alongside ship
FOB	Free On Board	On board vessel
CFR	Cost and Freight	On board vessel
CIF	Cost, Insurance & Freight	On board vessel
CPT	Carriage Paid To	At carrier
CIP	Carriage & Insurance Paid to	At carrier
DAP	Delivery At Place	At named place
DPU	Delivered at Place Unloaded	At named place unloaded
DDP	Delivered Duty Paid	At named place

TABLE XIII Incoterm obligations and charges along the shipment's journey

	EXW	FCA	FAS	FOB	CFR	CIF	CPT	CIP	DAP	DPU	DDP
Export packaging											
Loading chargers											
Delivery to port/place											
Export duty, taxes, customs clearance											
Origin terminal charges											
Loading on carriage											
Carriage charges											
Insurance											
Destination terminal charges											
Delivery to destination											
Unloading at destination											
Import duty, taxes, customs clearance											

Notes: This table is for illustrative purposes only and is not intended to be used alone; it should always be used in conjunction with the [Incoterms 2020 rule book](#).

- Supplier responsibility
- Borrower responsibility
- Negotiable

shipment, the Borrower is responsible for import customs clearance and for the arrangement of the further transport of the shipment.

The place named next to the Incoterms rule selected is important, since this indicates where the goods are to be “delivered”, indicating where the risk transfers from the Supplier/Contractor to the Borrower. For the D rules (i.e., DAP, DPU, and DPP), the place named is the place of both delivery and final destination, requiring the Supplier/Contractor to organize carriage to that point. Under the C rules (i.e., CFR, CIF, CPT, and CIP), the place named is the destination to which the Supplier/Contractor must organize and pay for the carriage, which is not the final destination. To avoid any misunderstanding, care should be taken to be as geographically specific as possible.

It is also important to specify “2020” after “Incoterms,” since this reflects the most recent version.

Most Bank SPDs use the CIP clause, which assigns responsibility and risk to the Supplier/Contractor until the equipment is delivered to the first carrier at the place of shipment, not the place of destination. It thus becomes the Borrower’s responsibility to manage the transit from that stage, including last-mile delivery (the final logistics stage). This is generally done by contracting with logistics Organizations.

If multiple logistics Organizations need to be used, it is important that the transfer between them is seamless—there should be no ambiguities about whose responsibility it is to manage the transfer, including the exact time and place when this will occur. To avoid this need for coordination, Borrowers may consider engaging a Third-Party Logistics Provider (3PL), who can coordinate between different carriers and manage all other related logistics aspects, including packaging, warehousing, and inventory management.

Borrowers should also be aware that not all logistics providers are willing to accept the standard CIP clause, since some may have a lower risk tolerance and want to transfer ownership earlier in the supply chain. Again, it is critical to ask questions, to not assume standard practice, and to check that contract drafting reflects a common understanding between the parties.

Borrowers should further consider specifying in Works requirements/specification what the acceptance and release criteria are when the obligation to manage the transport transfers to the Borrower. This is important since customs agencies have the power to hold shipments if documentation is not consistent or specifications are not fulfilled. Borrowers must ensure that the goods have all necessary customs declarations, meeting respective country requirements to avoid delays during transit.

Borrowers should, further, have a thorough understanding of the dimensions, weights, and volumes of shipments, as even small deviations can halt the shipment’s progress if requirements are not met. These aspects should also be captured in the contract, and all parties must fully understand their respective roles and responsibilities.

Conclusion

This Section introduced Borrowers to activities that can be conducted as part of strategy development and procurement planning. Carrying out these activities can help Borrowers develop a better understanding of the potential Suppliers/Contractors’ supply chains, including any inherent risks or

potential challenges. This then provides an opportunity to address these supply chain issues in the interactions with Suppliers/Contractors as part of the Procurement Process.

While these activities can be conducted in the sequence outlined, they should not be viewed as a linear process, but rather as a framework, with a toolbox of activities that can be deployed as needed. The six broad areas discussed are interconnected: insight developed with one activity, such as supply chain mapping, will also help inform how supply chain risk should be managed.

The following checklist summarizes some of the key lessons from this Section, together with recommended templates that can be used for the corresponding activity.

Section III: Learning Checklist

- I know how to assess a supply chain's market and operating environment (Practical Toolbox A)
- I know how to assess Borrower's SCM capability and identify needs for capacity building (Practical Toolbox B)
- I know how to identify supply chain characteristics through market research and analysis (Practical Toolbox C)
- I know potential contractual clauses for small construction projects under National Procurement (using the Borrower's own procurement documents) that address environmental and social concerns (Practical Toolbox D)
- I know how to determine supply chain due diligence and analysis needed based on the Supply Positioning model (Practical Toolbox E)
- I know how to determine SCM implications based on the Supplier Preferencing model (Practical Toolbox F)
- I know how to map a supply chain and identify possible risks (Practical Toolbox G)
- I know how to identify supply chain vulnerabilities (Practical Toolbox H)
- I know how to conduct supply chain risk assessment with the supply chain risk management process (Practical Toolboxes I, J, K and L)
- I know how to identify logistics aspects relevant to the supply chain (Practical Toolbox M)

Supply Chain Considerations in the Evaluation Phase

Overview

This Section introduces criteria against which the Bidders/Proposers' supply chains can be assessed during the evaluation phase. The evaluation criteria are generally informed by the project/procurement risks identified in the PPSD or as part of the Procurement Plan.

This Section only covers evaluation criteria that are specific to SCM (for more detailed guidance on evaluation, please see the Bank's Procurement Guidance on [Evaluation Criteria](#)). The preparatory activities described in Section III can help identify specific supply chain risks, which can then be addressed with appropriate evaluation criteria. Comprehensiveness should be proportionate to the complexity, risk, and value of the planned procurement.

This Section should be read with reference to the Bank's [Procurement Regulations](#) for IPF Borrowers, the [Standard Procurement Documents \(SPD\)](#), and, if applicable, the associated User Guide relevant to the selected SPD.

Given the various optional processes and approaches in SPDs, such as single stage vs. two-stage procurement processes, and Best and Final Offer/Negotiations where applicable, this Section does not go into detail about these various options, which again must be carried out in accordance with the applicable Procurement Documents.

Assessing Bidders/Proposers against SCM criteria in the evaluation phase can be critical, since a significant amount of risk may be associated with the supply chains managed by the Bidders/Proposers. As such, one or a combination of procurement actions may be required, which can include the following:

- Setting SCM qualification requirements for Bidders/Proposers, for instance, by establishing minimum standards on how they manage their Suppliers/Subcontractors for any risks that may occur, such as delay or poor quality
- Including Works requirements/specifications in the Procurement Documents, for example, by specifying that the Bidders/Proposers' Suppliers/Subcontractors need to have programs in place to address environmental and social risks
- Setting KPIs to measure progress and implement corrective actions during contract implementation, for instance, by investigating root causes of supply chain disruptions and implementing remedies

Applying SCM Evaluation Criteria to Support Prequalification or Qualification

Practical Toolbox N includes potential qualifying SCM criteria that could be used as part of prequalification (if using a two-stage process) or qualification (if using a single-stage process). Bidders/Proposers at this stage will generally be assessed against minimum (pass/fail) qualification requirements/criteria that are based on the Bidders/Proposers general capabilities as evidenced in their current practices and processes (that is, the status-quo of their current operations, and not necessarily what they may be able to do should they be awarded the specific project).

