Drivers of Delays in Procurement of Infrastructure Projects

WORLD BANK GROUP

QUALITY INFRASTRUCTURE INVESTMENT PARTNERSHIP

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Abbreviations

AFR	Africa Region
EAP	East Asia and Pacific Region
ECA	Europe and Central Asia Region
eGP	E-Government Procurement
CoST	CoST – the Infrastructure Transparency Initiative
IMF	International Monetary Fund
IsDB	Islamic Development Bank
LCR	Latin America and Caribbean Region
MNA	Middle East and North Africa Region
PPP	Public-Private Partnership
SAR	South Asia Region
STEP	Systematic Tracking of Exchanges in Procurement
WASH	Water, Sanitation and Hygiene Projects

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Contents

Executive Summary

Delays in procurement and contract execution of infrastructure projects are common.[1] While there are global estimates about project cost increases, there is less evidence about the extent of such delays, their causes, and their impact.

The impact of delays on the outcomes of infrastructure investments can be considerable, in terms of the deferral of both broader economic benefits to the economy and more specific benefits to business and local communities.

The objective of this study was to analyze the reasons for delays in procurement and contract execution of infrastructure projects. It analyzes available data from three different sources[2]:

- Tender data for 656 works contracts extracted from the World Bank Systematic Tracking of Exchanges in Procurement (STEP), covering the period 2013-2022. This sample was used to analyze the incidence and extent of delays in the procurement of World Bank infrastructure projects.
- A sample of 312 works contracts for infrastructure projects financed by the World Bank and the Islamic Development Bank (IsDB), covering the period 2007-2019.[3] This sample was used to analyze the reasons for delays in the procurement and delivery of World Bank and IsDB infrastructure projects at the contract level.
- CoST assurance reports from 2016 to 2020 covering 480 infrastructure projects across 12 member countries of CoST.[4] This sample was used to analyze the reasons of delays for the reviewed infrastructure projects.

A literature review of relevant papers was also conducted to identify the common drivers of delay in procurement and contract execution of infrastructure projects which emerge from past research. This was complemented by virtual focus group meetings held with informed experts from seven CoST member countries and World Bank governance professionals, who provided their perspectives on the nature and drivers of delays in procurement and contract execution.

[1] Delay is defined as the difference between actual completion time of a milestone and the contractual or planned milestone.

[2] These three data set samples are selected based on the availability and accuracy of the information necessary for the analysis, and therefore they are not necessarily representative samples. This data limitation should be considered for the interpretation of the empirical results presented in this report, as they are not necessarily representative of all infrastructure projects/contracts funded by the World Bank or the IsDB or conducted in CoST member countries.

[3] The IsDB showed interest in the study and agreed to provide their data to be included in the analysis.

[4] CoST is a UK-based charity working with government, civil society, and the private sector in 19 countries to strengthen transparency, participation, and accountability within the infrastructure sector. CoST showed interest to contribute to the study as they have done assurance reports during the period 2016-2020 that can be analyzed to consolidate the drivers of delays in procurement and contract execution in member countries. See the CoST website at https://infrastructuretransparency.org/our-approach/core-feature-assurance.

Key Findings

Tender data show that significant delays are quite commonplace in works' procurement processes. Analysis of the World Bank STEP works contract data showed that about 44 percent of the sample did not experience delays in issuing the procurement notice, and 20 percent of the sample experiencing more than 120 days of delays. Only about 22 percent of the sample signed the contract on time compared to what has planned, while 28 percent of the sample experienced delays of more than 270 days. On average, there was a substantial delay in contract signature for contracts procured using prequalification and contracts procured using single-stage, one-envelope tenders experienced a significant delay in issuing the procurement notice. In addition, the evaluation period was the stage that experienced the longest average actual duration across the procurement procedure types.

Common causes of delays that are often found in the literature are also prevalent in the analyzed World Bank and IsDB project data. The top three drivers of delay in the literature are weak project and contract management, changes to project design or scope, and funding constraints. Approximately half (53 percent) of the sample contracts from World Bank and IsDB project data had at least one identified reason for delay[5] in procurement and contract execution indicated in the project documents analyzed.

These delays are the result of a combination of internal and external factors. The World Bank and IsDB sample indicated that implementing entities were responsible for the delays in most of the contracts (44 percent) while 27 percent and 16 percent of the contracts experienced delays attributed to external stakeholders[6] and contractors, respectively. Almost half (46 percent) of the sample contracts experienced a delay at the contract execution stage, whereas for about a fifth (21 percent) it was at the tender planning stage. For World Bank- and IsDB-financed infrastructure projects, the main reasons for delays in procurement and contract execution were weak procurement capacity, weak contract management capacity, and poor quality of project feasibility reports, which were all attributable to the implementing entity.

Looking more broadly across the project cycle using CoST data paints a more nuanced view of the drivers of delay by differentiating between when the drivers manifested themselves versus when their impacts were observed. The analysis of the CoST assurance reports indicated there were more drivers of delay during project preparation (60 percent) than during tender process (10 percent) and contract execution (30 percent). This was largely due to the high percentage of deferred drivers of delay identified that were at the preparation stage such as low-quality design, but which's impacts showed up in the downstream stages such as tendering or contract execution.[7] The focus groups also highlighted local factors as

[5] Delay is defined as the difference between actual and contractual completion time.

[6] External stakeholders may include government entities other than the relevant implementing entity or contractor.

[7] Deferred drivers of delay arise when an issue at one stage of procurement that gives rise to later delays and other problems further down the project cycle. Examples include incomplete and inaccurate drawings and design, lack of feasibility and preparatory studies, and outdated designs.

significant drivers of delay that need to be identified early on as a project risk. These ranged from security issues and weather patterns in the different countries to currency devaluation driving up the costs of importing construction materials.

Key Recommendations

To address the identified issues, the following recommendations are proposed to policymakers, procurement officials, and project managers to embed good practice into their organizations.

- **Invest in project preparation**: proper site surveys, complete designs, reasonable timeframes for implementation, timely access to the construction site aligned with construction season, and engagement with local communities will all reduce the risks of delays through subsequent stages of the project cycle.
- **Use an adaptable project and contract framework**: manage project risks, promote collaborative working, and help to build trust between the client and its supply chain.
- **Ensure cashflow through the supply chain:** avoid "supply chain financing", reducing the risks of liquidity failures and unfinished projects from an inadequate budget and delayed payments.
- **Adopt risk management tools:** an example is using a project risk register throughout the project cycle to help proactively manage potential procurement risks and reduce the opportunities for delay, especially during the bid evaluation stage and implementation.
- **Support client organizations to develop capacity and skills:** training on procurement and contract management will help to improve project preparation, planning, and tendering.
- **Use an eGovernment procurement system:** extend to include a contract management module for efficient procurement implementation and contract monitoring and management.
- **Invest in data collection and analytics systems:** enable decision-makers and senior managers to access a digital dashboard of project performance.
- **Disclose tender award results and contract performance data:** make stakeholders such as civil society, media, auditors, and taxpayers aware of delays.

1. Introduction

High quality infrastructure investment is a vital component of efforts to meet today's most pressing global challenges. Countries' abilities to meet national goals and the United Nations Sustainable Development Goals (SDGs), deal with the effects of climate change, and deliver inclusive economic growth will be seriously undermined unless the countries accelerate the delivery of good quality infrastructure and services. The Global Infrastructure Hub (2023)[8] estimates that globally US$94 trillion of investment in infrastructure projects is required by 2040 to meet national goals, SDGs and other mentioned challenges, equivalent to US$3.7 trillion per year. This compares to an annual spending of US$2.7 trillion in 2020 and a US$15 trillion "investment gap in infrastructure". There is an urgent need therefore to increase both the quantity and quality of infrastructure investment and to reduce financial losses caused by various delays. These losses are a result of weak institutions, poor governance, and a lack of transparency (International Monetary Fund, 2015).

The above shortcomings are exacerbated by delays in the procurement processes and contract execution of infrastructure projects. While there are global estimates, such as from the International Monetary Fund (IMF) (Schwatz et al. 2020), of cost increases in infrastructure projects, there is less evidence about the extent of delays during procurement and contract execution, their causes, and their impact.

The impact of delays on the outcomes of infrastructure investment can be considerable, in terms of delaying the realization of both the potential revenues generated by an infrastructure project and its social and economic benefits to business and local communities. Earlier research by Flyvbjerg (2014) into megaprojects indicates that only 0.2 percent of megaprojects analyzed were on time, within the planned budget and on track to achieve the anticipated benefits. For example, the £18 billion Elizabeth railway line in London opened more than two years after the original planned completion date, with Transport for London estimating lost revenue of around £1 billion (Lydall 2019). A study of the Texas road sector looking into the direct and indirect impacts of delays in three projects identified delay costs ranging between US$96,000 per month for the smallest of the projects and US$447,000 for the largest (Beaty at al*.* 2011).

Within this context, and in light of the gap in evidence on delays specifically linked to procurement and contract execution, the objective of this study is to analyze the reasons for delays in procurement and contract execution of infrastructure projects using available data. It addresses the evidence gap by analyzing procurement and contract execution information and data from three different sources. In particular, it looks at:

- **the incidence and extent of delays in the procurement** of World Bank infrastructure projects, based upon tender data for a sample of 656 works contracts extracted from the World Bank Systematic Tracking of Exchanges in Procurement (STEP).

[8] https://outlook.gihub.org/

- **the reasons for delays in procurement and contract management at the contract level**, based upon a sample of 312 works contracts for infrastructure projects financed by the World Bank and the Islamic Development Bank (IsDB).
- **the reasons for delays at the project level for infrastructure projects,** with a focus on those linked to the procurement processes and contract execution stage, [9] based on the review of 480 infrastructure projects across 12 member countries which participate in the CoST – the Infrastructure Transparency Initiative. Each of these projects was subject to an in-depth, independent review using the CoST assurance process. This complemented the more in-depth examination of the process of procuring and executing contracts that was provided by the World Bank and IsDB datasets.

[9] A project may include more than one contract. Thus, the analysis looked at all contracts in the project.

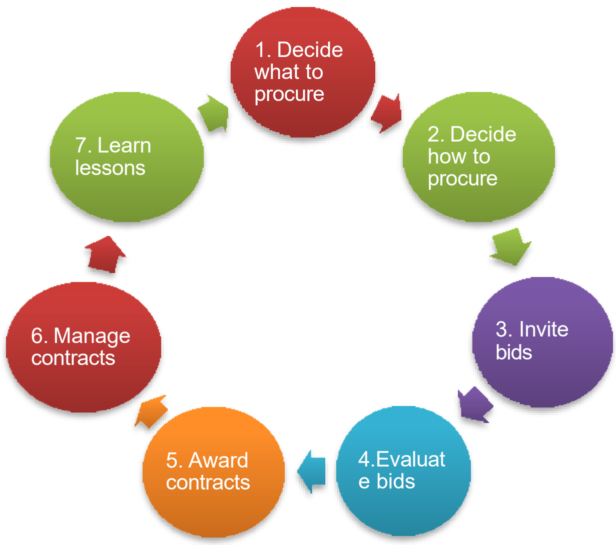
2. Understanding Infrastructure Procurement

When studying the nature of delays in infrastructure projects and their underlying reasons, it is important to distinguish between delays that occur at the project level, and those related to the procurement and contract execution of individual contracts within a project. In the case of a major project, there would in many cases be a need to procure specific services or works for project appraisal, design of the works, construction of the works, contract administration, and supervision of the works.

The procurement of each of these activities carries several forms of risk which ultimately can be a driver of delay, including:

- **Contract-level risks:** resulting from the procurement of individual contracts that form part of the same project. A common example of such a risk would be when the procurement approach adopted results in too many, or too few bids, undermining performance and giving rise to delays. These also include risks associated with the implementation of specific contracts.
- **Project-level risks:** resulting from poorly procured and managed projects[10] which impact on the implementation of the project and the execution of individual contracts. A common example would be when shortcomings during project preparation and design result in delays during implementation of the main works contract.

Figure 2.1 Stages of Procurement



Source: World Bank.

[10] A project may include more than one contract.

2.1 Stages of Procurement

The term "procurement" relates to the whole process of designing and fulfilling contracts for the provision of goods, services, or works (see Glossary in Appendix C). As illustrated in Figure 2.1, six stages are typically recognized in a procurement system. Stage 6, "Manage contracts", is of particular importance when procuring infrastructure works. It is good practice to set out the early stages of procurement in a procurement plan that identifies, clarifies, and consolidates requirements, while determining timeframes for their procurement, with the aim of ensuring that each element is in place as and when required.

Ideally there is an additional stage, "lessons learned", intended to facilitate continuous improvement in procurement strategies and practice. It is important to note that different stages can be the responsibility of different institutions and individuals, and procurement process does not end until all provisions of the contract have been fulfilled.

Shortcomings within, or between, any stage of procurement can lead to two broad categories of drivers of delays. These are:

- **Immediate drivers of delay**: these generally relate to a lack of capacity (in terms of access to the necessary finance, skilled resources, and equipment, together with the appropriate means of bringing those resources to bear effectively) to fulfil project requirements in a timely manner. It is normally linked to a cause of delay that emerges at the same stage of procurement where it was identified. An example would be a delay in evaluating tenders due to lack of capacity on the part of those responsible for evaluation.
- **Deferred drivers of delay**: these arise when a shortcoming at one stage of procurement may even expedite progress in the short term but gives rise to later delays and other problems further down the project cycle. It is normally linked to a cause of delay that relates to deficiencies in project processes. An example would be incomplete, inaccurate, or inconsistent tender documents, which could be traced back to poor tender processes and would result in significant delays at subsequent stages of procurement.

Both immediate and deferred drivers of delay can also be associated with non-transparent practices. A contractor with low capacity to perform, for example, may be selected because of vested interests in the tender process. A slow pace of work can be imposed to increase supervision costs, and a lack of social consultation can be a strategy to avoid accountability. Delays can also derive from the incompetence of the client which commissioned the infrastructure, the supervisor managing the project, and the contractor. This can occur when resource allocation is inefficient and there is a lack of skills and capacity to complete the project.

As motivations are often hidden, it can be hard to distinguish non-transparent from incompetent practices. The dichotomy of immediate and deferred drivers offers a practical lens to assess delays by putting the emphasis on the root causes of delays without the challenge of investigating hidden motivations. This study identified the stage of the infrastructure cycle to which the associated driver of the delay was most likely connected, regardless of where in the cycle the consequences may have later arisen. Looking at underlying causes of delays is essential both to develop adequate mitigation methods and to ensure successful outcomes in procurement and contract execution.

3. Methodology

This study aimed to explore the drivers of delay during the procurement and contract execution stages of global infrastructure projects (see Figure 2.1) is based on a strong body of evidence. From the outset, the possibility of including data from international financing entities other than the World Bank was explored. The expanded data set included Islamic Development Bank (IsDB) and CoST data. CoST had conducted assurance reports for some projects that could be analyzed to consolidate the drivers of delays in procurement and contract execution in its member countries.

Three sources of data were employed (from the World Bank, IsDB and CoST) based on their availability of information and quality of data. The approach used for the study was therefore as follows:

- Literature review
- Analysis of the incidence of delays in the procurement cycle in selected World Bank infrastructure works contracts.
- Analysis of the reasons of delays in procurement and contract execution in selected World Bank and IsDB infrastructure works contracts.
- Analysis of existing CoST assurance reports.
- Focus group discussion meetings.

3.1 Literature Review

The study began with a thorough literature review. The literature review covered 19 papers and was conducted to identify the common reasons to explain the drivers of delays in procurement and contract execution of infrastructure projects. The literature review principally focused on contract level procurement risks and looked to obtain data from a broad range of geographies. A summary of the review of main findings is in section 4 and more discussion is included in Appendix A.

3.2 Analysis of the incidence of delays in the procurement cycle in selected World Bank infrastructure contracts

The study analyzed procurement data for a sample of 656[11] infrastructure works contracts (value US$20.8 billion) obtained from the World Bank Systematic Tracking of Exchanges in Procurement (STEP). This sample was used to analyze the incidence and extent of delays in World Bank-financed infrastructure projects and identify the stages in which the delays occurred. These 656 contracts were selected based on availability of reliable data on tender dates and completeness of the associated records.

[11] 59 contracts valued at US$4.4 billion of the 656 are also part of the 312 contracts mentioned in section 3.3.