PRACTICAL TOOLBOX N: Illustrative SCM evaluation criteria

TABLE XIV Illustrative SCM evaluation criteria

SCM Criterion	What to Ask For	What to Evaluate
Supply risk management process/approach, including risk mitigation strategies	<ul style="list-style-type: none"> ■ Describe your supply chain risk management process/approach ■ Describe the major risks you have identified in your supply chain and how they are being addressed ■ Describe what measures and practices you have in place to ensure you have sufficient resilience in your supply chain to deliver this project ■ Describe a situation where your supply chain risk management process/approach helped to prevent or mitigate a disruption in your supply chain 	<ul style="list-style-type: none"> ■ The supply chain risk management process/approach by the Bidder/Proposer should be detailed, including a list of the major risks in the Bidder/Proposer's supply chain and what strategies are implemented to mitigate these risks, an evaluation of each risk's likelihood of occurrence and severity of impact, disaster response action plans, and a listing of key personnel responsible for each risk ■ The identified risks should also include those that the Borrower would have listed, and they should be relevant to the specific project ■ The situation chosen should be of considerable magnitude (e.g., not just a small error), and include what strategies were pursued to address the disruption and resume stable operations; the description should also include lessons learned, and what will be improved going forward so that similar disruptions will have no or only limited impact
Supplier/ Contractor code of conduct	<ul style="list-style-type: none"> ■ Provide your Supplier/ Contractor code of conduct 	<ul style="list-style-type: none"> ■ The code of conduct that the Bidder/Proposer has for their Suppliers/Contractors should mirror the Bank's Code of Conduct for Contractor's Personnel, including obligations for required conduct, mechanisms for raising concerns, and consequences for violating the code of conduct; see the Bank's Standard Procurement Documents, for example the Code of Conduct for the Request for Work Proposals Design and Build (page 97)

(continues)

PRACTICAL TOOLBOX N: Illustrative SCM evaluation criteria *(continued)*

TABLE XIV Illustrative SCM evaluation criteria *(continued)*

SCM Criterion	What to Ask For	What to Evaluate
Supplier/Contractor performance	<ul style="list-style-type: none"> Describe how you evaluate, select, and manage your Suppliers/Contractors 	<ul style="list-style-type: none"> Bidders/Proposers should have a formal process for Supplier/Contractor evaluation, selection, and management, which should include KPIs, procedures for quality inspection, and processes for corrective actions; if Bidders/Proposers have a preferred Supplier/Contractor list, information should be sought about the inclusion criteria
Supplier/Contractor environmental and social performance	<ul style="list-style-type: none"> Describe the processes you have in place to assess and monitor the environmental and social performance of your Suppliers/Contractors Describe how you developed and update these processes 	<ul style="list-style-type: none"> The environmental and social supply chain due diligence approach by the Bidders'/Proposers' Suppliers/Contractors should describe how the Bidder/Proposer would require its Suppliers/Subcontractors to meet the relevant requirements, and how it can be verified that these requirements are met during contract implementation; the approach should also describe the actions in case of non-compliance Governance structures, strategies, risk management protocols, metrics, and targets should be clear, with evidence of how they are effectively cascaded through their Suppliers/Contractors Policies for reporting, inspections and audits should be specific and thorough, including timing of audits, who conducts them, independence, what is audited, whether the audits are announced or not, and what is done if requirements/obligations are not met

(continues)

PRACTICAL TOOLBOX N: Illustrative SCM evaluation criteria *(continued)*

Table XIV Illustrative SCM evaluation criteria *(continued)*

SCM Criterion	What to Ask For	What to Evaluate
Supply chain visibility	<ul style="list-style-type: none"> ■ Describe the visibility you have through your supply chain, specifically, until what tier you are able to monitor your supply chain, and what information you are able to obtain ■ Provide the associated supply chain map ■ Describe the approaches and sources you use in obtaining supply chain visibility 	<ul style="list-style-type: none"> ■ The map should capture all the direct Suppliers/Contractors of the Bidder/Proposer, their location, and the transportation involved from the Supplier/Contractor to the Bidder/Proposer; more detailed maps include the Bidder/Proposer's second-tier suppliers/Subcontractors (i.e., the Borrower's third-tier supplier) and beyond; the supply chain map should also include the habitat type at the source area and confirm, where possible, that the Bidder/Proposer's Suppliers/Contractors are not adversely impacting these areas ■ The more detail that is provided, the better; information can include how diligently the Bidder/Proposer is monitoring their Suppliers/Contractors, including frequency of communication and information exchange, collaboration on joint projects, and insight into any challenges that the Suppliers/Contractors may be experiencing (for example, financial stress, delivery problems) ■ This should include a description of the processes used to gather insight, such as desk research, scanning newspaper articles and press releases, or supply chain mapping, including the frequency with which these are conducted, as well as who is responsible

Applying Rated-Type SCM Evaluation Criteria

To support the achievement of VfM, Borrowers can use rated criteria to assist in the determination of the most advantageous Bid/Proposal. Rated criteria are increasingly used in modern procurement practices to signal what is important to the supply market and can often encourage innovation from Bidders/Proposers. Using rated criteria at the Bid/Proposal stage enables the Borrower to look beyond the past performance of the Bidder/Proposer and assess the extent to which the Bid/Proposal is able to meet or exceed the contract's requirements.

Practical Toolbox O illustrates rated-type SCM evaluation criteria that could be applied. Please see the Bank's Guidance on [Evaluation Criteria](#) for details on applying rated criteria.

PRACTICAL TOOLBOX O: An example of rated SCM evaluation criteria

TABLE XV Illustrative rated-type SCM evaluation criteria

SCM Criterion	What to Ask For	What to Evaluate
Proficiency in supply chain risk management	<ul style="list-style-type: none"> Describe potential SCM risks that could occur in the project and how you would mitigate or manage them 	<ul style="list-style-type: none"> The degree to which the Bidders/Proposers demonstrates they understand the key SCM risks in the project and the extent to which they can offer specific management strategies to mitigate them This could include the identification of potential vulnerabilities/choke points, specific contingency plans, backup suppliers, safety inventory, or secured capacity
SCM competencies of key personnel	<ul style="list-style-type: none"> Describe key personnel's experiences in managing supply chains of a similar complexity as the supply chain in this project and what their specific SCM role would be for this project 	<ul style="list-style-type: none"> The extent to which key personnel have experience and capability in successfully managing supply chains (of similar complexity as the supply chain in this project) Clarity of SCM roles and responsibilities
Proficiency in delivering against environmental and social objectives	<ul style="list-style-type: none"> Describe what approaches you would undertake in your supply chain(s) to support the project in achieving its environmental and social goals 	<ul style="list-style-type: none"> The extent to which the Bidder/Proposer demonstrates practice that is likely to support the project in its environmental and social goals The extent to which the Bidder/Proposer demonstrates that they are able to influence their supply chain to successfully deliver against the project's environmental and social goals Specific metrics the Bidder/Proposer intends to commit to and report on, such as training, carbon emission reductions, roadmaps to carbon neutrality, or the percentage of local businesses contracted by the Bidder/Proposer for the Borrower's project/contract

Considering Third-Party/Independent Audits

Borrowers may also consider a third-party/independent audit or inspection. In these audits, trained auditors typically inspect working conditions, employee safety, and pay records, examine physical factory conditions, and conduct interviews with workers. Audits can also focus on examining certifications and documentation for products, standards, and testing and quality management systems; reviewing production processes and materials controls; and reviewing production equipment calibration and

maintenance records. Use of third-party/independent audits can be expensive, but if used effectively, can lead to improvements in systems and processes. Illustrative assessment dimensions that can be used in such an audit are provided in Example Box 14.

EXAMPLE BOX 14: Illustrative assessment dimensions for a supplier/contractor audit

A Supplier/Contractor credibility and capacity audit report can include the following assessments. Please note that these assessment dimensions are illustrative and do not apply to all projects.

- Company profile, which can include information about company ownership, contact information, and subsidiary plants
- Personnel, which can include an organizational chart, employee headcounts, and key staff
- Main market, which can include information on foreign trading staff and export information
- Manufacturing ability, which can include information on the main facilities (including a listing of major machinery and instruments) and yearly output
- Certificates, which can include a listing of all management system certificates obtained (such as ISO standard certifications), as well as product certifications
- Quality control management, which can include obligations to prevent environmental harm, the presence of written instructions, and procedures for quality control and corrective actions
- Development plan, which can include strategic initiatives the Organization plans to pursue, such as the expansion of overseas markets
- Production flow chart, which can include an overview of the different stages the product goes through as part of the manufacturing process
- Sampling, which can include information about the products that were sampled as part of the audit
- Monitoring and reporting systems
- Engagement and communication with stakeholders and customers

In addition to the written information provided on these aspects, the audit report can also include photographs of the products at various stages of processing, the buildings, the production floor, the office space, and/or worker dormitories.

While audits are an important part of ascertaining a Bidder's/Proposer's SCM approach, the effort needed to conduct them can be extensive due to the complexity of global supply chains. Audits are therefore not conducted frequently. Audits are also most effective if they are unannounced, since otherwise the Bidder/Proposer could prepare for the visit. However, most audits are preplanned due to the need for site visit authorizations. Most auditors are skilled at reviewing Organizations and have techniques to minimize the risks of issues being hidden from the audit. Audits may be used as part of Bidder/Proposer evaluation and selection, but may also be used once a contract has been signed to check that the Supplier is adhering to specified standards.