To the extent possible, for each of the contracts, dates were verified based on official documents such as bid evaluation reports, signed contracts, and contract amendments filed in STEP. The final sample, which covered the period 2013−2022, has contracts whose contract value ranged from US$5 million to US$813 million, and is comprised of only works contracts from World Bank infrastructure projects with complete and accurate data on the main milestones in the procurement process. Therefore, the sample and the empirical results presented in this report are not necessarily representative of all World Bank infrastructure projects. Furthermore, the analysis was limited to the information available in contract and procurement documents, which was an additional potential bias to the results. For example, if a contract had some missing dates in the procurement cycle from the STEP data, it was not included in the analysis on the incidence and extent of delays. Additionally, about 27%[12] of the STEP sample contracts were signed during the COVID-19 pandemic and thus COVID-19 restrictions may have served as an additional factor impacting average actual milestone durations and the incidence and extent of delays in the tender process during that period. (See Appendix B for more details.)

Using the rich information registered in STEP on planned and actual dates of procurement milestones, delays in a milestone (such as contract signing date) were calculated as the difference in days between the actual milestone date and the date of the same milestone in the procurement plan.

3.3 Analysis of World Bank and IsDB contract Data

The study also assessed the reasons for delays within a sample of 312[13] infrastructure works contracts financed by the World Bank (54%) and the IsDB (46%). The value of the World Bank contracts is US$6.8 billion. The IsDB sample includes large-value contracts with available information on the reasons of delays in procurement or contract management[14]. The data on the World Bank contracts were initially selected from STEP and further cleansed to include only those contracts for which information on the reasons of delays and tender dates were available in project files[15]. This resulted in the exclusion of some contracts from the analysis because of lack of data, though these contracts may have had substantial delays.

Contracts from across the globe were selected; however, some regions had more contracts than others. Also, some countries had more contracts in the sample than others. Europe and Central Asia, Africa, and South Asia were the top three regions with the highest number of contracts in the sample.

For the sample of World Bank and IsDB contracts, an extensive manual review of project documents was conducted to identify the reasons of delays, including aide-memoires, procurement plans, implementation completion reports, STEP data, government documents,

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[12] Contracts signed on or after March 11, 2020, when WHO declared COVID-19 pandemic.

[13] 59 contracts financed by the World Bank and valued at US$4.4 billion of the 312 are also part of the 656 contracts mentioned in section 3.2.

[14] Value of the IsDB sampled contracts were not available to the team.

[15] In addition to World Bank data and information validated/provided by the project task team.

and public information. Missing data and information were clarified with the World Bank project task team for specific projects. Reasons for delays were categorized based on the responsible stakeholders and the stages of procurement cycle.

The final sample covers contracts whose contract-value ranged from US$1 million to US$416 million, the period 2007−2019 so that the results are not biased by the exceptional circumstances due to the Covid-19 pandemic. The final sample comprised only works contracts from World Bank and IsDB infrastructure projects with information about delays in procurement and contract execution, and therefore it was not necessarily representative of all World Bank and IsDB infrastructure projects. Furthermore, the analysis was limited to the information available in project documents, which was an additional potential bias to the results. For example, if a relevant reason for delay in procurement and contract execution was not documented in the project files analyzed, this reason was not picked up in the analysis.

In this dataset, in order to identify contracts that experienced delays, delays were defined as the difference in days between the actual completion date and the contractual completion date of a contract.

3.4 Analysis of CoST Assurance Reports

The analysis used CoST assurance reports from 2016 to 2020[16] covering 480 infrastructure projects from 12 CoST members. This sample was used to analyze the incidence and reasons of delays for the reviewed infrastructure projects.

Previously, the projects were independently reviewed by local technical experts using the CoST assurance process[17], which highlights key issues of concern based on the evidence obtained from the data and information published and made available by the procuring entity. This then allowed project-level risks to be identified as well as contract-level procurement risks.

From each assurance report, information was extracted on project characteristics including: the scope of work, sector, value, procuring entity, procurement method, source of funding, percentages of time and cost overruns, and reasons for the delays in the tender process and contract execution. Assurance reports that did not disaggregate the information per project were not included in the analysis given the difficulties in attributing the information to individual projects.

Delays were calculated comparing actual and contractual duration of the construction contracts [18] . The assurance reports relied on information in the public domain, such as contract start date and completion date, plus additional information provided by procuring entities. As the assurance reports contained a detailed analysis of project implementation, this information is used to look into immediate and deferred drivers that could compromise

[16] Pre COVID 19 start date.

[17] See the CoST website at https://infrastructuretransparency.org/our-approach/core-feature-assurance.

[18] Definition of delays here is different than what used in analyzing incidents of delays from STEP data, see section 3.2.

on-time delivery of a project. The final sample comprised only infrastructure projects with information available about delays, and therefore it was not necessarily representative of all CoST member countries' infrastructure projects. Furthermore, the analysis was limited to information publicly available or provided by procuring entities in member countries, which was an additional potential bias to the results.

The categories of delay were then linked, based on the team analysis, with the stage of the project cycle to which the associated driver of the delay was most likely connected, regardless of where in the project cycle the consequences may have arisen. For example, a design issue may have become apparent during the execution of the works contract, but it most likely referred to a failure during the planning stage, the consequences of which were deferred to a later stage of the project cycle. Similarly, issues of contractors' liquidity or a contract budget that became insufficient to cover the scope tendered may have only showed at implementation, but it could be associated with a tender process that failed to carry out adequate due diligence on bidders and the bidding conditions. Depending on the underlying reasons, the same category of delay might be considered an immediate or a deferred driver, as in the case of a contractor capacity issue. This could relate to a temporary technical challenge by the contractor (an immediate driver) or it could be due to inadequate due-diligence processes in a tender that failed to identify a suitable bidder (a deferred driver).

Each category of delay identified in an assurance report was included in the data collection table, with often multiple reasons for delay identified on any one project. Where this arose, it was not possible to identify the primary driver of the delay. To avoid the complexities of critical-path analysis, the drivers of delays were considered to work as concurrent causes of delay.

There were 82 projects where no delays were reported. There were also instances where, despite the absence of delays, the assurance report indicated the presence of one or more drivers of delay based on the categorization applied. In those situations, regardless of not counting as a delayed project, the study included the category to assess potential long-term impact, particularly in ongoing projects.

Despite the above limitations, the assurance reports provided a rich narrative to assess project delays. They were a valuable source of information that brought new elements to understand contributing factors to project delays. They also shed light on the risk of mismanagement on project overruns. Although CoST assurance is not aimed at attributing culpability, and integrity challenges are not expressly mentioned in the reports, a higher level of insights was gained through assessment of the assurance evidence. This helped to understand where delays might be connected to conflicts of interest and potential questionable behavior during the implementation of projects. These points are addressed in the next section.

3.5 Focus Group Discussion Meetings

As a complement to the above analysis, focus groups discussions were also organized for the purposes of triangulating findings with the opinions of experts working in the field. One such discussion convened informed experts from seven CoST member countries to gather their perspectives on both the nature and the causes of delays based on the published CoST assurance reports, and the extent to which the study's findings reflected their experiences and understanding of the sector. A second focus group discussion workshop was also with World Bank governance specialists to solicit their feedback on the findings emerging from the analysis.

4. Literature Review Findings

Prior literature on the reasons of procurement delays in public infrastructure projects is largely based on perception or experience surveys, with a few papers analyzing procurement and contract data to validate their findings. A summary of the literature review is provided in Appendix A.

The literature clearly highlighted that delays in the procurement and execution of construction contracts are a global phenomenon. In their analysis of 260 papers, Rivera et al. (2017) identify that on average, 74% of construction projects worldwide were delayed. Of these, project duration was on average 42% longer than the original contract duration for construction. When broken down by region, Europe had the lowest percentage of projects delayed but, when there was a delay, the length of the delay was longer than any other region (see Table 4.1). This may be due to the value and complexity of the projects in a very densely populated part of the world.

Table 4.1 Percentage of Construction Projects Delayed and Length of Delays

Region	Percentage of projects delayed	Length of delay as percentage of original contract duration for construction
Africa	75%	53%
North America	98%	37%
Asia	68%	37%
Europe	53%	55%
Middle East	79%	30%

Source: Rivera et al. (2017).

Seven key reasons for delay that commonly arise during the procurement and execution of construction contracts emerge from the literature review. Table 4.2 shows how many of the reviewed papers referred to each of the seven drivers.[19] Those related to funding constraints and delayed payments were the most frequently mentioned, being highlighted in 17 of the 19 papers. Changes to design and scope of work; shortage of materials, equipment, and manpower; and weak project and contract management were each identified in 16 papers. Each paper typically identified up to 10 drivers of delay and would often rank them in order of importance. To capture this, Table 4.2 also counts the number of times that a driver of delay appears within papers' top three drivers of delay. Across all reviewed papers, the top three drivers of delay were: (i) weak project and contract management, (ii) changes to design

[19] It should be noted that the reasons listed in this table are not exhaustive. Reasons such as unforeseen site conditions, force majeure, fraud and corruption, delays in decision-making, additional work (not linked to initial design), financial difficulties of contractor (not related to delays in payment from employer), obsolete or unsuitable construction methods, utility diversions, etc. are less commonly appearing, and therefore are not included in table. Additionally, some factors, though separately listed in papers, were assessed to be a subset of those listed in Table 4.2. For example, disputes between contractor and employer were due to either weak contract management or inappropriate dispute resolution mechanisms in contracts. Similarly, delays due to price variations of materials were assessed to be due to not including price adjustment provisions in contracts or using wrong indices or weights.

or scope, and (iii) funding constraints or delayed payments.[20] These are highlighted in blue tint in Table 4.2

However, it is important to note that the drivers mentioned in the literature were not necessarily the underlying drivers of delay, with deferred drivers potentially being responsible. For example, an outdated project design identified during execution was more likely to be linked to a poor or inadequate design process and occur at an earlier stage of the project cycle. Identifying the stage of the project cycle that is closely connected to the origin of the delay is paramount to getting clarity on the underlying drivers of delay and knowing how to tackle them efficiently.

Table 4.2 Drivers of Delays Identified in Literature Review

Drivers for delays	Paper reference number																			Number of papers identifying the driver	Number of papers identifying the driver as a top three driver
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
Land has not been acquired or the construction site is unavailable		√	√	√	√				√									√	√	7	4
Statutory approvals from government agencies have not been obtained.			√	√	√				√			√			√			√	√	8	1
Issues arising during tender and contract award process		√	√	√		√	√	√	√	√	√	√		√			√	√	√	14	2
Employer has funding constraints or there are delayed payments to contractor	√	√		√	√	√		√	√	√	√	√	√		√	√	√	√	√	17	8

[20] Top three drivers of delays are highlighted in Table 4.2

Project design or scope of work is changed during construction	√	√	√	√		√	√	√		√	√	√		√	√	√	√	√	√	16	10
Contractor has a shortage of materials, equipment, and manpower	√	√	√	√		√	√	√	√		√	√	√	√	√	√		√	√	16	4
Weak project and contract management	√	√	√	√		√	√	√	√		√	√		√	√	√	√	√	√	16	13

Source: World Bank.

5. Data Analysis Findings

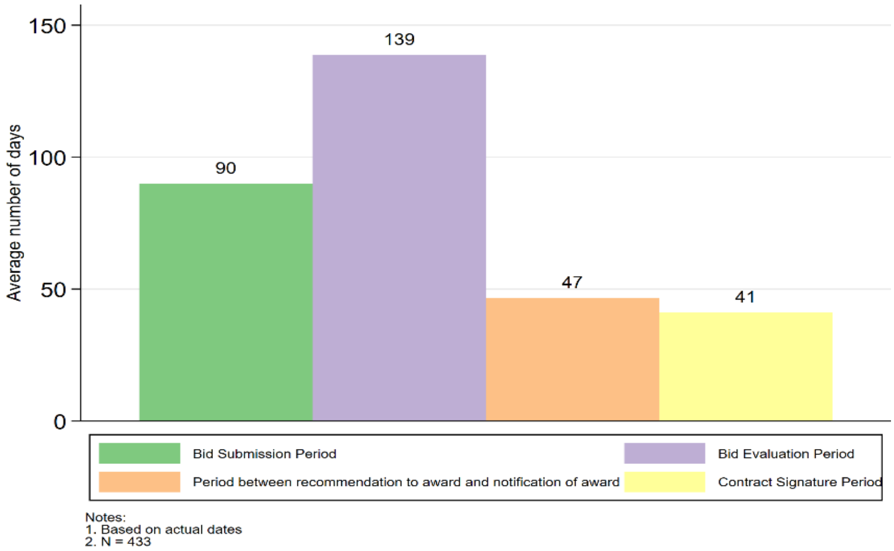
5.1 Incidence and extent of delays in the procurement of World Bank infrastructure projects

Using STEP data, delays in each stage of the tender cycle were calculated as the difference between the actual date of a milestone and the relevant planned date for each procurement activity in STEP. The analysis focused on two key milestones, the date of the procurement notices and the contract signature date.

Overall, the analysis finds that an important share of contracts experience delays. While approximately 44 percent of the contracts in the sample did not experience any delay in the issuance of the procurement notice, about 20 percent experienced delays of more than 120 days. At contract signature, 22 percent of the contracts in the sample did not experience any delay at contract signature, while about 28 percent experienced more than 270 days of delays.

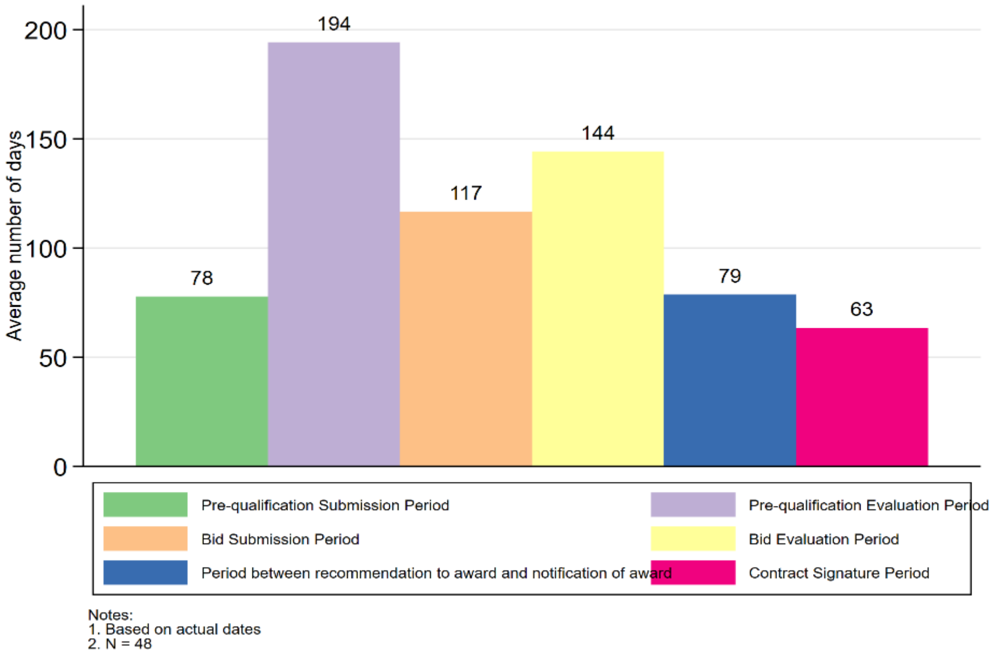
By stage, the evaluation period was the stage that experienced the longest average actual duration across all procurement procedure types (Figures 5.1–5.3). Single-stage two-envelope tenders experienced the longest average duration (more than three months) for contract signature among all procurement procedures (Figure 5.3). In light of these results, governments may need to focus more on shortening the duration of the prequalification evaluation stage and the bid evaluation stage, and for single stage bidding on the preparation of tender documents. It would also be important to monitor the time necessary for contract signature, so that contracts are signed within 30 days after the contract award.