Preparing the Bid Evaluation Report

When preparing the Bid Evaluation Report (BER) and recommendations for contract award, Borrowers should also describe how SCM considerations have influenced the overall contract award decision. This can include specific supply chain risks related to the Borrower's project/contract, the Bidder/Proposer's ability to mitigate them, or any other SCM capabilities the Bidder/Proposer possesses that would be beneficial to the project/contract. The BER should also include next steps on contract finalization, KPIs, and what SCM issues need to be documented as part of the contract management approach.

Guidance for the contract award process is provided in the Bank's [Procurement Regulations for IPF Borrowers](#). From an SCM perspective, Borrowers should be pragmatic and focus on materiality since not every supply chain risk or uncertainty can be avoided, and situations vary based on specific field operations and conditions in local markets. In most instances, there is no perfect Bidder/Proposer, especially when it comes to their supply chains and how they are managed.

Conclusion

This Section introduced Borrowers to supply chain aspects that can be considered in the evaluation phase. The insights obtained in Section III serve as the foundation for the development of these criteria, enabling the Borrower to select the Bidder/Proposer with the desired SCM capabilities and assisting with the identification of the most advantageous Bid/Proposal.

At the end of the evaluation phase, Borrowers should prepare the BER to also include how SCM considerations influenced the evaluation of the Bidders/Proposers.

The following checklist summarizes some of the most important lessons from this Section, together with recommended templates that can be used for the corresponding activity.

SECTION IV: Learning Checklist

- I know how to identify and apply SCM evaluation criteria to support prequalification or qualification (Practical Toolbox N)
- I know how to develop and apply rated-type SCM evaluation criteria (Practical Toolbox O)
- I understand the benefits of third-party/independent audits (Example Box 14)
- I know how to include SCM considerations in the BER

Contract Management

Overview

Once the contract has been signed, the work is far from over: in many instances the hard work of implementation has just begun. Due to the uncertainties and risks associated with managing supply chains, Borrowers should actively manage the contract throughout implementation. For general guidance, Borrowers should review Section 8.7 of the [PPSD Procurement Guidance](#) on Contract Management, as well as the Bank's Guidance on [Contract Management Principles](#) and [Contract Management Practice](#).

This Section will highlight SCM considerations as part of the contract management phase, including the following:

- Recognizing the role of the supervising engineer in providing supply chain oversight
- Including SCM considerations in the Works contract mobilization plan
- Managing supply chain risks
- Managing Supplier relationships

For construction projects, Borrowers [Employers] often engage a supervising engineer who serves, among other things, as the Borrower's agent, supervisor, and certifier in accordance with the contract. Due to the close contact with the main Contractor, the supervising engineer is also well positioned to obtain insight into the Contractor's supply chain, in particular the Suppliers and Subcontractors that are on-site. The supervising engineer can provide the Borrower with additional supply chain intelligence from their presence on the project site. If monitoring such aspects on the project site are important, these should be specified in the contract with the supervising engineer if possible.

The commencement of Works normally begins with a mobilization or preconstruction phase during which the site is prepared for construction. The supervising engineer plays a key role here, especially in the development and implementation of the Contract mobilization plan. The actions specified in the plan can be complemented with supply chain mobilization actions to ensure appropriate performance monitoring and communication modalities across the supply chain, specifically with Suppliers and Subcontractors.

A critical element in contract management is supply chain risk management, especially if the main Contractor is relying on many Suppliers and Subcontractors (who may be relying on their own

Suppliers and Subcontractors as well). Supply chain risk management should therefore be conducted on a regular basis by the main Contractor, especially the monitoring of environmental and social requirements related to Suppliers and Subcontractors.

Recognizing the Role of the Supervising Engineer in Providing Supply Chain Oversight

The supervising engineer oversees, on the Borrower's behalf, the main Contractor's mobilization of resources and the coordination of their activities. As such, the supervising engineer interacts with the main Contractor, who is then responsible for arranging work with their Suppliers and Subcontractors. The supervising engineer thus needs to check that the Contractor is effectively coordinating with their Suppliers and Subcontractors to ensure smooth project delivery. This oversight is important to deliver against schedules, budgets, and quality standards.

Taking an SCM perspective, the supervising engineer should be monitoring, for instance, that tasks by Suppliers and Subcontractors are performed on-time and on-budget, and be vigilant for any delays due to supply disruptions. Attention also needs to be paid to a specific sequence of work that has to be completed before other work can commence.

As per the FIDIC Red Book, the supervising engineer can also require either party to attend the other party's management meetings to discuss arrangements for future works and/or other matters in connection with the execution of the Works (clause 3.8). This is part of a proactive contract monitoring approach, through which deviations can be discussed early and agreements can be sought. Taking an SCM perspective, the supervising engineer could require the Contractor—including their Suppliers and Subcontractors—to attend joint meetings to address any potential changes and issues.

The supervising engineer is also responsible for implementing and administering the Contract Management Plan (CMP). A CMP is developed for all contracts deemed to require one per the PPSD. This includes all Works projects classified as high-risk for sexual exploitation and abuse (SEA) and sexual harassment (SH). The CMP is a tool that provides a structured and systematic approach to planning how, when, where, and by whom a contract is implemented, monitored, managed, and administered. A CMP includes details on contract management roles and responsibilities, a list of contacts, KPIs, record keeping and audit requirements, and payment procedures (for further detail on CMPs, see the Bank's Guidance on [Contract Management Practice](#) and the [Standard Procurement Documents](#)).

Including SCM Considerations in the Works Contract Mobilization Plan

The commencement of Works normally begins with a mobilization or preconstruction phase during which the site is prepared for construction. This can include, among other things, land clearance, excavation, building access roads to the site, work site establishment, and construction of the Contractor's personnel accommodations. The supervising engineer plays a key role here as well, especially in the development of the contract mobilization plan.

Supply chain mobilization actions can include the following (these actions can complement the actions already noted in the sample template in Annex 4 of the Bank’s Guidance on [Contract Management Practice](#), pages 102–104):

- Establish a system to monitor the performance of Suppliers/Subcontractors in terms of quality, cost, and adherence to schedules
- Put appropriate measures in place to address environmental and social risks and impacts in the supply chain
- Establish KPIs to monitor how the Contractor is managing its supply chain (see Example Box 15 for illustrative KPIs)
- Put appropriate measures in place that require the Contractor to proactively report on any potential supply disruptions (Annex VII summarizes two possible supply chain dynamics that can give rise to such disruptions)
- Establish a schedule of regular meetings, field visits, inspections, reviews, and audits of Suppliers/Subcontractors
- Establish reporting modalities and modalities of communication between the main Contractor (including, among others, their Suppliers, Subcontractors, and the supervising engineer)

EXAMPLE BOX 15: Illustrative SCM KPIs for Suppliers/Contractors

- Response time to supply chain disruptions (for example, hours or days needed to resume work after a disruption)
- Frequency and magnitude of delays (as measured by the length of the delay and whether it prevented other tasks to be performed)
- Specific innovation obtained from Suppliers/Subcontractors (as measured by a lower cost or better quality made possible with the help of Suppliers/Subcontractors)
- Reports of incidents, accidents, and fines
- Supply chain reporting and auditing (measured by audit reports received as requested, together with their comprehensiveness and adherence to requirements, for example, environmental and social monitoring, risk monitoring)

Managing Supply Chain Risks

As part of the CMP, Borrowers also need to develop a risk management plan. Analysis conducted by the Borrower in the PPSD and procurement planning phase can be used as a starting point to inform the plan. The CMP can be updated as the contract progresses, for instance by adjusting likelihood and severity values for risks, or adding new risks that emerge. Managing risks with a flexible approach is prudent as supply chains are subject to numerous and rapidly changing external influences. Within

the construction context, this pertains to the risk of supply shortages in particular, as well as environmental and social risks.

While it is important for the Borrower and supervising engineer to actively monitor and manage risks, Suppliers/Contractors should do the same with their second-tier Suppliers/Subcontractors. Borrowers should request regular risk updates from Suppliers/Contractors, particularly in relation to the Suppliers'/Contractors' supply chain. For example, while a Supplier/Contractor has the right to claim an extension of time for exceptionally adverse climatic conditions for their own site, this FIDIC clause (clause 8.5(c)) does not apply to adverse climatic effects in the supply chain (e.g., the delay of needed construction material due to a tropic storm preventing the transporting vessel to reach the destination port on time). Practical Toolbox P offers an illustrative checklist for Borrowers to conduct ongoing supply chain risk management.