Figure 5.1 Average Duration of Single-Stage One-Envelope Tenders



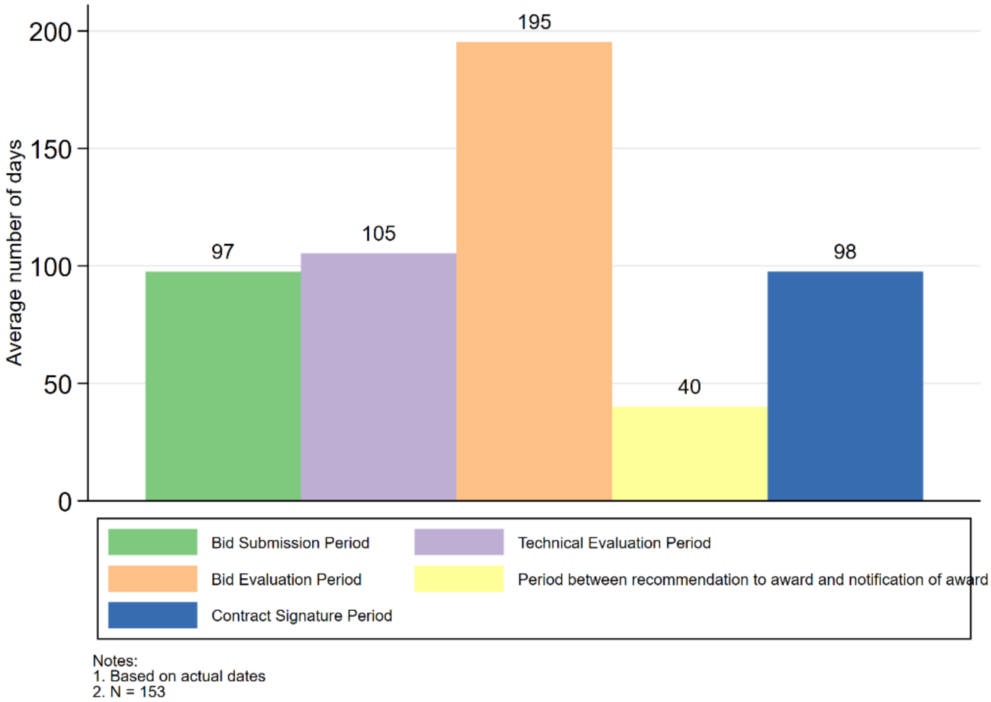
Source: World Bank.

Figure 5.2 Average Duration of Single-Stage One-Envelope Tenders with Prequalification



Source: World Bank.

Figure 5.3 Average Duration of Single-Stage Two-Envelope Tenders



Source: World Bank.

Table 5.1 shows the average planned duration for different stages in a tender cycle for different procurement methods. It is interesting that for the same milestone, the average planned duration is different for different procurement methods[21]. For example, planned contract signature duration ranged from 33 to 98 days. This indicates that governments need to focus on preparing proper procurement plans.

Table 5.1 Average Planned Duration for Different Tenders

Period	Average planned duration (days) (N is sample size)			
	Single-stage one-envelope tenders	Single-stage one-envelope tenders with pre-qualification	Single-stage two-envelope tenders	Two-stage tenders with pre-qualification
Bid submission	90 (N = 401)	117 (N = 47)	97 (N = 141)	
Bid evaluation	139 (N = 394)	144 (N = 48)	195 (N = 138)	
Between contract award and notification award	47 (N = 330)	79 (N = 39)	40 (N = 126)	138 (N = 4)
Contract signature	41 (N = 346)	63 (N = 36)	98 (N = 139)	33 (N = 4)
Technical evaluation			105 (N = 145)	
Pre-qualification submission		78 (N = 35)		72 (N = 4)
Pre-qualification evaluation		194 (N = 33)		101 (N = 4)
Stage one bid submission				116 (N = 4)
Stage one bid evaluation				173 (N = 4)
Stage two bid submission				31 (N = 4)
Stage two bid evaluation				138 (N = 4)

Source: World Bank.

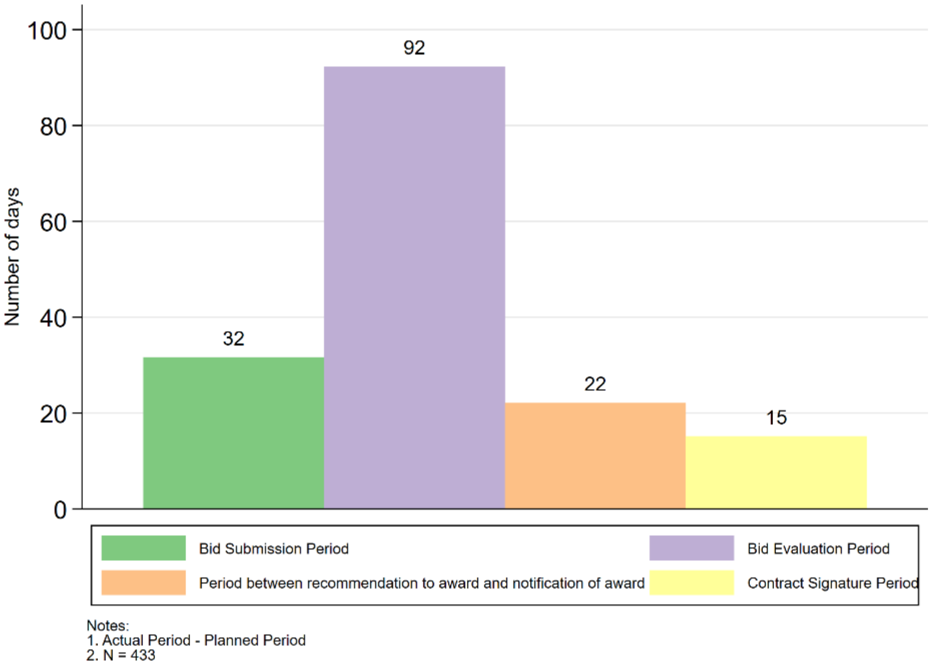
Across the different types of procurement procedures, the procurement stage with the longest delay [22] was the evaluation stage (whether prequalification evaluation or bid evaluation) (Figures 5.4–5.6), indicating that it warrants close monitoring. The use of e-Government procurement may help in monitoring these stages and alert senior officials if evaluation committees take longer than the client's agreed standard.

Further analysis (e.g., impact of procurement risk, contract value, type of associations between bidders, and COVID-19 pandemic, as well as cost overrun) of the STEP tender data is provided in Appendix B.

[21] One would expect that for the procurement methods listed in Table 5.1 similar periods are planned.

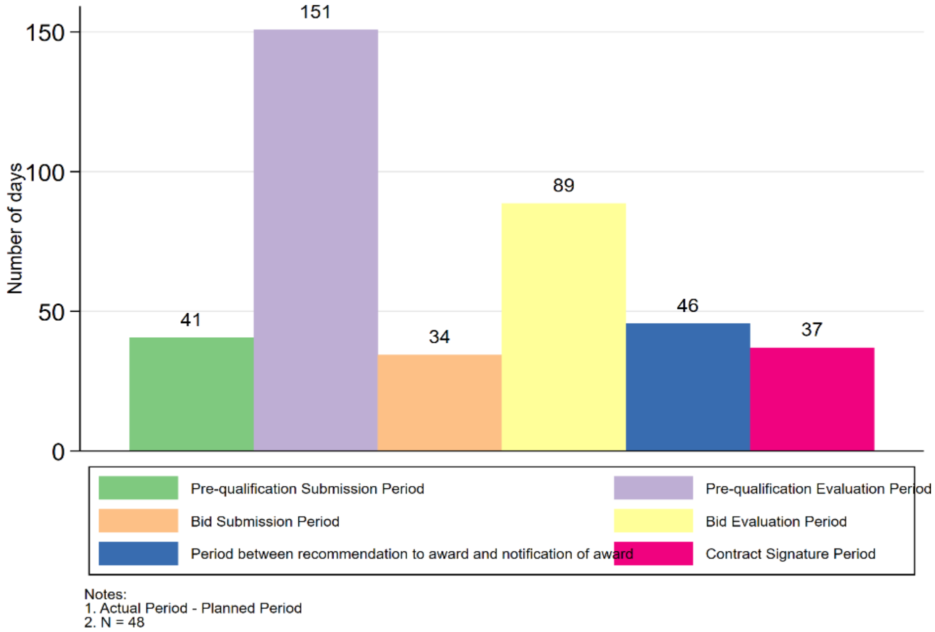
[22] One could also argue that the planned evaluation periods were not realistic and were overoptimized.

Figure 5.4 Average Delays in Stage Duration for Single-Stage One-Envelope Tenders



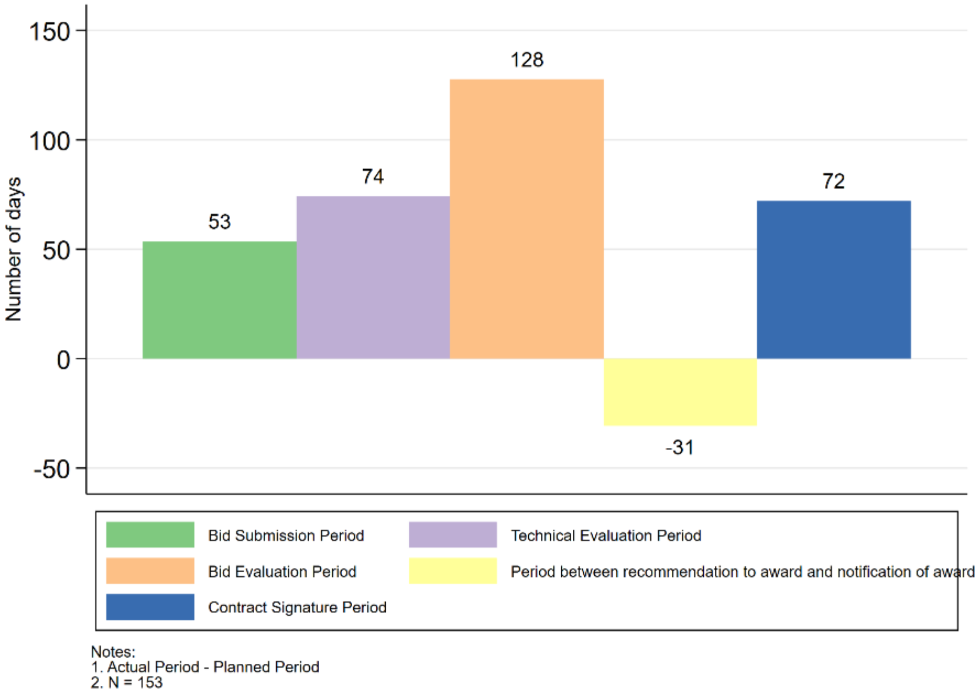
Source: World Bank.

Figure 5.5 Average Delays in Stage Duration for Single-Stage One-Envelope Tenders with Prequalification



Source: World Bank.

Figure 5.6 Average Delays in stage duration by Stage for Single-Stage Two-Envelope Tenders



Source: World Bank.

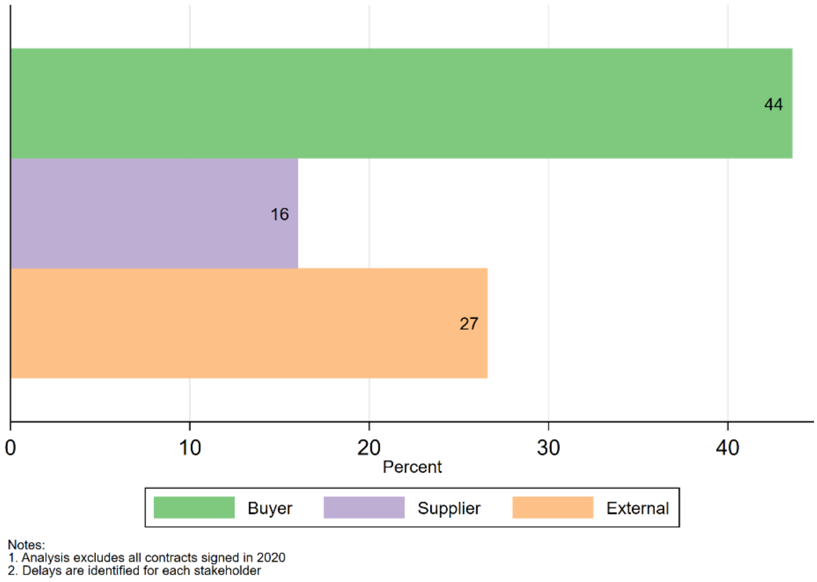
5.1 Reasons for delays in procurement and contract execution

For approximately half (53 percent) of the 312 World Bank and Islamic Development Bank (IsDB) sample contracts, the project documents included at least one reason for delay in procurement and contract execution. Implementing entities/buyers were responsible for the delays in most of the contracts (44 percent), while 27 percent and 16 percent of the contracts experienced delays attributed to external stakeholders and contractors/suppliers respectively (Figure 5.7). Almost half (46 percent) of the contracts experienced delay at the contract execution stage while for about 36 percent it was at pre-planning and pre-tender stages. Only 5 percent of the sample experienced delays during the actual tender process (Figure 5.8).

The most frequent reasons for the delays attributed to buyers are: (i) weak procurement capacity (13 percent), (ii) weak contract management capacity (11 percent), and (iii) low quality of feasibility report (8 percent). The most frequent reasons for the delays attributed to the contractor/supplier included: (i) weak contract administration (6 percent), (ii) lack of resources (5 percent), and (iii) liquidity issues (3 percent). Among the most frequent reasons for the delays attributed to external stakeholders were: (i) delay in approval by other departments (6 percent), and (ii) force majeure situations and events (10 percent) (see Table 5.2).

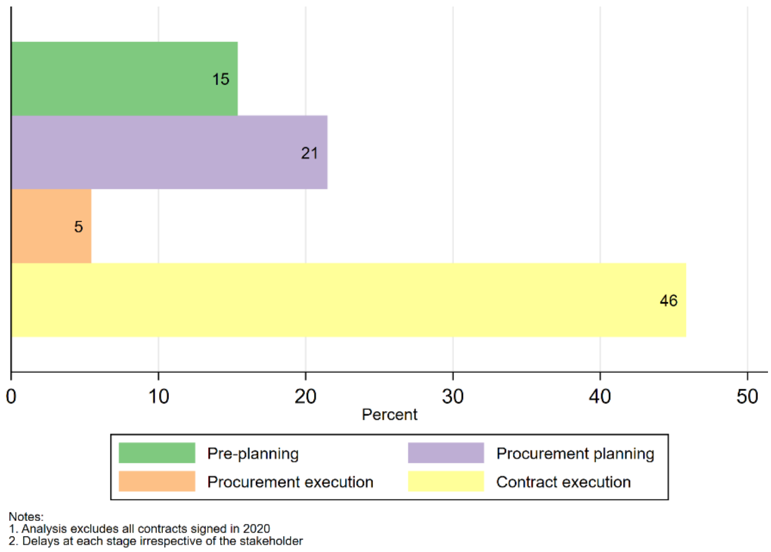
The most frequent reasons for delays are different for work contracts above US$100 million (Table 5.3). For these contracts, the top three reasons for the delays attributed to buyers are: (i) low quality of feasibility report (38%); (ii) weak procurement capacity (17%), and (iii) change in scope of work (13%).

Figure 5.7 Stakeholder Responsible for Delay



Source: World Bank and IsDB.
Note: Percentages do not add up to 100% since a contract may have experienced several delays attributed to various stakeholders or may have experienced no delays.

Figure 5.8 Stage of Procurement Cycle with Delay



Source: World Bank and IsDB.
Note: Percentages do not add up to 100% since a contract may have experienced several delays attributed to various stakeholders or may have experienced no delays.

Table 5.2 Rank of Reasons for Delays for All Contracts

Delay	Percentage
Due to implementing entity/buyer	
Weak procurement capacity (I.e., leads to inadequate bidding method, inadequate prequalification system, ambiguous or incomplete tender document, and inadequate type of contract)	13%
Weak contract management/administration capacity	11%
Poor quality of feasibility report	8%
Land acquisition and resettlement issues	5%
Change in scope	5%
Modification in scope of service due to change in scope	5%
Delay in related works	5%
Inadequate baselining, lack or poor planning, and outdated schedule of rates	4%
Due to contractor/supplier	
Weak contract administration	6%
Lack of resources (such as material issues, machine Issues, and manpower issues)	5%
Liquidity issues	3%
Due to external stakeholder	
Delay in approval by other departments (such as environment clearance, social issues, and permits)	6%
Force majeure situation (such as political)	5%
Force majeure event (such as Covid-19)	5%
Delay in others works	4%
Unforeseen geological issues	4%

Source: World Bank and IsDB.

Table 5.3 Rank of Reasons for Delays for Contracts Valued Over US$100 Million[23]

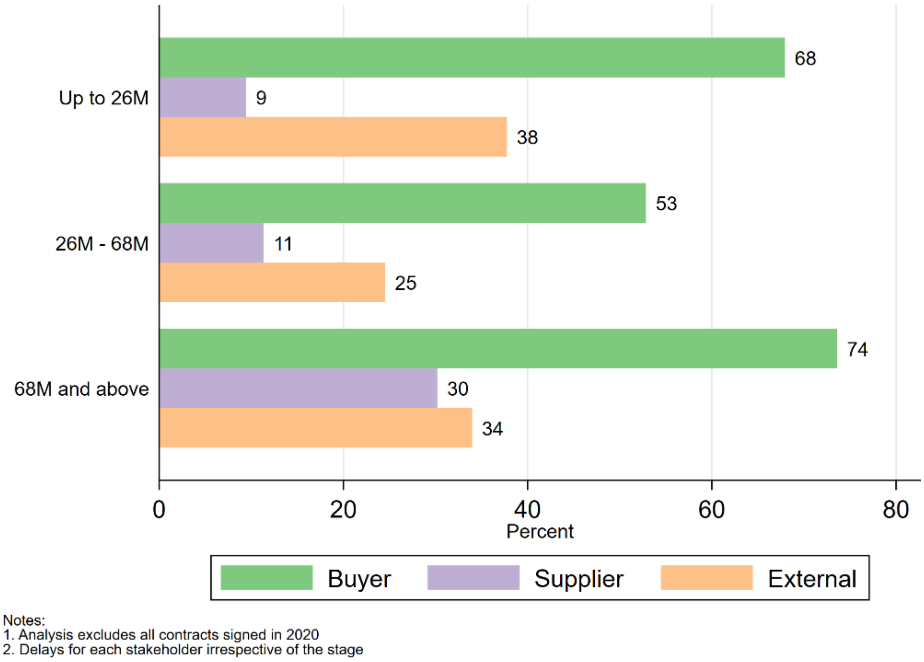
Delay	Percentage
Due to implementing entity/buyer	
Low quality of feasibility report	38%
Weak procurement capacity (I.e., leads to inadequate bidding method, inadequate prequalification system, ambiguous or incomplete tender document, and inadequate type of contract)	17%
Modification in scope of service due to change in scope	13%
Due to contractor/supplier	
Others	13%
Lack of resources (such as material issues, machine Issues, and manpower issues)	4%
Weak contract administration	4%
Non-compliance with contract	4%
Due to external stakeholder	
Delay by financial institution in issuing no objection	13%
Delay in approval by other departments (such as environment clearance, social issues, and permits)	13%
Relocation of utilities	8%
Delay in counterpart funding	8%

Source: World Bank and IsDB.

Across all regions, and regardless of the value of the contract, the majority of reasons for delays available in project documents indicated that the delay was attributable to the buyer (Figure 5.9) and that the delay occurred during the contract execution stage (Figure 5.10).

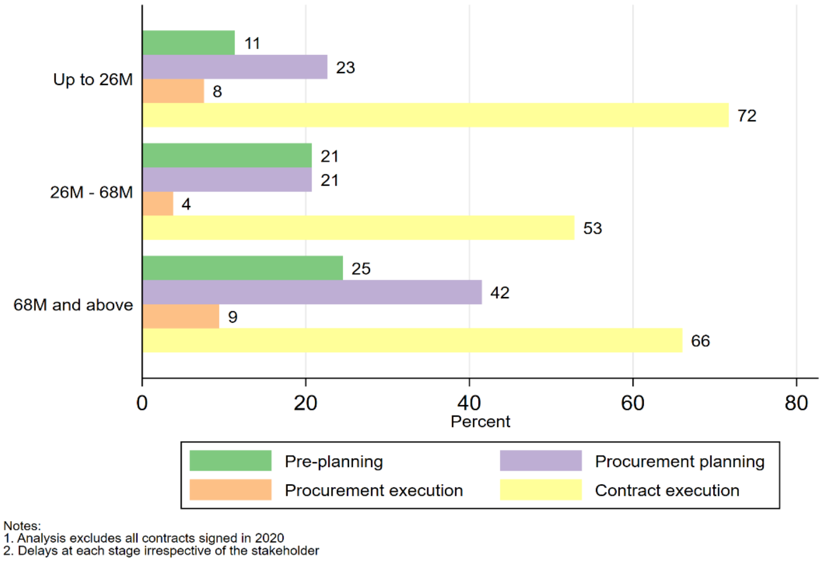
[23] 29 contracts valued at US$5.8 billion from the World Bank data set.

Figure 5.9 Reasons for delays by Stakeholder and Contract Value (US$)



Source: World Bank and IsDB.
Note: Percentages do not add up to 100% since a contract may have experienced several delays attributed to various stakeholders or may have experienced no delays.

Figure 5.10 Reasons for Delays by Stage and Contract Value (US$)



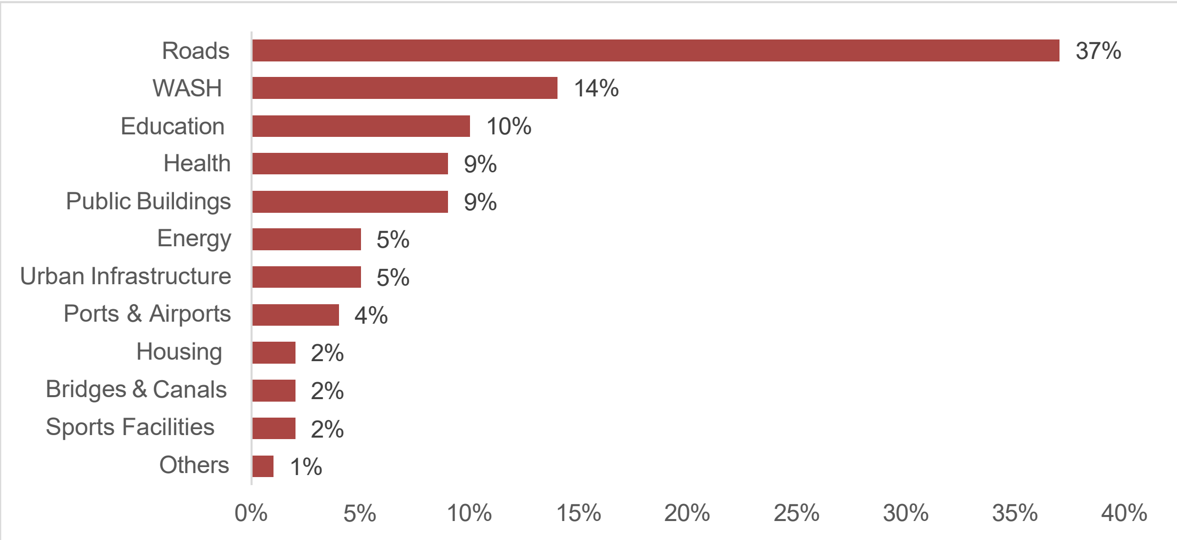
Source: World Bank and IsDB.
Note: Percentages do not add up to 100% since a contract may have experienced several delays attributed to various stakeholders or may have experienced no delays.

5.3 Reasons for delays linked to procurement at the project level for infrastructure projects

The analysis focused on CoST assurance reports[24] from 12 countries that covered a sample of 480 projects, totaling US$12 billion in public investment. Projects included a variety of sectors (Figure 5.11) and geographies (Latin America and the Caribbean 46 percent, Africa 35 percent, and Europe and central Asia 19 percent), with road projects accounting for 37 percent. Of the 480 projects assessed, 205 (43 percent) reported delay to the initial contracted dates for construction, 186 (39 percent) lacked information on delays, and 82 (17 percent) of projects had no reported delays.[25]

Based on the analysis, the reasons for delay were grouped by CoST around the different stages of the project cycle: project preparation, tender, and contract execution (Table 5.4).[26] Figure 5.12 summarizes the reasons for delays in the three project stages.

Figure 5.11 Sectors of Projects in CoST Assurance Reports



Source: CoST.
Note: WASH means water, sanitation, hygiene projects.

[24] See the CoST website at https://infrastructuretransparency.org/our-approach/core-feature-assurance.

[25] As highlighted in Section 3.4, the final sample comprised only infrastructure projects with information available about delays. Therefore, this sample is not necessarily representative of all CoST member countries' infrastructure projects, and the statistics on the incidence of projects with delays may be biased.

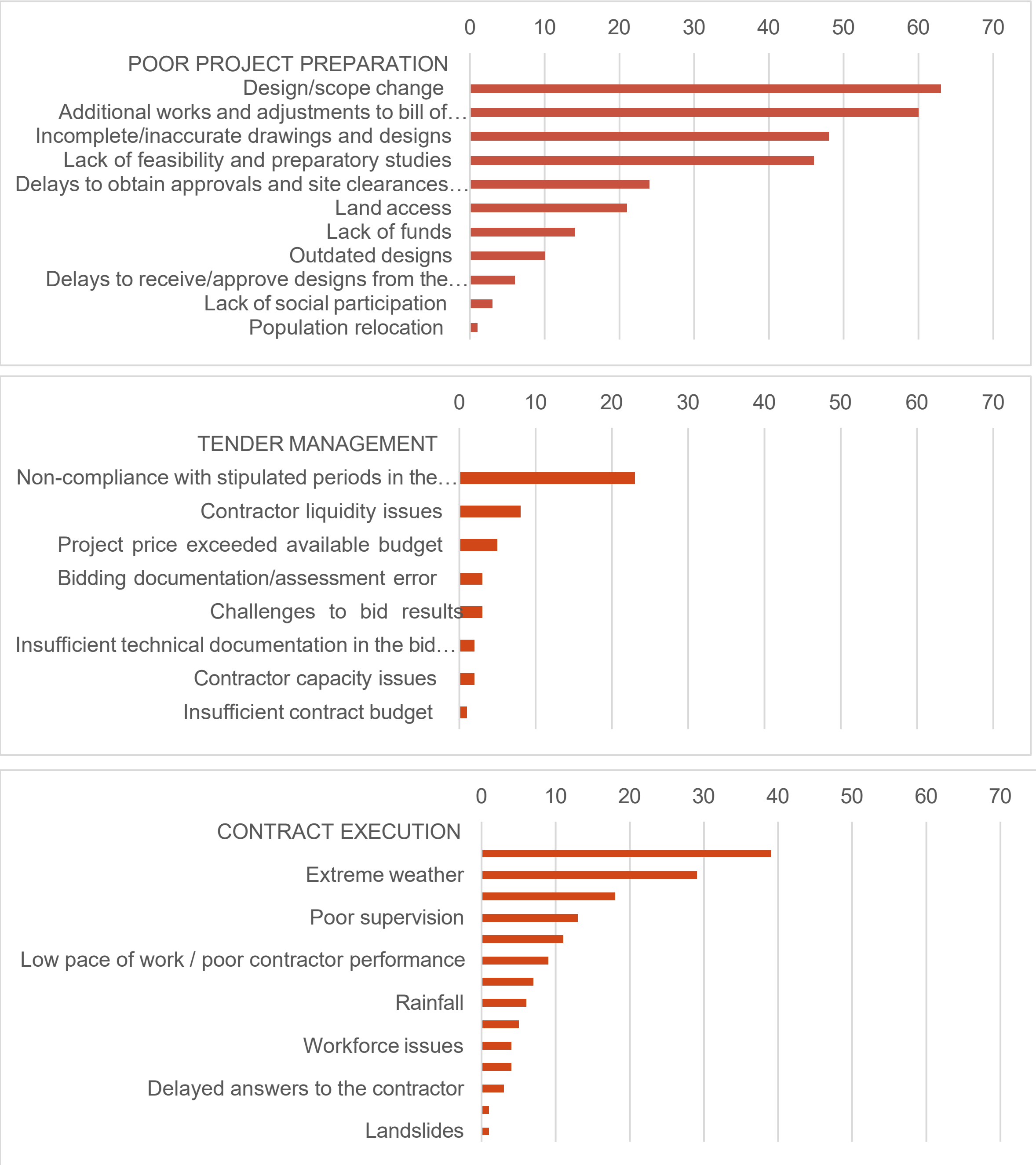
[26] The definitions of "project risks" and "contract risks" are reported in Appendix C.

Table 5.4 Categories of Delay Identified in CoST Assurance Reports

Project stage	Immediate delays	Deferred delays
Project preparation	• Design/scope changes • Additional works and adjustments to bills of quantities • Lack of funds	• Incomplete or inaccurate drawings and designs • Lack of feasibility and preparatory studies • Outdated designs • Land access • Delays to obtain approvals and clearances to start work on site • Delays to receive/approve designs from the procuring entity • Lack of social participation • Population relocation • Lack of funds
Tender	• Non-compliance with stipulated periods in the procurement law • Contractor liquidity issues • Contract price exceeded available budget • Contractor capacity issues	• Bidding documentation/assessment error • Challenges to bid results. • Insufficient technical documentation in the bid process • Insufficient contract budget • Contractor capacity issues • Contractor liquidity issues
Contract execution	• Slow pace of work/poor contractor performance • Contractual disputes	• Delayed payment to contractor • Extreme weather • Covid-19 • Poor supervision • Lack of equipment and materials • Political instability • Rainfall • Poor site coordination • Workforce issues • Delayed answers to the contractor • Change in contractor instructions. • Landslides

Source: CoST.

Figure 5.12 Summary Analysis of Reasons for Delays in CoST Assurance Reports

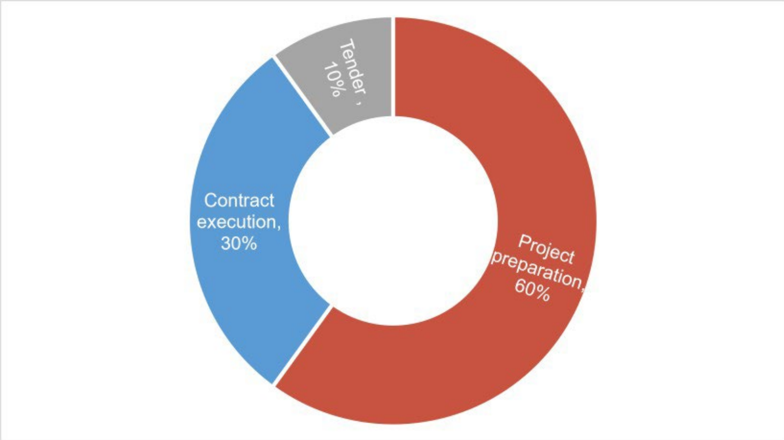


Source: CoST.

There were more drivers of delay during project preparation (60 percent) than during tender (10 percent) and contract execution (30 percent) (Figure 5.13). The finding is largely due to the high percentage of deferred drivers of delay identified, such as incomplete and inaccurate drawing and design, the lack of feasibility and preparatory studies, and outdated designs.

The classification between immediate and deferred drivers of delay helps to understand how delays propagate down the project cycle. Issues related to preparation stages were likely to drive the high number of design and scope changes as well as additional works and adjustments to rates and quantities, which were categorized as immediate drivers.

Figure 5.13 Allocation of Delays During the Project Cycle



Source: CoST.

The CoST data also provided examples of how weak project preparation can potentially affect the integrity of the process. Considering the relevance of project preparation in determining the success of the following stages, an increased focus on project design with adequate feasibility analysis, a well-defined scope of work, and coherent time schedules would avoid incomplete projects going to tender and execution. The higher the project complexity, the higher the need of a planning process that integrates project vision and goals and translates this into measurable targets at contractual level (see Box 5.1). This could substantially reduce the incidence of project delays and help control potential opportunistic behavior during tender and contract execution.

Box 5.1 Planning Lessons from London 2012

The legacy of the London 2012 Olympics can be seen as an example that investing in adequate planning and project preparation can mitigate delays. The speed and complexity of the event required an iterative master planning and design process that allowed a flexible but robust planning system to accommodate design changes without undermining tender and construction timescales. This was achieved with a masterplan vision that was translated, from the outset, into measurable targets for sustainable development, standards for inclusive design, and deadlines. These were then embedded at contractual level and monitored at every stage of the design, tender, planning, and delivery process.

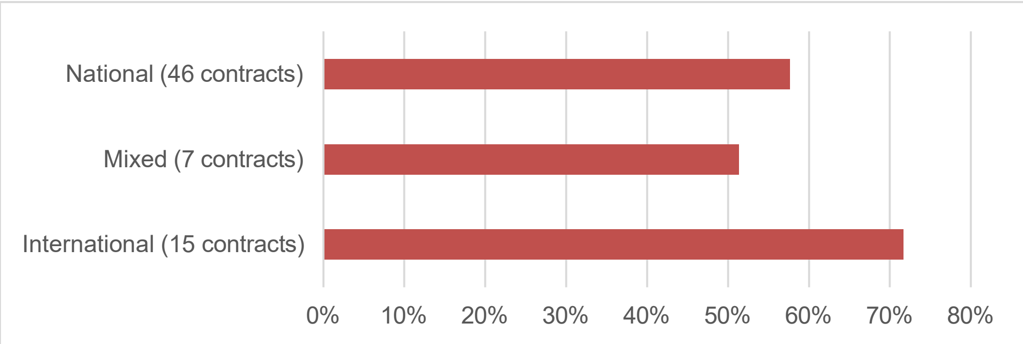
Source: Olympic Delivery Authority (2011).