PRACTICAL TOOLBOX P: Ongoing supply chain risk management checklist

TABLE XVI Ongoing supply chain risk management checklist

<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Regular review of any news or reports on the Suppliers'/Contractors' industry and supply chain (e.g., actual or impending regulations, industry supply shortages, logistics constraints)
<input type="checkbox"/>	Regular review of any news on critical higher-tier Suppliers/sub-Contractors in the Suppliers'/Contractors' supply chain (e.g., ensuring their financial health)
<input type="checkbox"/>	Regular review and update of the risks in the risk management plan (as part of the CMP)
<input type="checkbox"/>	Requesting regular updates from Suppliers/Contractors on any adjustments to their contingency plans
<input type="checkbox"/>	Recognizing and investigating any "red flags" in project execution (e.g., if a slight delay occurred due to a supply chain problem, Borrowers should work to make sure that this is not the start of a bigger problem, and that the Supplier/Contractor is implementing protocols so that this does not happen again in the future)

If risks or challenges emerge in the Supplier's/Contractor's supply chain, they should be addressed proactively in discussions with the supervising engineer. Borrowers and supervising engineers should work with the Supplier/Contractor to address these risks or challenges, demonstrating the Borrower's commitment to a positive and collaborative working relationship. Termination of the contract should always be the last resort.

A critical component of supply chain risk management is the concern for environmental and social risks in the supply chain. For example, Works SPDs include requirements for regular environmental and social progress reports, immediate reporting of serious environmental and social incidents, and formal contract modification in the event of any new or amended environmental and social implications identified during implementation.

Subclause 4.1 of the Contractor's General Obligation in the Works SPD sets out that:

The Contractor shall not carry out mobilization to Site (e.g. limited clearance for haul roads, site accesses and work site establishment, geotechnical investigations or investigations to select ancillary features such as quarries and borrow pits) unless the Engineer gives a Notice of No-objection to the Contractor, a Notice that shall not be unreasonably delayed, to the measures the Contractor proposes to manage the environmental and social risks and impacts, which at a minimum shall include applying the Management Strategies and Implementation Plans (MSIPs) and Code of Conduct for Contractor's Personnel submitted as part of the Bid and agreed as part of the Contract.

The Contractor shall submit to the Engineer for Review any additional MSIPs as are necessary to manage the ES risks and impacts of ongoing Works (e.g., excavation, earthworks, bridge and structure works, stream and road diversions, quarrying or extraction of materials, concrete batching and asphalt manufacture). These MSIPs collectively comprise the Contractor's Environmental and Social Management Plan (C-ESMP). The Contractor shall review the C-ESMP, periodically (but not less than every six (6) months), and update it as required to ensure that it contains measures appropriate to the Works. The updated C-ESMP shall be submitted to the Engineer for Review.

Managing Supplier Relationships

For the most significant projects, a Supplier Relationship Management (SRM) approach can help to successfully manage supply chain risks and challenges throughout the Contract Management phase. Since SRM requires time and commitment, the amount of effort invested into relationship should be proportionate to the risk/value of project (normally SRM would be used for higher risk/higher value projects).

While Borrowers and supervising engineers can ask Suppliers/Contractors to share certain information on a regular basis, the Supplier/Contractor may not go out of their way to collect and provide this information, just sharing the bare minimum to meet the thresholds of the contract. This may be especially true for supply chain related matters, since the Supplier/Contractor may need to expend considerable effort to collect the information requested by the Borrower and supervising engineer. Collaboratively, positively, and proactively engaging with Suppliers/Contractors thus encourages greater transparency and often leads to more effective risk management and better overall SCM.

Proactive SRM by the Borrower can also lead to increased trust, commitment, and goodwill from the Supplier/Contractor, possibly gaining the Borrower preferential treatment from the Contractor, and becoming a customer of choice. Illustrative benefits of this status are provided in Example Box 16.

Borrowers can use some of the insights they gained from the Supplier Preferencing exercise to understand the Supplier/Contractor's perspective and consider how they can become a better customer.

EXAMPLE BOX 16: Illustrative benefits of being a customer of choice

- The Supplier/Contractor may give the Borrower preference when faced with a constrained environment, for example in terms of supply shortages. Specifically, the Supplier/Contractor may use the constrained supply to complete the Borrower's project, before using it for the project of another customer.
- The Supplier/Contractor may expend extra effort to expedite a delayed shipment that is needed for the completion of the project.
- The Supplier/Contractor may more proactively require their higher-tier Suppliers/Subcontractors to comply with the Borrower's requirements.

This can be as simple as paying invoices promptly, also enabling the Supplier/Contractor to pay their higher-tier Suppliers/Subcontractors/Primary Suppliers (i.e., the Borrower's second-tier Suppliers) on time. If payment is not issued when promised, this may be used as an excuse by the Supplier/Contractor for any supply chain delays or quality issues. Not paying on time can also damage the relationship with the Supplier/Contractor, making them less responsive to special requests or project changes. Smaller Organizations in the supply chain may also not have sufficient cashflow to withstand significant payment delays, putting them at risk of bankruptcy. Therefore, not paying on time may create significant supply chain problems. Practical Toolbox Q offers some further suggestions for how Borrowers can foster their relationship with Suppliers/Contractors.

PRACTICAL TOOLBOX Q: Borrower actions to foster good Supplier/Contractor relationships

- Frequent sharing of relevant information, making it easier for the Suppliers/Contractors to perform well
- Being clear on specifications, answering questions, and not changing requirements frequently
- Making sure the Supplier/Contractor fully understands the contractual commitments involved in managing their supply chain
- Addressing supply chain challenges in a collaborative fashion; not leaving Suppliers/Contractors to manage them on their own
- Assisting the Supplier/Contractor to assess environmental and social concerns in their supply chain (for instance, training, provision of templates or policies that can be adapted)
- Aiming to resolve disputes in a collaborative manner

Better Supplier/Contractor relationships can also be fostered with frequent communication and updates. While there are contractual communication requirements specified in the FIDIC Red Book (2017) and the Bank's [Standard Procurement Documents](#), these should be complemented by

reporting requirements in case of any impending or actual supply chain disruptions that the Supplier/Contractor foresees, as well as possible mitigation actions. Keeping each party up to date above and beyond the minimum that is contractually required can go a long way. Example Box 17 provides some illustrative SCM information that could be communicated. While none of these examples may eventually impact the supply chain (since they are merely anticipated), knowing about their potential can be invaluable to plan ahead.

EXAMPLE BOX 17: Illustrative SCM information to communicate

- Anticipated supply shortages that may impact the project and plans to remedy
- Anticipated major environmental/social incidents or emerging risks in the supply chain
- Anticipated changes in the Supplier's/Contractor's supply base
- Anticipated specification change requests by the Supplier's subcontractors (that is, the Borrower's second-tier Suppliers)
- Anticipated logistics challenges
- Anticipated changes in regulations that will impact the Supplier's/Contractor's supply chain
- Anticipated challenges for the Supplier's subcontractors (that is, the Borrower's second-tier Suppliers), such as their financial health

Better relationships facilitate better collaboration. Collaboration between the supervising engineer, designers, project managers, Suppliers/Contractors, and Primary Suppliers during contract execution can yield creative and innovative solutions that benefit all parties involved. Example Box 18 provides an illustration of such a collaboration within the context of the 2012 Olympic Games. Such collaboration is prudent from a risk management perspective, especially in times of frequent raw material shortages and constrained capacities. By working together, shortages can be detected earlier, and mitigation strategies (for instance, using alternate materials and/or the re-specification of requirements) can be devised jointly and implemented quickly.

EXAMPLE BOX 18: Collaboration as part of the 2012 Olympic Games in London, United Kingdom³⁹

Collaboration on construction projects as part of the 2012 Olympic Games in London, UK, led to significantly improved outcomes. For instance, the Velodrome was originally designed to have a traditional, structural steel roof. However, the design of the roof and the structural foundation posed challenges for this approach, which led to the development of four alternative roof designs. The final choice was a steel cable-net roof on the Velodrome, reducing needed steel by 1000 tons, reducing installation time, reducing health and safety risk (eliminating the need to work at great heights), achieving carbon savings of more than 27%, and achieving an award-winning design. All of this was achieved along with a cost savings of £1.5m over the steel arch design.

Managing supplier relationships is critical, since a contract may not be able to cover every challenge encountered as part of a large project. The supervising engineer, again, plays a key role here: they can proactively develop a good, collaborative, professional working relationship with the Contractor, nurturing trust and commitment. In addition, knowing about potential risks early can help the supervising engineer to also develop possible alternatives.

Conclusion

This Section highlighted that once a contract has been signed, the hard work is far from over, and in many instances, it has only just begun. Borrowers should actively manage the contract throughout implementation. For construction projects, the supervising engineer plays a central role, serving as the Borrower's agent, supervisor, and certifier in accordance with the contract. The position and expertise of the supervising engineers enable them to also offer valuable supply chain oversight, since they can also monitor Subcontractors/Primary Suppliers performing work on the job site. This performance monitoring can be formalized in the contract mobilization plan, which can outline KPIs on how the Contractor is managing their supply chain and specify measures to require the Contractor to proactively report on any potential supply disruptions. Especially in construction projects, ongoing supply chain risk management is essential.

The Section concluded by highlighting the importance of Supplier Relationship Management, and how developing trust and commitment with the Contractor can foster better collaboration and enhanced project outcomes. The following checklist summarizes some of the most important lessons from this Section, together with recommended templates that can be used for the corresponding activity.

SECTION V: LEARNING CHECKLIST

- I know how to discuss providing supply chain oversight with the supervising engineer
- I know how to include SCM considerations in the contract mobilization plan (Example Box 15)
- I know how to formalize the management of supply chain risks in the CMP (Practical Toolbox P)
- I know how to formalize the management of Supplier/Contractor relationships (Example Boxes 16 and 17, Practical Toolbox Q)

Conclusion

SCM has never been more topical and important than it is today. It is likely that critical issues we have seen in global supply chains (that is, supply shortages, logistics issues, geopolitical events, skills shortages, cost increases, inflation) will remain with us for the foreseeable future.

Projects are vulnerable to external shocks, making SCM critical. Even a simple product can have a complex, global supply chain with many associated risks. Breakdowns at any point in the chain have the potential to jeopardize the successful completion of a Borrower's project.

Projects are also increasingly prioritizing sustainability and the management of environmental and social risks (for example, safe working conditions, carbon emissions). Given that many of these risks can be present within the deeper supply chain, SCM becomes increasingly important in supporting the project to achieve any sustainability objectives it may have.

While there is no silver bullet to overcome supply chain challenges, SCM tools and approaches can help Borrowers better understand and manage SCM risks, increasing the likelihood of project development outcomes.

Preparation is key, and effective SCM relies on a good understanding of the supply market and operating environment. Supply chain mapping can provide a useful starting point to identify vulnerabilities/chokepoints and the likelihood of critical supply failures.

A Borrower's ability to influence Suppliers/Contractors to successfully manage SCM risks will ultimately depend on, amongst other things, the capability of the Supplier/Contractor, the importance of the project to the Supplier/Contractor, and the extent to which the Supplier/Contractor can influence their own supply chain. Generally, Borrowers have the greatest leverage (or opportunity to influence the Supplier/Contractor) before the contract is signed, particularly in the strategy development and procurement planning phase.

Obligations and requirements can be a useful tool to set SCM expectations (and responsibilities) for Suppliers/Contractors, but it is important to consider what the Supplier/Contractor is able to control and set obligations and requirements accordingly.

On the Borrower's side, coordination and collaboration are key to ensuring that stakeholders know what they are responsible for in managing the supply chain (for example, who is the owner of an identified risk). The role of the supervising engineer can be important to help coordinate SCM activities.

Finally, recognizing that Borrowers have finite resources that can be dedicated to SCM analysis and due diligence, the application of the SCM tools and approaches should be proportionate to the risk/value of the project—with the greatest SCM emphasis on projects that have the highest risk/value profile.

Environmental and Social Requirements

There are different sources of requirements and guidance related to environmental and social sustainability in Bank-financed IPF projects. It is important for Borrowers to identify and understand these requirements, and how they may relate to the proposed project and the activities of the different parties involved in delivering the project, which includes Suppliers/Contractors and Suppliers/Subcontractors. Identifying relevant requirements will allow Borrowers to structure the project appropriately and proactively manage environmental and social risks and impacts from the earliest stages of a project's lifecycle.

National Legislation and International Commitments

Borrowers need to identify the relevant requirements in national legislation, international agreements and conventions, and sector specific guidance.⁴⁰

National legislation will include many requirements relevant to SCM. Most countries have comprehensive labor legislation, covering terms and conditions of work, occupational health and safety, and protection for vulnerable groups. National legislation may include requirements to carry out environmental and social risk assessments for proposed projects; specify processes for use of land or land acquisition; set out obligations relating to biodiversity; or have specific requirements for engagement and consultation with different stakeholders. There can also be specific requirements for maximum emission levels, quality of water discharge, and noise levels. In addition to national legislation, there may also be regional and local legislation that needs to be adhered to.

Governments may also be subject to different international agreements or conventions, which apply when a government is a party or has ratified these, that are relevant to SCM for the proposed project. Examples⁴¹ include the [ILO Labor Standards](#), the [Paris Agreement](#), the [Aarhus Convention](#), the [Convention on Biological Diversity](#), the [Convention on Migratory Species](#), and the [World Heritage Convention](#).

The Bank's Environmental and Social Framework

Borrowers also need to comply with lender requirements. The lenders may be multinational development banks, such as the World Bank, or they may be commercial banks, many of which adhere to the Equator Principles. For Bank-financed IPF projects, the [Bank's Environmental and Social Framework \(ESF\)](#) applies. This consists of:

- A Vision for Sustainable Development,
- Ten Environmental and Social Standards (ESSs), which set out the requirements that apply to Borrowers,
- An Environmental and Social Policy for Investment Project Financing (IPF), which sets out the requirements that apply to the Bank, and
- An Environmental and Social Directive for IPF and a Directive on Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups.

The Borrower is required to comply with the ESSs as relevant to the project, and make sure that the contractors working in the project do the same.

The ESF specifies that “the Borrower will develop and implement an ESCP [Environmental and Social Commitment Plan], which will set out measures and actions required for the project to achieve compliance with the ESSs over a specified timeframe.” (ESS 1, paragraph 36).

This involves the identification and mitigation of significant environmental and social risks, not only at Suppliers'/Contractors' sites, but also at the project level^l, and through supply chains to Primary Suppliers. To support the implementation of the ESF, the Bank's SPDs, which are used for all international procurements identified in the Procurement Plan, already have incorporated requirements under the ESSs into standard provisions.

Practical Toolbox R offers an excerpt from Section 6 of the ESF stipulating environmental requirements for the purchase of natural resource commodities, while Practical Toolbox S offers an excerpt from Section 2 of the ESF stipulating social requirements and the protection of labor conditions and worker rights.

PRACTICAL TOOLBOX R: Environmental requirements under the ESS6

Excerpt from ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources:

38. Where a Borrower is purchasing natural resource commodities, including food, timber and fiber, that are known to originate from areas where there is a risk of significant conversion or significant degradation of natural or critical habitats, the Borrower's environmental and social assessment will include an evaluation of the systems and verification practices used by the Primary suppliers.

(continues)

PRACTICAL TOOLBOX R: Environmental requirements under the ESS6 *(continued)*

39. The Borrower will establish systems and verification practices which will:
 - (a) identify where the supply is coming from and the habitat type of the source area;
 - (b) where possible, limit procurement to those Suppliers that can demonstrate that they are not contributing to significant conversion or degradation of natural or critical habitats; and
 - (c) where possible and within a reasonable period, shift the Borrower's Primary Suppliers to suppliers that can demonstrate that they are not significantly adversely impacting these areas.
40. The ability of the Borrower to fully address these risks will depend upon the Borrower's level of control or influence over its primary suppliers.