Context also has an impact on the type of delays encountered. Weather and security issues are two examples. Some countries, which experience climate change with more intensity, reported delays associated with extreme weather conditions and rainfall more often than other countries. Security issues and political instability, on the other hand, have only been reported in fragile contexts. The focus group discussion further identified this as a critical issue.

Sector characteristics also played a role in determining the categories of delay, with land issues and delays to obtain approvals and clearances reported more frequently in road projects. Delayed payments to the contractor were reported with more frequency in contracts above the threshold of US$1 million, which reiterated the importance of adequate financial planning as projects increased in size and complexity.

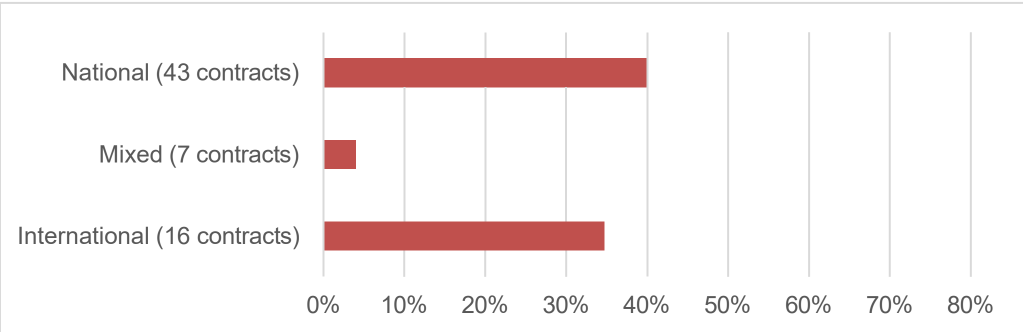
The funding source and tender method are two additional variables worth mentioning despite the low number of contracts where information was reported. In the roads sector, internationally funded projects experienced higher averages of time overruns than domestically funded projects, but lower cost overruns (Figures 5.14 and 5.15). In general, road projects procured through open bidding reported less delay than projects procured using restricted and direct bidding processes (Figure 5.16).

Figure 5.14 Average Time Overrun on Road Contracts by Funding Source



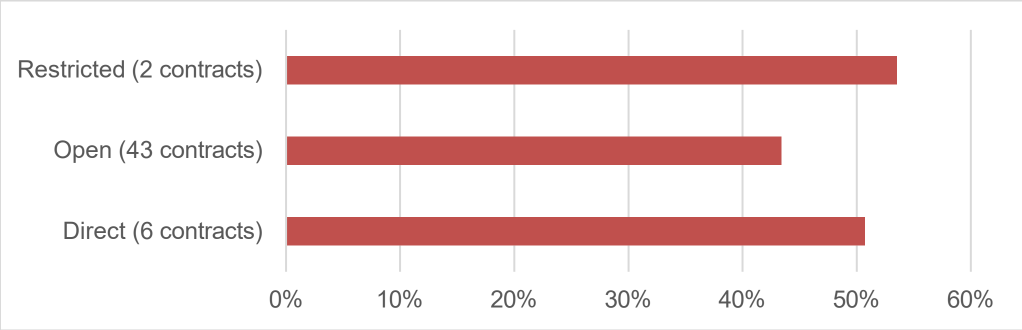
Source: Cost

Figure 5.15 Average Cost Overrun on Road Contracts by Funding Source



Source: Cost

Figure 5.16 Average Time Overrun on Road Projects by Procurement Method



Source: Cost

For the contract execution stage, however, a high number of delays were identified, with late payments to the contractor having the highest incidence. As with changes to project design, delayed payments were likely to be driven by underlying deferred drivers, such as projects implemented without budget approval, resulting in severe consequences during implementation. The issue of project delays was found in other geographies and sectors. In the health sector, previous CoST research indicated that a lack of financial planning was a common issue found in 30 percent of healthcare projects subject to the CoST assurance (Prada and Broyd 2020).

Information from the CoST reports also show that the impact of weather on project implementation can be substantial. Past research has shown that in the UK weather could extend projects by an average of 21% due to decreased productivity, damage to constructed elements, and difficulties in accessing site locations (Ballesteros-Pérez at al. 2018). The assurance data captured instances of delays associated with weather conditions, which included cases of severe impact caused by storms Eta and Iota that hit Central America in November 2020.

However, it is important to note that only in a few cases (four projects) was weather identified as the sole driver of delay. In most projects, the weather impact was combined with other causes of delay, normally some form of planning shortcoming. Adjustments to the bill of quantities and design changes were common categories of delay emerging in combination with the weather impacts.

The review of the assurance reports also identified that factors which are often considered drivers of delay can be present in circumstances where projects do not record time overruns. Although representing a minority of cases (34 of 82 projects), this included delays to award of the works contract, incomplete designs, design modification, additional works, delayed payments, site coordination problems, land and resettlement issues, and security issues.

Overall, the assurance findings reinforced two important considerations for contract implementation. First, the relevance of contract management: even when projects were on time, an identified driver of delay could later become a cause of overrun if not managed correctly. Second, and in line with industry perceptions, once drivers of delays manifested, the likelihood that an overrun would impact project delivery was high. Based on the CoST assurance data, the chances of a project being kept on time in the presence of a driver of such a delay was less than 10 percent.

Despite the role played by mitigation measures to recover delays, analysis of the assurance reports highlighted the importance of preventative measures aimed at avoiding such drivers giving rise to delays in the first place. Project delays tend to be rooted in ingrained practices, for example, a missing planning stage and a lack of a monitoring culture and changing these practices during implementation would be challenging.

Redesigning practices from the outset, by establishing adequate planning, budgetary, and oversight processes for example, have a higher chance of success to avoid delays than continuing to play a catch-up game on mitigation measures or relying on a 10 percent chance of success. A focus on deferred drivers of delay during risk-assessment stages could help change this mentality.

While not covered by the scope of this report, it is worth noting that Public−Private Partnerships (PPPs) have gained in popularity as governments have sought to raise additional finance to fund their infrastructure needs. Multilateral and bilateral development banks offer technical assistance to improve the planning of PPPs. The World Bank, the Asian Development Bank, and the Japan International Cooperation Agency, as an example, have support facilities for PPP projects, from the planning phase to the implementation phase, involving all related stakeholders including the private sector.

The contractual arrangement between the public and private sector is often highly complex as it sets out the relationship covering the financing, often through user charges as well as the design, build, and operation of the asset. A better understanding of the drivers of delay in PPPs could enable targeted assistance to public and private partners.

6. Key Findings and Recommendations

6.1 Key Findings

Overall, delays in the procurement processes for infrastructure projects seem to be quite common. Based on the analysis conducted on the World Bank Systematic Tracking of Exchanges in Procurement (STEP) data, only about 44 percent of the contracts in the sample did not experience delays in issuing a procurement notice and about 22 percent of the contracts in the sample had no delays in signing the contract. Forty-three percent of the CoST projects analyzed experienced a delay in procurement and contract execution. By stage of the tender cycle, analysis of the actual and planned durations using STEP data show that the procurement stage with the longest delay was the evaluation stage (whether prequalification evaluation or bid evaluation), while prequalification evaluation had the longest duration. Almost half (46 percent) of the sample contracts from selected World Bank and IsDB) experienced delay at the contract execution stage while about a fifth (21 percent) did so at the tender planning stage.

Delays are the results of a combination of internal and external factors. Both the data analyzed, and the literature reviewed point to the impact of institutional capacity for procurement and contract management in delays. Within the data analyzed from selected World Bank and IsDB infrastructure projects', implementing entities were responsible for the delays in most of the contracts (44 percent). Twenty seven percent and 16 percent of the contracts experienced delays attributed to external stakeholders and contractors/suppliers respectively. The top three reasons of delays, which were all attributable to the buyer, were:
(i) weak procurement capacity (such as inadequate procurement methods used, inadequate prequalification, ambiguous or incomplete tender document, and inadequate type of contract) (13 percent), (ii) weak capacity to manage contracts and poor contract management/administration (11 percent), and (iii) poor quality of project feasibility reports (8 percent). In turn, the literature review identified that the top three drivers of delay were:
(i) weak project and contract management, (ii) project design or scope of work is changed during construction, and (iii) employer has funding constraints or there are delayed payments to contractors. Focus group discussions also highlighted the importance of local factors - ranging from security issues, seismic conditions, and weather patterns to currency devaluation driving up the costs of importing construction materials - as significant drivers of delay that need to be identified early on as a project risk.

Looking more broadly across the project cycle using CoST data paints a more nuanced view of the drivers of delay by differentiating between when the drivers manifested themselves versus when their impacts were observed. The analysis of selected CoST assurance reports indicated that delays during project procurement preparation were the most common in project implementation, followed by delays during tender and contract execution. This delay was largely due to the high percentage of deferred drivers of delay identified, such as incomplete and inaccurate drawings and design, the lack of feasibility and preparatory studies, and outdated designs, the implications of which trickled down through the project cycle (where the downstream effects were then observed during contract execution as seen in the analysis of the World Bank and IsDB data as well as in the literature review). In addition, lack of funds was likely to be driven by broader deferred reasons such as projects implemented without budget approval, resulting in severe setbacks in contract execution.

Table 6.1 summarizes the key findings from the literature review, analysis of the CoST assurance reports and World Bank and IsDB project data.

Table 6.1 Top Drivers of Delay

Literature review findings	CoST assurance reports project analysis findings	World Bank and IsDB contract data analysis findings
1. Poor project and contract management 2. Project design or scope of work changes during construction 3. Employer has funding constraints or there are delayed payments to the contractor.	Planning stage: 1. Design and scope changes. 2. Additional works and adjustments to bill of quantities 3. Incomplete and inaccurate drawings and design Contract execution: 4. Delayed payment to contractor Tender: 5. Non-compliance with stipulated periods in procurement law	Attributed to implementing entities: 1. Weak procurement capacity (such as inadequate procurement method, inadequate prequalification, ambiguous or incomplete tender document, and inadequate type of contract) 2. Weak capacity to manage contracts and poor contract management/administration 3. low quality of project feasibility report. Attributed to contractor/supplier: 4. Weak contract administration 5. Liquidity issues Attributed to external stakeholders: 6. Delay in approval by other departments 7. Force majeure situations 8. Force majeure events

Overall, the drivers of delays identified from the World Bank and IsDB project data analysis and from the CoST assurance reports were, in general, consistent with findings of the literature review.

6.2 Key Recommendations

To address the shortcomings driving infrastructure project delays highlighted through the present analysis, the following recommendations are proposed to support policymakers, procurement officials, and project managers to embed good practice into their organizations.

- **Invest in project preparation**: Investing in proper site surveys and complete designs; identifying reasonable timeframes for implementation; ensuring timely access to the construction site, and engagement with local communities will reduce the risks of delays through subsequent stages of the project cycle, including procurement processes. For Bank financed projects, all these issues should be addressed at the time of preparation of the World Bank Project Procurement Strategy for Development (PPSD).[27]

- **Use an adaptable contract framework**: This can be adjusted to manage project risks, promote collaborative working, and help to build trust between the client and the supply chain. To achieve this, it is important to select the right type of contract and a proper procurement method. For Bank financed projects, this should be addressed at the time of preparation of the PPSD.

- **Ensure financing/cashflow through the supply chain:** Procurement processes are better initiated only after the entire budget is committed. This avoids "supply chain financing", reducing the risks of liquidity failures and unfinished projects from an inadequate budget and delayed payments.

- **Adopt risk management tools:** Using a project risk tool throughout the project cycle can help to proactively manage potential procurement risks and reduce the opportunities for delay, especially during the bid evaluation stage. This is a dynamic exercise which should continue until closure of the contract.

- **Develop capacity and skills:** training on procurement and contract management will help to improve project preparation, planning and tendering; develop appropriate contractual frameworks; manage project risks; and execute contracts to deliver quality infrastructure. Preparation of a national training strategy on procurement and contract management would be useful.

- **Establish/enhance an e-Government procurement (eGP) system:** The use of digital procurement and contract management systems wherever possible can support timely actions, facilitate approvals and enhance transparency. Establishment (or enhancement) of an eGP system which includes a contract management module for efficient procurement implementation and contract monitoring and management is important.

[27] For PPSD guidance and templates, see the World Bank Procurement Framework webpage at https://www.worldbank.org/en/projects-operations/products-and-services/brief/procurement-new-framework.

The functioning eGP system should ideally be integrated with other systems such as payment and accounting.

- **Invest in data collection and analytics systems:** Access to a digital dashboard compiling and analyzing available data is important for enabling decision-makers and senior managers to have not only a bird's-eye view of project performance but also to drill-down to contract-level information if needed. The eGP can be very useful in this regard.

- **Disclose tender award results and contract performance data[28]:** Putting such information in the public domain can help to make stakeholders such as civil society, media, auditors, and taxpayers aware of delays, which may put pressure on both employers and contractors to take remedial actions to address the delays.

Further studies would help better understand the drivers of delay and to develop good practice. These include:

- **Mapping potential indicators that can identify patterns of delay** to help improve data standardization and disclosure, so that open-data platforms can generate meaningful insights. Data standardization is currently still not optimal and procurement portals do not produce quality information on delays.

- **Carry out research into the drivers of delay in public-private partnerships (PPPs)** to better understand how problems with the finance model can drive delays and whether such approaches and the stakeholders are better able to manage the risk of delay than conventional publicly financed infrastructure.

- **Explore the linkages between delays and a lack of trust** among citizens and contractual and project parties, focusing on how trust could be built through improved transparency and participation in the sector.

[28] For countries that do not have appropriate public discourse of contract awards and contract performance.

Appendix A: Summary of the Literature

The literature summarized in Table A1 is rated as 1, 2 or 3. Papers rated 1 are robust analyses most relevant to the current study. Readers may want to prioritize reviewing these sources if they have limited time. Papers rated 2 are also relevant and of generally good quality. Those rated 3 are less relevant, may have unclear methodology or may be more than 10 years old, but are included because they address a key dimension not adequately covered by other sources or underpin the general thrust of the literature review. Note that ratings are not a judgement of academic quality, they indicate the relevance of the paper to the current purpose. Table A1 also highlights the top three drivers for delays in procurement and contract execution identified in each paper.

Paper 4 by Hariharan and Sawant (2012) stood out for its quality as the authors triangulated project data with findings from a survey. They also used the findings to assess the drivers in terms of project and contractual risk, understanding that some practices such as lowest price bidding could have unintended consequences.

There were a further two studies on performance in the Indian construction sector. Paper 18 by the Project Management Institute, KPMG India and the Indian Ministry of Statistics and Programme Implementation (2019) had a very useful set of recommendations that supported the broad thrust of this research, with a focus on investing in pre-planning, adopting a collaborative approach, strengthening contract management, and embedding a culture of risk management. Paper 19 is an unpublished internal study by the World Bank (n.d.) that used project data to assess the reasons for both cost increases and project delays.

Paper 16 by Kaliba, Muya and Mumba (2009) also examined data, and attributed responsibility for the drivers between the client, contractor, and consultant. Likewise, Paper 17 by Olawale and Sun (2010) used data to define a list of 90 factors that influence cost increases and delays before carrying out interviews and a survey of the UK construction industry. It also outlined some useful preventative measures, including having detailed designs at the outset, identifying project risks before the project starts, corrective measures to help bring a situation back on track, and organizational measures such as adopting partnering and collaborative working.

Most papers provided useful evidence based on perception surveys from a broad range of countries including Egypt, Ghana, India,[29] Jordan, Malaysia, Pakistan, Portugal, and Vietnam that helped to build an overall picture of the drivers of delays. Except for Portugal and Vietnam, these countries have similar professional roles and contractual systems as the UK, where separate contracts are signed with the participants (design and engineering partnerships, professional surveyors, contractors, subcontractors, and suppliers of materials and components). These are based on historically defined roles for the architect, engineer, quantity surveyor, and builder, with separate responsibilities for planning and designing the

[29] Six of the 19 papers reviewed were from India.

structure, constructing the asset, and supervising the construction (Hawkins 2013). Each participant belongs to a separate commercial unit, often with competing commercial objectives and no contractual responsibility to each other. Although the participants are expected to comply with various control mechanisms (such as managing the cost and time of contractual changes) set out in their contracts, these mechanisms can be ineffective (Hawkins 2012). Where control mechanisms are weak, or have broken down, an environment is created where there is a greater risk of delays. Further research is required of civil-code jurisdictions across Europe, Latin America, and Francophone Africa, where the professional roles and contractual system can be different.

There were also three studies that took a more global perspective, assessing the literature from several countries. The most notable was Paper 1 by Rivera et al. (2017), which assessed the reasons for non-performance based on an extensive literature review of 260 papers.

The literature review for this study largely focused on the issues that cause delays or an increase in cost during the award and execution of construction contracts. Few papers examined the service level contracts for design and/or supervision, nor the broader upstream project appraisal and preparation phase. It is only the papers rated 1 that acknowledged that the poor and inadequate project appraisal and preparation can lead to delays during tender and contract execution.

A few papers tended to focus on the drivers of cost increases or did not differentiate between the drivers of cost increases and the drivers of delay in their analysis. The literature review quite clearly indicated that while there was some overlap in the drivers of cost increase and delay, there were also some differences. For example, price fluctuations of materials, equipment, and labor were consistently highlighted as a risk, but the impact was principally on cost and less about time.

Table A.1 Summary of Literature Review

Paper	Rating	Region / countries	Top three drivers of delay	Synopsis and relevance
1. Rivera et al. (2017)	2	Global	1. Delayed payments 2. Poor project and contract management 3. Shortage of materials and equipment	This paper did not specifically look at the drivers of delays but had a helpful summary of the drivers of poor performance globally, which may consequently lead to delays and an increased cost in construction. The research was based on an extensive literature review of 260 papers, of which 57 papers documented 438 reported issues that could cause non-performance in the construction sector. It highlighted the top ten causes for non-performance. On average, 72 percent of projects were delayed with a 38 percent increase in original contracted duration, and 63 percent of projects experienced cost

Paper	Rating	Region / countries	Top three drivers of delay	Synopsis and relevance
				overruns, with a 24 percent increase in original contracted cost. Additionally, rework was a factor that affected performance and accounted for a 6 percent increase in total project costs. Customer satisfaction on projects was low, and 90 percent of all major issues causing non-performance were due to people.
2. Herrera et al. (2020)	2	Global	1. Failures in design 2. Price variation of materials 3. Inadequate project planning	This systematic literature review focused on the drivers of cost overruns in the roads sector and was included as these drivers may also lead to delays. It analyzed the frequency and importance with which cost overrun factors were reported in road projects. The research method consisted of a systematic review compound of five principal stages: (1) question formulation; (2) searching of relevant documents; (3) document selection; (4) evidence collection, analysis and synthesis; and (5) results' report. Thirty-eight cost overrun factors were identified and classified into 14 categories
3. Kogi and Were (2017)	2	Kenya	1. Land acquisition 2. Poorly defined project scope 3. Poor project management	The study was based on a perceptions survey that focused on determining the factors affecting cost overruns in the Kenyan road sector. It also looked at delays, demonstrating how project schedule affects cost overruns in construction projects, highlighting the three issues left as key challenges. It also explored the effects of contract management on cost overruns in construction projects; examined how resources affect cost overruns in construction projects; and established how government policies influence cost overruns in construction projects. The study concluded that the major factors affecting cost overruns in construction projects in Kenya includes project schedule, contract management, resources and government policies.

Paper	Rating	Region / countries	Top three drivers of delay	Synopsis and relevance
4. Hariharan et al. (2012)	1	India	1. Scope changes 2. Delays in the tender process 3. Poor coordination and commitments from the project participants	This was a robust paper based on project data as well as a short literature review from the previous 20 years. It also placed the issues of time and cost overruns in the context of managing project and procurement risk that few papers seemed to do. It identified that although there is a strong correlation between time and cost overrun, the drivers of time and cost overrun were not the same. While delays were attributed to scope changes, delay in finalization of tender documents, and short bid submission time, lack of commitment of project participants, poor coordination, and so on, cost overrun is attributed to variations between the quantities estimated and executed. The research outcome suggests that Indian construction industry needs to employ innovative technologies and better contract management strategies to overcome surprises and challenges as the project progresses. A shift from the current practices towards electronic tendering process, online contract bidding document, and so on could make the bidding process transparent and evaluation more realistic.
5. Ram and Paul (2015)	3	India	1. Land acquisition 2. Environmental issues 3. Delayed payments	This paper identified the predominate causes and factors that contribute to the sequence of delay in the India roads sector. It listed the top ten reasons for delay and then attempted to categorize them as "excusable" and "non-excusable" delays. It also identified the actor responsible for each cause of delay. Remarkably all non-excusable delays were attributed to the contractor and the excusable delays to the project owner.
6. Omoregie and Radford (2006)	2	Nigeria	1. Price fluctuations 2. Financing and payment of completed works	This paper used survey evidence to critically analyze the causes and effects of project delay and cost escalation in Nigeria. The analysis found that the minimum average

Paper	Rating	Region / countries	Top three drivers of delay	Synopsis and relevance
			3. Poor contract management	percentage escalation cost of projects in Nigeria was 14 percent; the minimum average percentage escalation period of projects in Nigeria was found to be 188 percent with an average percentage completion work of just 96 percent. To enhance the ability to study this disturbing trend in the future, some mathematical relationships to forecast future project delays and cost escalation effects in Nigeria was developed. It was recommended that efficient manpower and material systems, alternative financial strategies and increased contingency allowance pattern in pre-contract estimates be developed.
7. Wanjari and Dobariya (2016)	3	India	1. Price escalation of raw material, 2. Delay in planned activity 3. A lack of co-ordination between construction parties	This survey-based study used a short questionnaire that identified 15 prominent factors responsible for cost overrun. A total of 85 responses were received from 190 invitees from the construction sector. The top three factors affecting cost overruns were price escalation of raw material, delay in planned activity and a lack of co-ordination between construction parties.
8. Al-Mohammad and Jamaludin (2018)	2	Global including Ethiopia, Jordan, Saudi Arabia, Sri Lanka, Sudan, Kenya	Contractor 1. Poor site management and supervision 2. Ineffective planning and scheduling 3. Financial difficulties / insufficient cashflow Owners 1. Issuing change order 2. Delay in progress payments 3. Slow decision-making Consultant	This paper attempted to review past literature on causes of delay in different types of construction. The most common methods adopted by researchers for causes of delay identification were presented according to the actor (contractor, owner, and consultant) which was the source of the delay within an infrastructure project. The top five delay factors were discussed within each category. It concluded that delay caused by the contractor and owner had greater impact than those caused by consultants.

Paper	Rating	Region / countries	Top three drivers of delay	Synopsis and relevance
			1. Late reviewing and approving design documents 2. Incomplete documents and design 3. Poor qualifications and experience of the consultant	
9. Patil (2017)	3	India	1. Delays in land acquisition 2. Regulatory approvals leading to a delay in construction 3. Poor programme management 4. Design and scope changes	This was a short paper based on a master thesis that assessed causes and effects of cost and time overruns in construction projects in India. The evidence was from a limited literature review but is consistent with other papers in the issues it highlights. As well as the drivers of delay, it outlined the most common effects on cost overruns were delay, and supplementary agreement or adversarial relations among stakeholders, and budget shortfall of project owners.
10. Aziz (2013)	3	Egypt	1. Lowest bidding procurement method 2. Additional work 3. Bureaucracy in bidding/tendering method	This research used a survey of practitioners from private, public, and local general construction firms based on a shortlist of 52 factors to identify what are perceived to affect cost variation in the Egyptian wastewater projects with respect to their relative importance.
11. Frimponga, Oluwoyeb, and Crawford (2003)	3	Ghana	1. Monthly payment difficulties from agencies 2. Poor contractor management and technical performance 3. Escalation of material prices	The paper presented the results of a questionnaire survey conducted to identify and evaluate the relative importance of the significant factors contributing to delay and cost overruns in Ghana groundwater construction projects. Respondents of this survey included personnel from owners, consultants and contractors involved in groundwater projects in Ghana.
12. Moura, Teixeira and Pires (2007)	2	Portugal	1. Client liability 2. Design problems 3. Project specifics	This paper reported on a survey conducted among the main construction stakeholders to help clarify the reasons for the low competitiveness of the Portuguese construction industry.

Paper	Rating	Region / countries	Top three drivers of delay	Synopsis and relevance
13. Rahman, Memon, and Karim (2013)	3	Malaysia	1. Fluctuation of prices of materials 2. Cash flow and financial difficulties faced by contractors 3. Shortages of materials	This study focused on identifying significant resource factors causing construction cost overrun and assessed the relationship between these factors. Data collection was carried out through a structured questionnaire survey consisting of 20 factors identified from a comprehensive literature review.
14. Farooqui et al. (2012)	3	Pakistan	1. Poor project management 2. Delay in involvement of contractor during design 3. Poor performance of work	The aim of this paper was to find and prioritize those factors (related to design, location, and management) which could affect construction costs in Pakistan. A total of 82 factors were grouped under the category of location, design, and management. A questionnaire was developed in which respondents were asked to rate the factors in the light of the already defined criteria.
15. Le-Hoai, Lee, and Lee (2008)	2	Vietnam	1. Poor site / project management and supervision 2. Financial difficulties of owner and contractor 3. Design changes	This was one of the better papers that looked to understand the reasons for delays and cost overruns in Vietnam and the different roles involved. The research employed a questionnaire survey to elicit the causes of this situation by interviewing 87 Vietnamese construction experts. Twenty-one causes of delay and cost overruns appropriate with building and industrial construction projects were inferred and ranked with respect to frequency, severity, and importance indices.
16. Kaliba, Muya, and Mumba (2009)	1	Zambia	1. Delayed payments 2. Financial process 3. Financial difficulties 4. Contract modifications	Using a detailed literature review, structured interviews and questionnaire surveys, the results of the study confirmed the prevalence of cost escalation and schedule delays in road construction projects in Zambia. It is rated as 1 as it also identified some selected projects where it made some observations about the performance. The study established that bad weather, scope changes, environmental protection and mitigation costs, schedule delay, strikes, technical challenges, inflation and local government

Paper	Rating	Region / countries	Top three drivers of delay	Synopsis and relevance
				pressures were the major causes of cost escalation. Fourteen drivers of delay were identified, and it was interesting that the contractor and client were each responsible for six of the drivers with the consultant responsible for two.
17. Olawale and Sun (2010)	2	UK	1. Design changes 2. Risks/uncertainties 3. Inaccurate evaluation of project time/duration	A survey was conducted on 250 construction project organizations in the UK, followed by face-to-face interviews with experienced practitioners from 15 of these organizations. The common factors that inhibited both time and cost control during construction projects were first identified. Subsequently 90 mitigating measures were developed. Some mitigating measures were set out and classified as preventive, predictive, corrective, and organizational measures. They could be used as a checklist of good practice and help project managers to improve the effectiveness of control of their projects.
18. Project Management Institute, KPMG India, and Ministry of Statistics and Programme Implementation (2019)	1	India	1. Design/scope change 2. Inadequate baselining/ lack of planning 3. Land acquisition, utility shifting and local agitation	This report used data from the Indian Ministry of Statistics and Programme Implementation. It analyzed performance of infrastructure projects (including case studies) from different sectors, identifies the key reasons for time and cost overruns and their impact. The analysis had some useful conclusions and recommendations on how performance can be improved. These included: (i) investing heavily in pre-planning and site investigation, (ii) implementing collaborative and agile planning, (iii) reforming procurement process and strengthening contract management, (iv) implementing lean construction principles for productivity improvement, and (v) embedding a culture of risk management, from concept to commissioning.
19. World Bank (n.d.)	1	India	1. Contractor capacity	This unpublished study was commissioned to identify the

Paper	Rating	Region / countries	Top three drivers of delay	Synopsis and relevance
			2. Land acquisition 3. Delay in mobilization	reasons for cost and time overruns in civil works contracts in transport, water, urban, and energy projects in India. This involved in-depth analysis of secondary data collected from contract files supported by desk research and interviews with key stakeholders. A total of 84 contracts (cumulative value US$3.42 billion) were selected for analysis, out of which 41 contracts were financed by the World Bank, 28 by the Asian Development Bank, 14 by the Japan International and one by state government. Regarding sector, 68 percent of the contracts were for transport projects, 17 percent were water, 14 percent urban, and 1 percent energy. A mix of types of contracts (such as priced, engineer-procure-construct, and public-private partnerships) were studied.

Appendix B: Analysis of World Bank STEP Data

B.1 Overall Findings

Analysis of the 656 large value infrastructures contracts from the World Bank Systematic Tracking of Exchanges in Procurement (STEP) data showed that nearly half of the contracts were rated as having substantial procurement residual risk (47 percent) (see Table B1).

Contractors were equally likely to be either domestic (49 percent) or international (45 percent), with 80 percent of the contracts being with a single contractor. Looking at the origins of contractors and their structure, approximately equal shares of contracts with a single contractor are domestic versus international contractors, and similarly joint ventures are relatively evenly split between domestic, international, and combination domestic and international contractors. Two thirds (66 percent) of contracts were procured using single-stage, one-envelope tenders and 23 percent were procured using single-stage, two-envelope tenders.

Table B.1 Characteristics of Sampled Contracts

Characteristic (N is sample size)	Frequency	Percentage
Risk (Number of sample (N) = 656)		
High	95	14.48
Low	68	10.37
Moderate	185	28.2
Substantial	308	46.95
Value (N = 656)		
< US$7.3 million	132	20.12
US$7.3 million - US$11.4 million	131	19.97
US$11.4 million - US$18.3 million	131	19.97
US$18.3 million - US$41.9 million	131	19.97
> US$41.9 million	131	19.97
Region (N = 656)		
Africa (AFR)	293	44.66
East Asia and Pacific (EAP)	37	5.64
Europa and Central Asia (ECA)	67	10.21
Latin America and Caribbean (LCR)	38	5.79
Middle East and North Africa (MNA)	9	1.37
South Asia (SAR)	212	32.32
Supplier origin (N = 656)		
International	291	44.51
Domestic	321	48.78
Domestic and international	44	6.71
Contractor structure (N = 656)		
Single	545	83.08
Joint venture	111	16.92
Contractor structure and origin (N = 656)		

Characteristic (N is sample size)	Frequency	Percentage
Single, international	260	39.63
Single, domestic	286	43.45
Joint, all international	31	4.73
Joint, all domestic	35	5.34
Joint, domestic, and international	44	6.86
Procurement notice delay (N = 600)		
No delay	262	43.67
1-30 days	103	17.17
31-120 days	115	19.17
>120 days	120	20
Contract signature delay (N = 626)		
No delay	135	21.57
1-90 days	143	22.84
91-270 days	175	27.96
>270 days	173	27.64
Procurement procedure type (N = 656)		
One stage, one envelope	433	66.01
One stage, one envelope with prequalification	48	7.32
One stage, two envelopes	153	23.32
Two stages, with prequalification	4	0.61
Direct procurement	18	2.74

Source: World Bank.

Table B.2 Characteristics of Contracts by Procurement Procedure

Characteristic (N is sample size)	One stage, one envelope		One stage, one envelope with pre-qualification		One stage, two envelopes		Two stages with pre-qualification		Direct procurement	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Risk (N = 656)										
High	81	18.71	7	14.58	5	3.27	0	0	2	11.11
Substantial	191	44.11	24	50	83	54.25	1	25	9	50
Moderate	116	26.79	7	14.58	56	36.6	2	50	4	22.22
Low	45	10.39	10	20.83	9	5.88	1	25	3	16.67
Value (N = 656)										
< US$7.3 million	96	22.17	1	2.08	31	20.26	0	0	4	22.22
US$7.3 - US$11.4 million	93	21.48	1	2.08	34	22.22	0	0	3	16.67
US$11.4 - US$18.3 million	88	20.32	4	8.33	32	20.92	0	0	7	38.89
US$18.3 - US$41.9 million	81	18.71	13	27.08	30	19.61	4	100	3	16.67
> US$41.9 million	75	17.32	29	60.42	26	16.99	0	0	1	5.56
Region (N = 656)										
AFR	240	55.43	24	50	17	11.11	2	50	10	55.56
EAP	32	7.39	1	2.08	3	1.96	0	0	1	5.56
ECA	61	14.09	2	4.17	1	0.65	0		3	16.67
LCR	33	7.62	1	2.08	1	0.65	2	50	1	5.56
MNA	7	1.62	2	4.17	0	0	0	0	0	0
SAR	60	13.86	18	37.5	131	85.62	0	0	3	16.67
Contractor origin (N = 656)										
International	218	50.35	36	75	24	15.69	2	50	11	61.11
Domestic	177	40.88	11	22.92	124	81.05	2	50	7	38.89
Domestic and international	38	8.78	1	2.08	5	3.27	0	0	0	0
Contractor structure (N = 656)										

Characteristic (N is sample size)	One stage, one envelope		One stage, one envelope with pre-qualification		One stage, two envelopes		Two stages with pre-qualification		Direct procurement	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Single	350	80.83	40	83.33	135	88.24	4	100	17	94.44
Joint	83	19.17	8	16.67	18	11.76	0	0	1	5.56
Contractor structure and origin (N = 656)										
Single, international	194	44.8	31	64.58	23	15.03	2	50	10	55.56
Single, domestic	156	36.03	9	18.75	112	73.2	2	50	7	38.89
Joint, all international	24	5.54	5	10.42	1	0.65	0	0	1	5.56
Joint, all domestic	21	4.85	2	4.17	12	7.84	0	0	0	0
Joint, domestic and international	38	8.78	1	2.08	5	3.27	0	0	0	0

Source: World Bank.