PRACTICAL TOOLBOX S: Social ESF obligations under the ESS2

Excerpt from ESS2 Labor and Working Conditions:

39. As part of the environmental and social assessment, the Borrower will identify potential risks of child labor, forced labor and serious safety issues which may arise in relation to primary Suppliers.
40. Where there is a significant risk of child labor or forced labor related to primary supply workers, the Borrower will require the primary Supplier to identify those risks consistent with paragraphs 17 to 20 above [Protecting the work force: Child labor and minimum age; Forced labor]. The labor management procedures will set out roles and responsibilities for monitoring primary Suppliers. If child labor or forced labor cases are identified, the Borrower will require the primary Supplier to take appropriate steps to remedy them.
41. Additionally, where there is a significant risk of serious safety issues related to primary supply workers, the Borrower will require the relevant primary Supplier to introduce procedures and mitigation measures to address such safety issues. Such procedures and mitigation measures will be reviewed periodically to ascertain their effectiveness.
42. The ability of the Borrower to address these risks will depend upon the Borrower's level of control or influence over its primary suppliers. Where remedy is not possible, the Borrower will, within a reasonable period, shift the project's primary suppliers to suppliers that can demonstrate that they are meeting the relevant requirements of this ESS.

A Brief History of Supply Chain Management

SCM is a natural development of industrial evolution, going back to the industrial revolution that took place in the late 1800s, which replaced human labor with machine power. This improved productivity significantly, and promoted specialization of work. Specialization has been a trend ever since, and today's Organizations are intricately dependent on each other.

This fact is illustrated by the average passenger car, which consists of up to 85% purchased components. While the car Manufacturer is certainly involved in the design of the components, the Supplier/Contractor is responsible for the production. With a typical car having thousands of parts and hundreds of Suppliers/Contractors, managing the supply chain is critical. If just one part or component is missing, the final product may not be delivered.

While the automobile manufacturing industry is often used as a context to describe SCM principles, they are equally applicable to other settings. Consider, for example, a construction project whose successful completion is dependent on a range of Suppliers/Contractors, who may also be service providers. If, for instance, qualified electricians are not available to install the wiring, the project may need to be put on hold—even if everything else is available. This illustrates that the supply chain is only as strong as its weakest link.

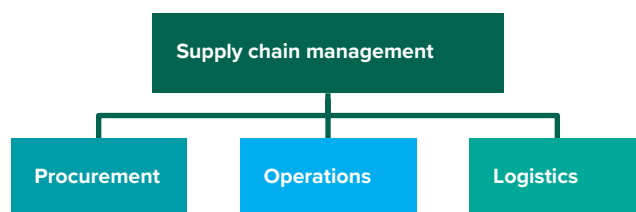
This interdependence on Suppliers/Contractors is often well-intended, since no one Organization can be best at everything that is needed to deliver an outcome. It is thus generally most effective to focus on what an Organization can truly do best, that is, its core competencies, and outsource everything else. This enables the Organization to leverage the unique and innovative capabilities of its supply base, while at the same time being more agile and flexible.

Associated with this interdependence is, however, a significant amount of risk, since a Supplier/Contractor does not have the same control over their supply base that they have over their own Organization. This is most frequently felt during times of crisis, such as the COVID-19 pandemic, when associated supply shortages arose. In these instances, it is beneficial to have a good grasp of the supply chain, including its various tiers, as well as their constraints and challenges. Risk management and contingency plans are also beneficial, and can help prepare for disruptions.

Supply Chain Management Functions and Objectives

There are three primary functions or subdisciplines that comprise SCM, which require integration to achieve the best outcomes (Figure XII). The three functions are briefly described in the following.

FIGURE XII Three primary functions of SCM



Procurement

The primary objective of procurement is to make sure that the right product is delivered in the right quantity, in the right quality, at the right place, at the right time, and at the right price. If any of these “rights” are not met, a Supplier/Contractor’s operations may be interrupted, preventing them from delivering the promised output.

It is therefore procurement’s task to ensure all inputs meet the exact specifications and are available when they are needed. For instance, it is procurement’s job to translate stakeholder needs into requirements for Suppliers/Contractors and then organize the Procurement Process. Specifically, procurement focuses on developing sourcing strategies, evaluating and managing Suppliers/Contractors, and negotiations.

Inputs that enable the delivery of the outputs also include products and services. For instance, if no trainers are available to educate the staff about how to use a medical imaging device safely and effectively, it may do more harm than good.

Resources needed in procurement include approved Supplier/Contractor lists, knowledge, negotiation skills, and contracts, with which procurement requisitions are transformed into purchase orders.

Operations

The primary objective of operations is to transform inputs into outputs. This transformation requires resources in the form of equipment and machines, but also qualified personnel and knowledge.

If these resources are not available or if they are not well managed, the Supplier/Contractor may not be able to deliver what they promised. It is therefore operations' task to ensure that resources are available, well-functioning, and best fit for the intended purpose; that is to say that it is operations' job to facilitate the successful transformation of inputs into outputs. Specific focus areas include process analysis, quality management, forecasting, and demand management.

Logistics

The primary objective of logistics is to ensure the efficient and effective flow of resources from an origin to a destination. If logistics are not coordinated well, the Supplier/Contractor may receive the ordered inputs late or damaged, preventing them from providing their promised output.

It is therefore logistics' task to select the most effective mode of transportation, monitor and coordinate the transfer between logistics providers, and check that all shipping documents are completed, that is, it is logistics' job to check that all transportation functions seamlessly. Specific topics logistics is focused on include distribution management, warehousing and transportation. Resources in logistics needed include for instance trucks, fuel, routings, and knowledge, which enable the transformation of loads into delivered goods.

The following examples illustrate the important role played by logistics.

- Especially for supply chains that span multiple countries, logistics may be responsible for the coordination between potentially multiple transportation carriers and modes of transportation (e.g., air, rail, truck), as well as the smooth transition.
- Logistics may also be responsible for the assurance of specific transportation conditions, such as the cold storage for vaccines, the management of customs declarations, and the arrangement of last-mile deliveries (e.g., from the destination warehouse to the final customer).

Support Functions

Supply chain managers would not be able to do their job and seamlessly integrate with each other without support functions. Three of the most critical ones are described in the following.

Information Technology (IT)

Information technology enables the three interdependent SCM functions to coordinate their activities. Information can be shared immediately with everyone that needs to know, and can be automated, enhancing planning and forecasting. Transparency is also greatly increased, reducing uncertainty.

For example, in an integrated information system, once a purchase order has been placed it is immediately visible to operations planning, warehousing, and accounts payables, letting them know that a new batch of products is about to be delivered and that an invoice is to be expected.

Human Resources

Supply chains must be managed, and this is where human resources come in. While IT is a great enabler, it cannot replace humans. Knowledgeable employees need to be hired and retained, which has become increasingly challenging. Specific skills are needed to effectively manage supply chains, which may involve building business relationships and weighing the pros and cons of a decision that is not straightforward.

Legal

When it comes to writing a contract or navigating disputes, an Organization's legal department is indispensable. While frameworks such as the FIDIC Red Book for construction can provide great guidance, expert advice to craft a comprehensive contract that covers the Borrower is still needed.

Skillsets to Build Supply Chain Resilience

Possessing Analytical Capabilities

Building supply chain resilience is a complex task, requiring a wide variety of data and information to be absorbed and processed to facilitate well-rounded decision-making. Having the ability to make sense of all this information and base decisions on it requires an analytical mindset. Borrowers with analytical mindsets ask many “why” questions to improve project outcomes.

With an analytical mindset, Borrowers can find creative solutions to roadblocks faced in a project. Brainstorming and an entrepreneurial attitude are helpful in this regard.

Feeling Empowered

Effective supply chain managers possess a sense of ownership, proactively and independently monitoring and managing supply chains, and anticipating challenges and roadblocks. This should not just be left to the Suppliers/Contractors.

Borrowers must develop a thorough understanding of supply chain issues. This knowledge can empower Borrowers to be flexible and agile, make decisions that are out of the ordinary, and effectively respond to emergencies. While the visibility into and control of higher-tier Suppliers/Contractors may be limited, Borrowers should ask Suppliers/Contractors questions about their supply chain design and any risk mitigation approaches they have in place. Protocols should also be established about when Suppliers/Contractors are to notify the Borrower about delays or concerns occurring at higher-tier Suppliers/Subcontractors.

Being an Effective Communicator

Possessing analytical capabilities and feeling empowered are important skills; the next step for supply chain managers is to communicate their strategy clearly and effectively to stakeholders. Since this might involve a significant change to how things were done previously, the message should be communicated convincingly. Stakeholders not only have to agree to the change, but they should also be convinced that this is the best path forward.