B.2 Delays in Tender Dates

Delays in tender dates were explored, with a focus on delays in procurement notice and contract signature, by looking at the difference between actual and planned dates to determine the extent to which actual dates were close to the planned dates. Substantial deviation between the planned and actual dates was considered a significant delay. [30]

On average, there was a substantial difference between actual and planned dates of contract signature with contracts procured using prequalification (Figure B.1). Contracts with single-stage, one-envelope tenders were likely to experience a significant difference between actual dates and planned dates during the procurement notice stage.

Contracts signed during COVID-19 pandemic experienced longer delays, as expected due to restrictions in movement and slow supply chain, than those signed before COVID-19 pandemic, see Table B.3.

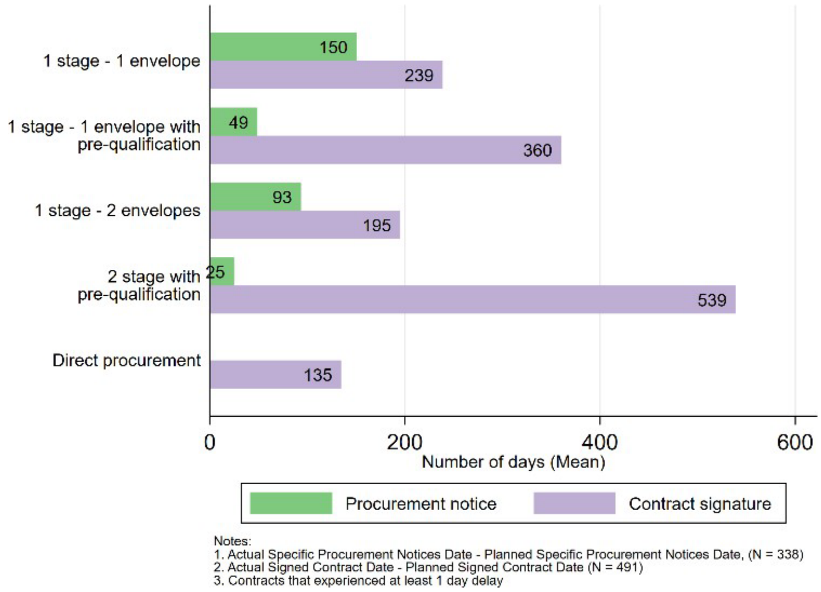
Table B.3: Impact of COVID-19 on Procurement Cycle and Extent of Delays

Procurement procedure	Average Duration of Actual Procurement Cycle (days)		Average Delay (days) in Contract Signature		Average Delay (days) in Procurement Notice	
	Before COVID-19	During COVID-19	Before COVID-19	During COVID-19	Before COVID-19	During COVID-19
One stage, one envelope	322	307	201	328	128	197
One stage, one envelope with prequalification	758	768	281	488	24	64
One stage, two envelopes	393	375	131	294	64	125
Two stages, with prequalification		959		539		25
Direct procurement	56	162	113	168		

N = 656 of which 175 contracts signed during COVID-19 pandemic.
Source: World Bank.

[30] Delays of 150 days or more were considered significant.

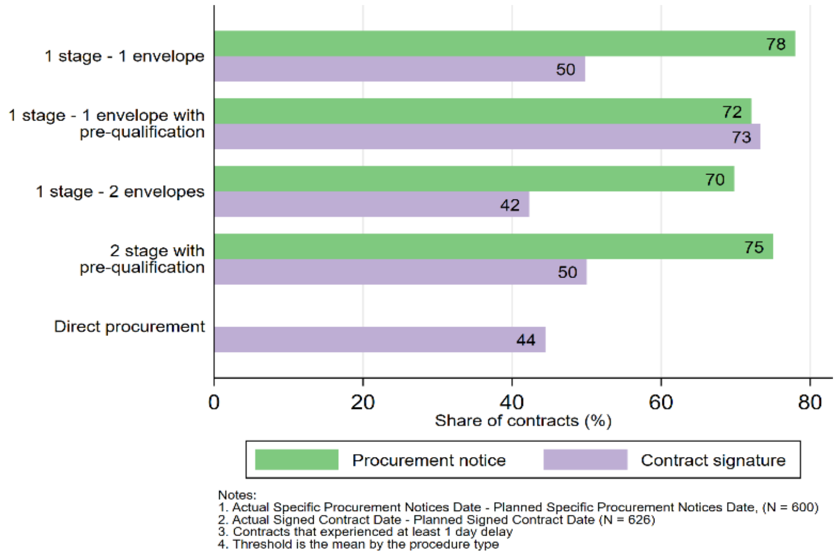
Figure B.1 Average Days Between Actual and Planned Procurement Notice and Contract Signature Dates by Procurement Procedure



Source: World Bank.

Overall, contracts were more likely to have delays in issuing a procurement notice (difference between actual and planned procurement notice dates) above the mean, with contracts procured using single-stage, one-envelope tenders experiencing the largest share (78 percent) of delays (Figure B.2). Contracts using single-stage, one-envelope tenders with prequalification experienced a substantial difference in actual and planned contract signature dates above the mean (73 percent).

Figure B.2 Share of Contracts with Difference in Actual and Planned Procurement Notice Dates Above the Mean by Procurement Procedure

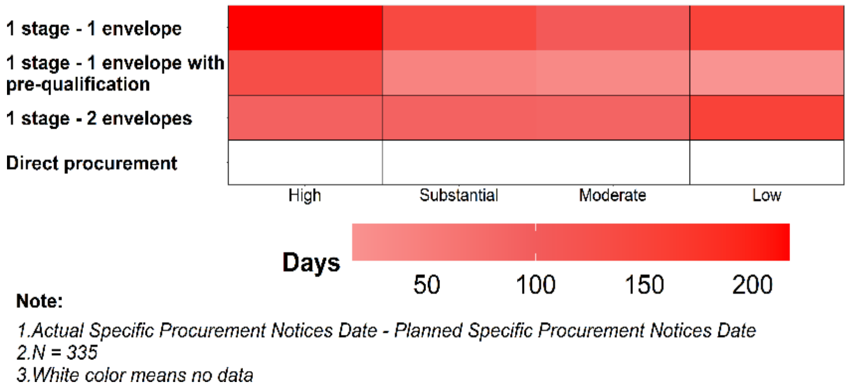


Source: World Bank.

Procurement Risk

Contracts procured using a single-stage, one-envelope procedure with high procurement risk were likely to have significant difference in actual and planned procurement notice dates (Figure B.3). In contrast, contracts procured by single-stage, one-envelope tenders with prequalification with low procurement risk were least likely to experience substantial delays in issuing the procurement notice.

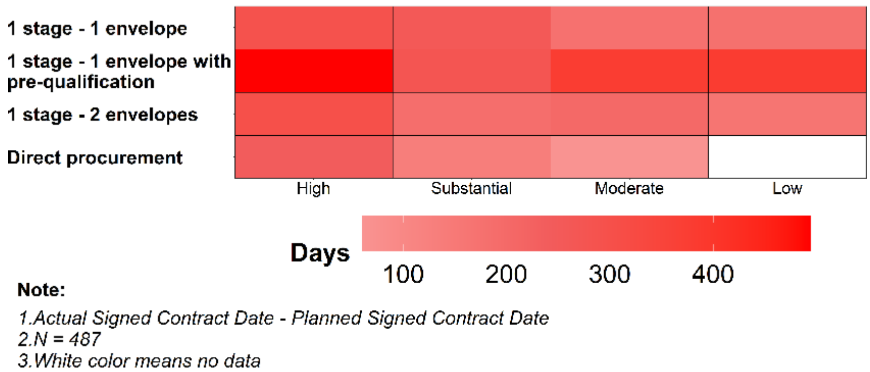
Figure B.3 Average Number of Days Between Actual and Planned Procurement Notice Dates by Procurement Risk



Source: World Bank.

Contracts procured using single-stage, one-envelope tenders with prequalification with high procurement risk were likely to have significant difference between the actual and planned contract signature dates (Figure B.4). In contrast, direct procurement contracts with low risk were less likely to encounter substantial delays in contract signature dates.

Figure B.4 Average Number of Days Between Actual and Planned Contract Signature Dates by Procurement Risk

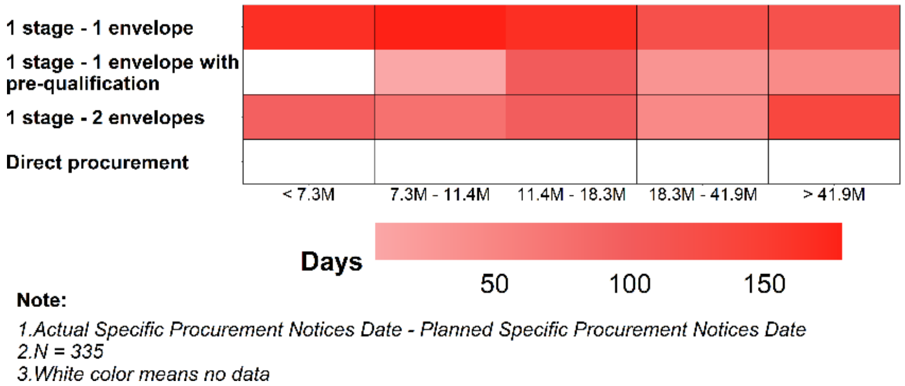


Source: World Bank.

Contract Value

Contracts with values between US$7.3 million and US$11.4 million procured using single-stage, one-envelope tenders experienced substantial delays in issuing procurement notices (Figure B.5). In contrast, contracts with this value range procured using single-stage, one-envelope tenders with pre-qualification were least likely to experience delays in issuing procurement notices.

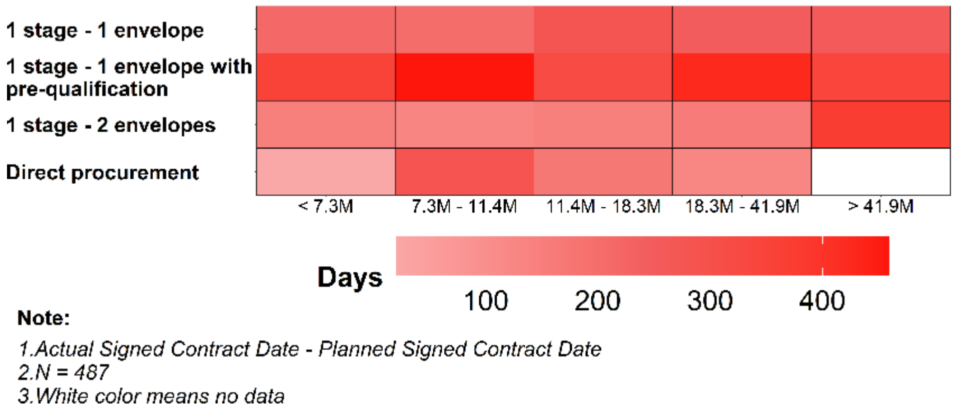
Figure B.5 Average Number of Days Between Actual and Planned Procurement Notice Dates by Contract Value



Source: World Bank.

There was a significant difference between actual and planned contract signature dates for contracts procured using single-stage, one envelope tenders with prequalification and with values between US$7.3 million and US$11.4 million (Figure B.6). In contrast, contracts procured using direct procurement with values below US$7.3 million were least likely to have a substantial difference between actual and planned contract signature dates.

Figure B.6 Average Number of Days Between Actual and Planned Contract Signature Dates by Contract Value

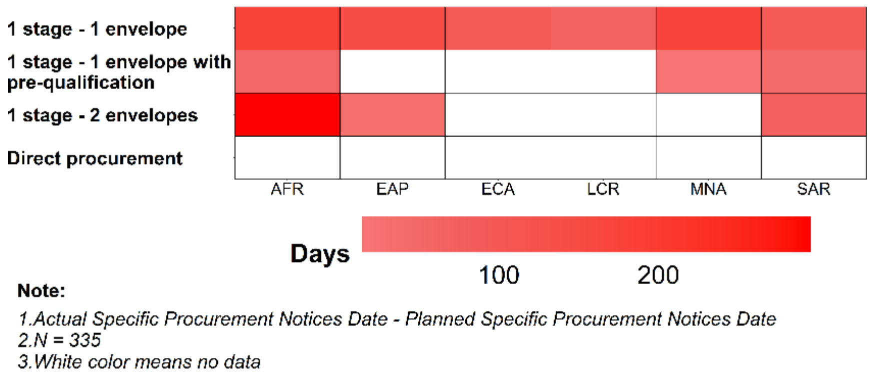


Source: World Bank.

Contract Region

There were variations across the regions when comparing the difference between actual and planned procurement notice dates. Contracts procured using single-stage, two-envelope tenders in the AFR region experienced the largest delay in issuing procurement notices among all regions (Figure B.7). Contracts from the MNA region procured using single-stage, one-envelope tenders with prequalification were least likely to face delays in issuing procurement notices.

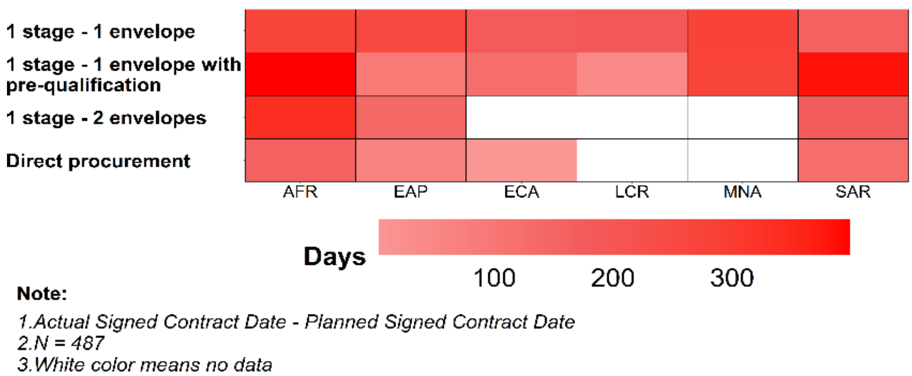
Figure B.7 Average Number of Days Between Actual and Planned Procurement Notice Dates by Region



Source: World Bank.

Contracts in the AFR region that were procured using single-stage, one-envelope tenders with prequalification were likely to have substantial delays in signing the contracts compared to the planned date (Figure B.8). On the other hand, contracts procured using direct procurement in the ECA region had the least likelihood of experiencing delays in signing the contracts compared to the planned date.

Figure B.8 Average Number of Days Between Actual and Planned Contract Signature Dates by Region

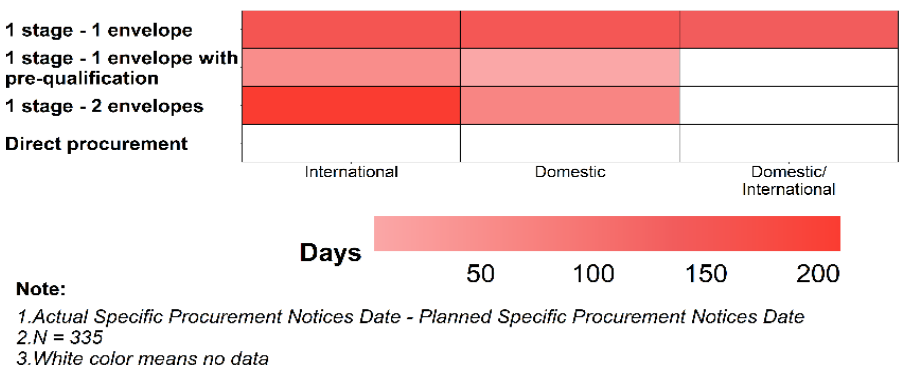


Source: World Bank.

Supplier Origin and Structure

Contracts procured using single-stage, two-envelope tenders and won by international suppliers were most likely to have large delays in issuing the procurement notice (Figure B.9). Contracts procured using single-stage, one-envelope tenders and won by domestic suppliers were least likely to face delays in issuing procurement notices.