When negotiating with Suppliers/Contractors, Borrowers must be well prepared and have arguments and/or data to back up their point. This can include knowledge about how the supply chain of the Supplier/Contractor is likely structured as well as the associated constraints and risks. Arguments

should be presented in a confident, clear, and concise manner. Being an effective communicator however also means to practice active listening, showing empathy, and being responsive to the concerns of the Supplier/Contractor.

Taking a Big Picture and Identifying Everything the Project Needs

To develop the best strategy, Borrowers should think about what the best solution for the target population is, and whether this solution is feasible. For example, it is not sufficient to merely procure a sophisticated medical equipment: the equipment also needs to be safely transported to the destination (potentially via armed escorts for high-value items). Experts may also be needed to set up the equipment at the destination, and the equipment may require an appropriate installation environment (for instance, a climate-controlled room with high-capacity electricity). There also need to be trained technicians that can safely operate and maintain the equipment on a consistent basis. Consumables required for equipment operation must also be available on an ongoing basis. Borrowers must consider the demand and supply of these consumables, and consider this when negotiating with the Supplier/Contractor. For instance, a service/availability guarantee for these consumables could be negotiated with the Supplier/Contractor, or the Supplier/Contractor could be incentivized to carry strategic stockpiles nearby.

Example Box 19 provides an illustration of what needs to be considered as part of the vaccine supply chain.

EXAMPLE BOX 19: The vaccine supply chain

Once vaccines for COVID-19 had been successfully developed, several other challenges presented themselves:

- Cold supply chain management: Vaccines had to be stored at a constant, low temperature during transportation, placing additional constraints on the choice of transportation carriers. The switch between different carriers also needed to be seamless, and accountability for the vaccine needed to be clearly spelled out, ensuring that the constant low temperature is maintained also during transfer.
- Last-mile-delivery: When the vaccine was delivered to a local warehouse, the last-mile-delivery needed to be organized, that is, the final delivery to health care centers. The challenge here was that many international transportation providers could not perform this last step, so a local provider that could accommodate the cold chain and tracking requirements needed to be found, bearing in mind that sometimes the final destination was in a remote location. In addition, the handover needed to be managed carefully, ensuring appropriate storage requirements at the warehouse and an expeditious handover to the local provider to get the vaccines to where they were needed as quickly as possible.
- Health care centers: The destinations where the vaccines were administered needed to be equipped with ultra-cold freezers to safely store the vaccines. At times these were simply not available.

Being Creative and Thinking Outside the Box

Being creative and thinking outside the box can facilitate the development of a much more powerful procurement strategy. Consider the following:

- Gaining leverage by coordinating procurement across different projects in the same industry: There is great potential for this approach in the health care sector in particular. Rather than every health center procuring from Suppliers/Contractors on their own, a regional or national group purchasing organization (GPO) could be established to procure the needed items from Suppliers/Contractors in bulk, bundling the budgets of participating health centers. This generates savings through quantity discounts and reduces administrative work at the local health centers. Approaching Suppliers/Contractors with a single voice can also incentivize them to develop supply chain infrastructure in the country, such as distribution centers or warehouses, enabling a more efficient and effective supply.
- Value analysis/value engineering: Value can be expressed as the relationship between a product's function and the resources necessary to produce it. The objective in value analysis and value engineering is to reduce cost and/or improve performance (performance dimensions can include quality, reliability, or speed). Value analysis is the approach applied to existing products, processes, or services, while value engineering is the approach applied to new products, processes or services that are being developed. Value engineering applied as part of the construction of a health care facility could include designing the building so that most commonly used services are located on the ground level, enabling staff to provide services most efficiently.
- Counteracting corruption and unethical behavior: Borrowers are sometimes challenged by local structures that make awarding the contract based on objective criteria difficult. This can be due to unofficial relationships among Suppliers/Contractors who agree on who should get the next contract, or contracts that include rebates given to an individual person for their personal gain. To avoid such collusion and change behavior, consistent, objective, and transparent processes need to be developed.

SCM and the Bank's Procurement Principles

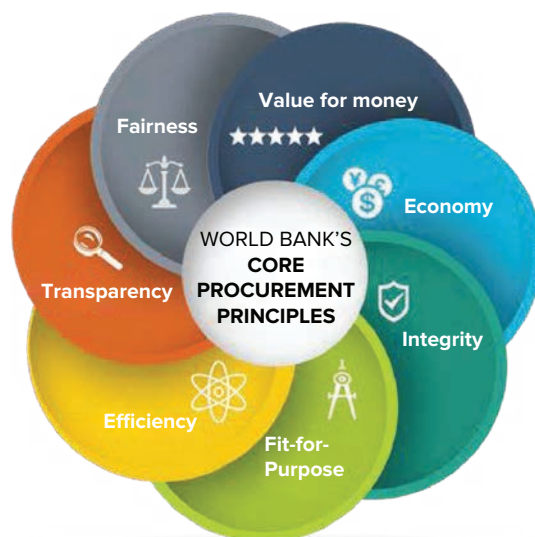
This Annex illustrates how each of the seven Core Procurement Principles of the Bank's Procurement Policy provides direction for supply chain management. For this purpose, illustrative SCM questions are provided for each principle.

The Bank's vision for IPF procurement, as stated in its Procurement Regulations, is as follows:

Procurement in Investment Project Financing (IPF) supports Borrowers to achieve value for money (VfM) with integrity in delivering sustainable development.

To support this vision, the Bank developed a set of Core Procurement Principles (Figure XIII) as part of its Procurement Framework. Each of these principles has implications for SCM.

FIGURE XIII The Bank's core procurement principles



While the Procurement Principles provide policy direction for Borrowers on how to evaluate, select, and manage Suppliers (that is, Manufacturers or Contractors), applying an SCM lens also helps Borrowers broaden their perspective and ask the right questions about the Supplier/Contractor's supply chain. This should result in more robust supply chains, reducing risk for Borrowers. How each

of the Bank's Core Procurement Principles can provide direction for supply chain management is illustrated below. Similar to the overriding Procurement Principles, these questions should be kept in mind during the entire Procurement Process, in particular during the early stages of strategy development and procurement planning, as well as when potential Suppliers/Contractors are assessed and evaluated.

Value for Money (VfM)

- To what degree is the Supplier/Contractor emphasizing VfM with their Suppliers/Subcontractors?
- How effectively is the Supplier/Contractor managing their Suppliers/Subcontractors?
- What is the Supplier/Contractor doing to improve the management of costs and increase benefits in its supply chain(s)?
- How is the Supplier/Contractor assessing risks in its supply chain(s)?
- What non-price attributes is the Supplier/Contractor using to assess its supply chain(s)?
- How does the Supplier/Contractor weigh price and non-price attributes?

Economy

- To what degree is the Supplier/Contractor emphasizing sustainability, quality, and/or life cycle costs with its Suppliers/Subcontractors?
- To what degree is the Supplier/Contractor applying economic, environmental, and social considerations in its Supplier/Subcontractor evaluation, selection, and management?

Integrity

- What are the Supplier/Contractor's standards of ethics when managing their supply chain(s)? How likely are Suppliers/Contractor to engage in fraud and corruption in their supply chain(s)?
- To what degree is the Supplier/Contractor's supply chain management aligned with the public interest and the broader principles of good governance?

Fit-for-Purpose

- To what degree is the Supplier/Contractor willing to tailor its supply chain management to meet project development objectives and outcomes?
- To what degree does the Supplier/Contractor consider the context, the risk, the value, and the complexity of our project and relay these expectations to its supply chain(s)?

Efficiency

- To what degree are the Supplier/Contractor's SCM efforts proportional to the value and risk of the project?
- Is the Supplier/Contractor emphasizing timeliness and avoiding delays in its supply chain(s)?

Transparency

- To what degree does the Supplier/Contractor disclose its SCM practices and provide appropriate documentation (for instance, in terms of ensuring environmental and social sustainability through its supply chain(s))?
- How responsive is the Supplier/Contractor to requests for SCM information?

Fairness

- How is the Supplier/Contractor evaluating, selecting, and managing its Suppliers/Subcontractors?
- To what degree is there an equitable distribution of rights and obligations among the Supplier/Contractor and its supply chain members?
- To what degree does the Supplier/Contractor have mechanisms in place through which their Suppliers/Subcontractors can raise complaints?

Supply Chain SWOT and PESTLE Analysis

Supply Chain SWOT Analysis

As part of the [PPSD](#), Borrowers are required to identify strengths, weakness, opportunities, and threats (SWOT) as part of their procurement planning process. Strengths and weaknesses are generally aspects internal to the Organization, while opportunities and threats refer to external dynamics.

Information gathered and analyzed through the approaches discussed in this Guidance can be valuable inputs for a SWOT analysis, which provides an effective framework for organizing and refining information, giving Borrowers more confidence in their chosen approach.

Strengths within an SCM context enable the Borrower to effectively assess, monitor, and manage the supply chain, while weaknesses prevent the Borrower from doing so. Opportunities are factors in the external business environment that make it easier for the Borrower to practice SCM, while threats could jeopardize this capability. Practical Toolbox T provides an illustration of the types of questions Borrowers could ask during an SCM-focused SWOT analysis.

PRACTICAL TOOLBOX T: Supply chain SWOT analysis

Table XVII provides illustrative leading questions that can help Borrowers to identify strengths, weaknesses, opportunities, and threats pertaining to their ability to effectively assess and monitor the supply chain of Suppliers/Contractors.

TABLE XVII Supply chain SWOT analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> ■ What unique insight into the supply chain do we have that enables us to design and manage the contract with the Supplier/Contractor more proactively? ■ What resources do we have internally to conduct extensive supply chain mapping and monitoring (for example, skills, knowledge, and expertise)? 	<ul style="list-style-type: none"> ■ What capabilities and skills do we need to develop to better assess and manage the Supplier/Contractor’s supply chain(s)? ■ What insight are we currently lacking that would help us to develop a better understanding of the supply chain(s)?

(continues)

PRACTICAL TOOLBOX T: Supply chain SWOT analysis (continued)

TABLE XVII Supply chain SWOT analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> ■ What supply chain insights can we obtain from our external partners and stakeholders (that is, supervising engineers, Consultants, subject matter experts, Bank staff)? ■ What supply chain insights and experience can we apply from prior projects (lessons learned)? ■ How can we best leverage our good relationships with current Suppliers/Contractors? 	<ul style="list-style-type: none"> ■ How can we improve our external relationships to obtain valuable supply chain information? ■ What lessons can we apply from prior supply chain challenges that we have encountered? ■ Can we mobilize the necessary resources to complete some/all of the SCM work needed? ■ How can we improve our current relationships with Suppliers/Contractors?
Opportunities	Threats
<ul style="list-style-type: none"> ■ What resources have become available to better monitor and manage supply chains (for instance, publications, training)? ■ What regulations or government policies are in place to make the supply chain's primary industry operate in a more predictable and reliable way? ■ How can technology enhance supply chain monitoring and management? ■ Have new Suppliers/Contractors entered the market that would better fit our needs? 	<ul style="list-style-type: none"> ■ What trends have made it more difficult for us to monitor and manage the supply chain (for instance, more complex or longer supply chains, Supplier/Contractor consolidation, deregulation)? ■ How have external pressures created challenges for our ability to manage and monitor supply chains (for example, inflation, COVID-19, political tensions)? ■ How widespread is fraud and corruption in the supply chain(s)?

Supply Chain PESTLE Analysis

PESTLE, which stands for Political, Economic, Social, Technological, Legal, and Environmental, is a tool for understanding the external forces that influence and shape a market and its supply chains. It is valuable for understanding the pressures a supply chain may be under, helping Borrowers to consider these factors in their SCM approach and thus minimizing risks.

Similar to Supply Chain SWOT analysis, Borrowers can ask a set of questions geared towards gaining a better understanding of the supply chain's context. Borrowers can take a broader perspective and consider these dimensions within the context of the project's supply chain. Table XVIII in Practical Toolbox U offers illustrative questions Borrowers could ask.

PRACTICAL TOOLBOX U: Supply chain PESTLE analysis

Table XVIII provides leading questions that can help identify political, economic, social, technological, legal, and environmental risks in supply chains. PESTLE analysis provides a framework for considering how these factors may influence the project's SCM approach. PESTLE analysis is especially relevant when supply chains span multiple states, regions and/or countries, that may operate in very different contexts.

TABLE XVIII Supply chain PESTLE analysis

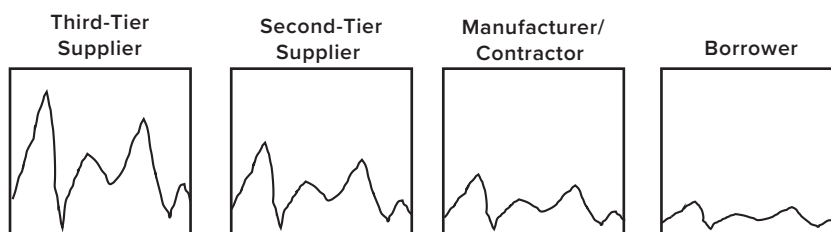
Political	<ul style="list-style-type: none"> ■ What is the nature and stability of the governments in each of the states, regions and/or countries in which supply chain Organizations are located? ■ What is the level of government intervention in the market? Are there industries that are supported by government, and what implications does this have for the supply chain? ■ What is the level of bureaucracy? What is the level of fraud and corruption? To what degree does the rule of law apply? ■ Are there any current or developing geopolitical tensions that may impact current/future trading relationships?
Economic	<ul style="list-style-type: none"> ■ What are current and anticipated future interest rates, tax systems, economic growth dynamics, inflation pressures, and exchange rates? ■ What implications does this have on workforce availability, commodity prices, and economic health in the states, regions and/or countries involved?
Social	<ul style="list-style-type: none"> ■ What are the dominant social trends that could influence demand for the products or services (for instance, population growth/decline, change in behaviors/tastes)? ■ What can influence the ability or willingness of employees to work? ■ What are typical employment structures in the supply chain (for example, temporary vs. full-time employment, hiring of foreign workers)? ■ What social standards are in place to prevent forced labor, ensure fair wages, and provide a safe working environment?
Technological	<ul style="list-style-type: none"> ■ What is the availability of technological infrastructure and associated information in the states, regions and/or countries the supply chain spans? What are associated challenges and opportunities? ■ What is the rate of technological change? ■ Is knowledge about how to best use advanced information technology available?
Legal	<ul style="list-style-type: none"> ■ How different is the legal environment in the states, regions and/or countries involved? ■ What implications does this have for the successful completion of the project; for example, regarding environmental and social concerns, employment law, and health and safety? ■ How might legal changes impact the supply chain's ability to successfully support the project?
Environmental	<ul style="list-style-type: none"> ■ What is the level of environmental concern in the states, regions and/or countries of the supply chain? Are there significant discrepancies that would make supply chain management more challenging? ■ What are the regulations, standards, and requirements at each stage of the supply chain?

Supply Chain Dynamics

With increasing specialization and more complex supply chains, information sharing up and down the supply chain is critical to effective communication and coordination. This is especially important since higher-tier Suppliers/Subcontractors may provide critical inputs without which the project cannot be completed. Two commonly encountered supply chain dynamics can be alleviated with such information sharing.

The first dynamic is the “bullwhip effect,” which refers to unexpected variability in orders creating even greater volatility in demand higher up in the supply chain. Consider a local healthcare center ordering a much larger quantity of syringes than usual from a distributor due to a vaccine drive. The distributor, not knowing the reason for the surge in demand, is caught off-guard and is now struggling to fulfill the order. To avoid the same situation in the future, the distributor orders a much larger quantity from the wholesaler. The wholesaler may have the same experience: they are caught off-guard, and to be able to fulfill the need better in the future, they now order even more from their Supplier/Contractor. Had the distributor and wholesaler known the reason for the spike in demand (that is, that it was only short-term), they would not have reacted by immediately adjusting their orders in this fashion. Figure XIV provides a simple illustration of these demand swing exaggerations as one moves higher up in the supply chain. Communication from lower tiers in the supply chain (that is, the Borrower or the main Supplier/Contractor) to their higher tiers is thus important, avoiding supply change confusion.

FIGURE XIV Demand exaggeration across the supply chain



The second dynamic is the “ripple effect,” which is the idea that even disruptions that occur at Suppliers/Contractors far removed from the main producer or Contractor can “ripple” through the supply chain and jeopardize the completion of the project. Due to the propagation of disruptions through the supply chain, it is important to ensure that smaller disruptions higher up in the supply chain are also communicated down the supply chain. Even small disruptions, although they may seem far removed, can impact the ability of the project to be completed on time and on budget.

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For additional information, such as Standard Procurement Documents (SPDs), Guidance, briefing, training and e-learning materials see www.worldbank.org/procurement