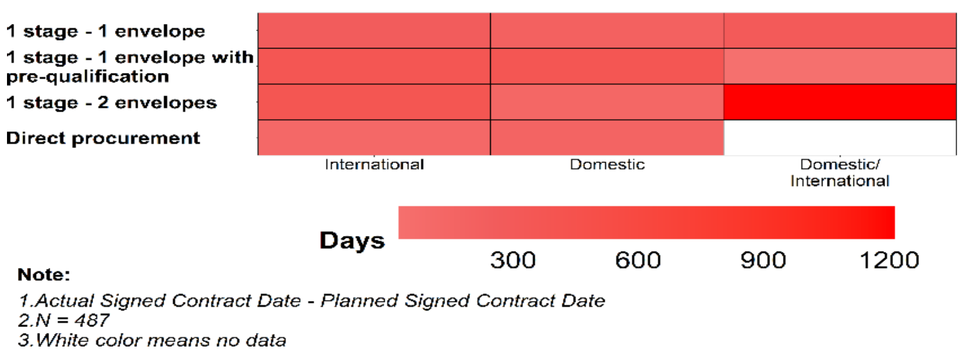
Figure B.9 Average Number of Days Between Actual and Planned Procurement Notice Dates by Supplier Origin



Source: World Bank.

Contracts procured using single-stage, two-envelope tenders and won by joint ventures between domestic and international suppliers were likely to experience substantial delays in contract signature compared to the planned date (Figure B.10). In contrast, contracts procured using single-stage, one-envelope tenders with prequalification and won by joint ventures between domestic and international suppliers were least likely to experience delays in contract signature.

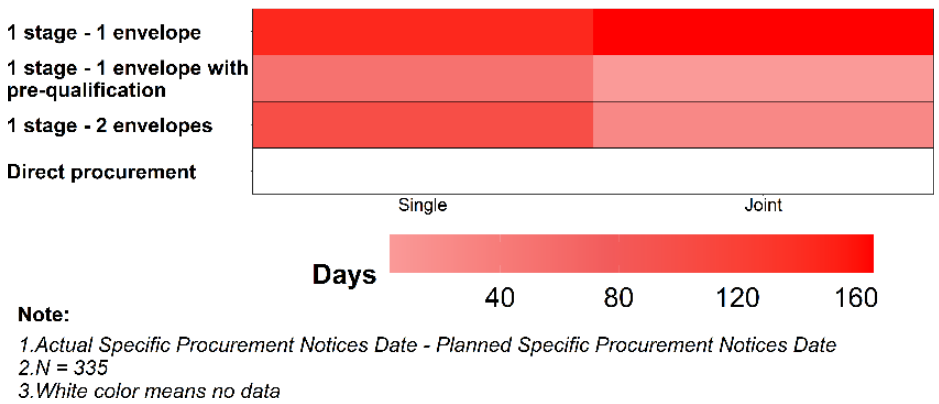
Figure B.10 Average Number of Days Between Actual and Planned Contract Signature Dates by Supplier Origin



Source: World Bank.

Single-stage, one-envelope tenders that involve joint ventures between suppliers were likely to have a substantial difference between actual and planned procurement notice dates (Figure B.11).

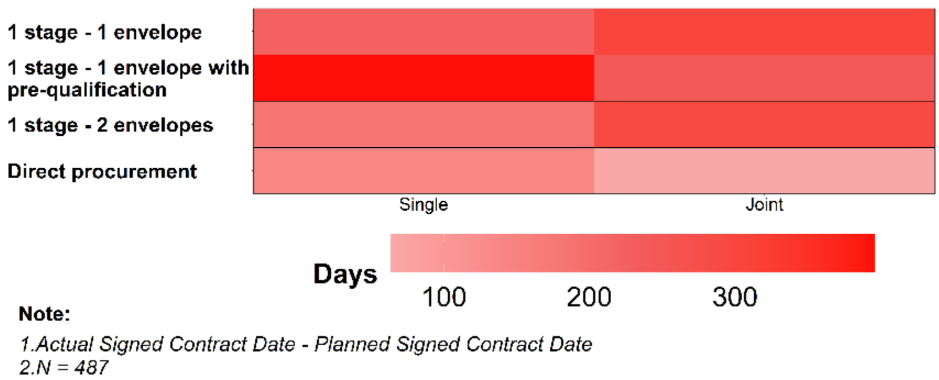
Figure B.11 Average Number of Days Between Actual and Planned Procurement Notice Dates by Supplier Structure



Source: World Bank.

The actual and planned contract signature dates differed significantly for contracts with single-stage, one-envelope tenders with prequalification that were won by single suppliers (Figure B.12). In contrast, direct procurement contracts that were won by joint ventures were least likely to have substantial variation in actual and planned contract signature dates.

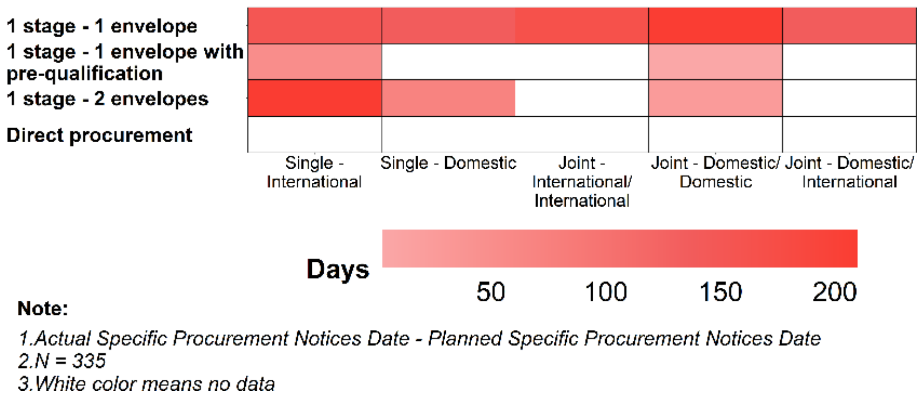
Figure B.12 Average Number of Days Between Actual and Planned Contract Signature Dates by Supplier Structure



Source: World Bank.

There was a higher likelihood of delays in issuing procurement notices for contracts procured using single-stage, one-envelope tenders and won by joint ventures of domestic suppliers (Figure B.13). However, contracts procured using single-stage, one-envelope tenders with prequalification and won by joint ventures of domestic suppliers had the least chance of experiencing major delays in issuing procurement notices.

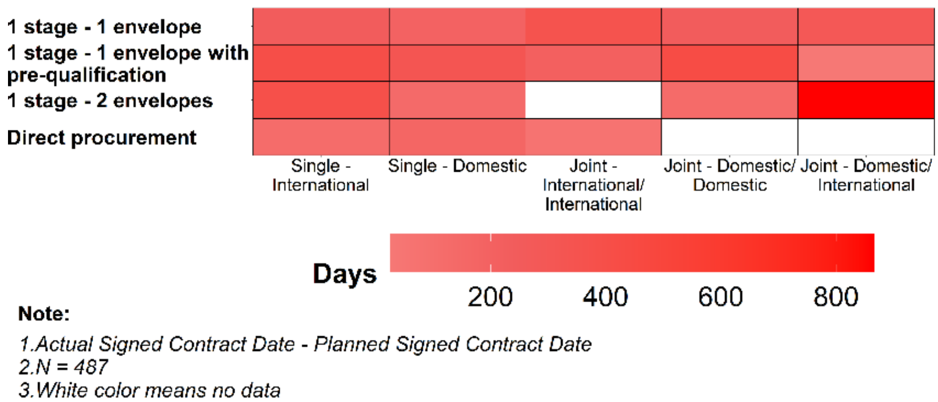
Figure B.13 Average Number of Days Between Actual and Planned Procurement Notice Dates by Supplier Structure and Origin



Source: World Bank.

There were significant delays in contract signature for contracts procured using single-stage, two-envelope tenders and won by joint ventures of domestic and international suppliers (Figure B.14). In contrast, contracts procured using single-stage, one-envelope tenders with prequalification and won by joint ventures of domestic and international suppliers were least likely to experience significant delays in contract signature.

Figure B.14 Average Number of Days Between Actual and Planned Contract Signature Dates by Supplier Structure and Origin



Source: World Bank.

B.3 Duration of Procurement Cycle

The procurement cycle is defined as the period between release of the procurement notice (invitation to vendors in case of direct procurement) and signing of the contract, that is the difference between the actual signed contract date and the actual procurement notice date (actual date for invitation to vendors for directly procured contracts). The analysis looked at (i) average number of days and (ii) share of contracts with a duration above the average by procurement method.

The duration of the actual procurement cycle for all procurement procedures, in general, was more than twice what was planned (Table B.4).

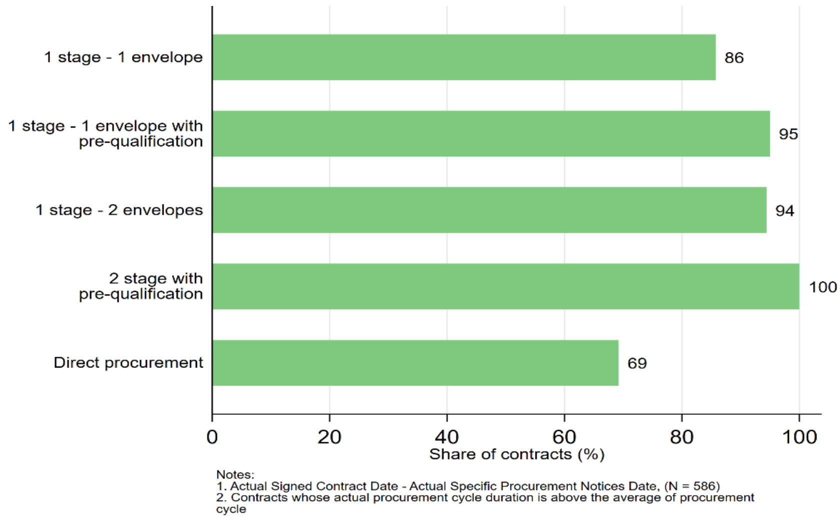
Table B.4 Mean of Procurement Cycle Duration

Procurement method	Planned days	Actual days
One stage, one envelope	152	318
One stage, one envelope with prequalification	312	761
One stage, two envelopes	143	387
Two stages with prequalification	333	959
Direct procurement	28	97

Source: World Bank.

Nearly all contracts had their actual procurement cycle duration above the average of the planned procurement cycle duration by type of procurement procedure, implying there were delays in the actual procurement cycle (Figure B.15).

Figure B.15 Share of Contracts with Actual Procurement Cycle Duration Above Average Planned Duration

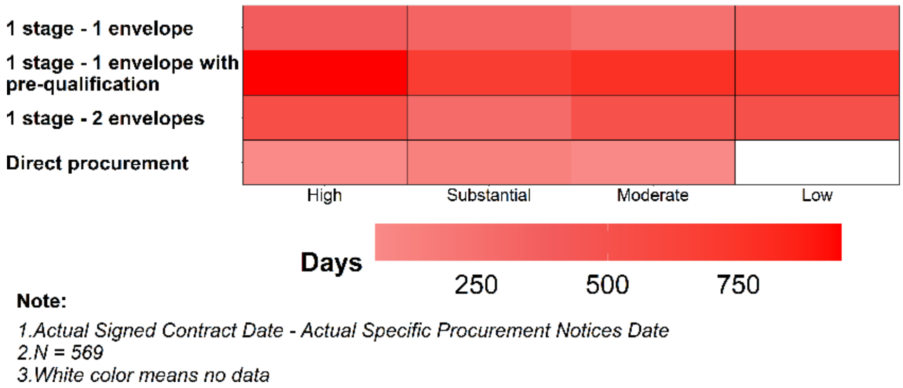


Source: World Bank.

Procurement Risk

On average, contracts with a high procurement risk rating were more likely to have a longer actual procurement cycle duration. Contracts procured using single-stage, one-envelope tenders with prequalification experienced the longest duration (Figure B.16).

Figure B.16 Average Duration of Actual Procurement Cycle by Procurement Method and Procurement Risk

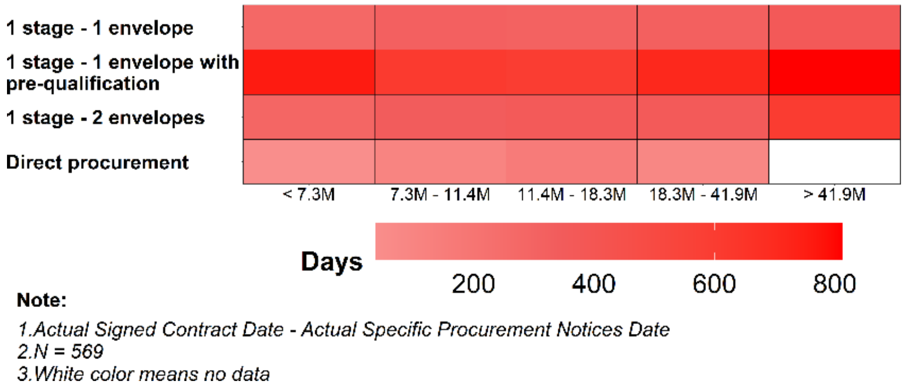


Source: World Bank.

Contract Value

High value contracts (greater than US$41.9 million) were more likely to experience longer actual procurement cycle duration. Contracts procured using single-stage, one-envelope tenders with prequalification had the longest duration (Figure B.17).

Figure B.17 Average Duration of Actual Procurement Cycle by Procurement Procedure and Contract Value (US$)

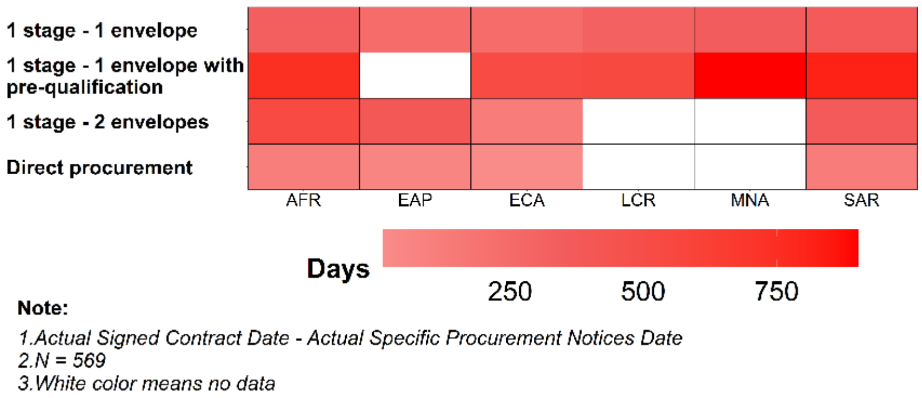


Source: World Bank.

Contract Region

Contracts procured with single-stage, one-envelope tenders with pre-qualification in the MNA, SAR, and AFR regions experienced the longest duration in the actual procurement cycle (Figure B.18). In contrast, direct procurement in the ECA and EAP regions experienced the shortest procurement cycle time.

Figure B.18 Average Duration of Actual Procurement Cycle by Procurement Method and Contract Region

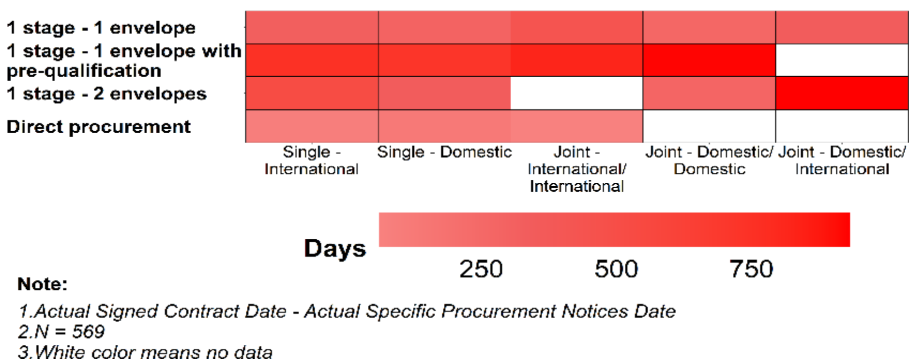


Source: World Bank.

Supplier Structure and Origin

Contracts procured using single-stage, two-envelope tenders and won by joint ventures of domestic and international suppliers, as well as contracts procured using single-stage, one-envelope tenders with prequalification and won by joint ventures of domestic suppliers, were more likely to experience longer actual procurement cycle duration (Figure B.19).

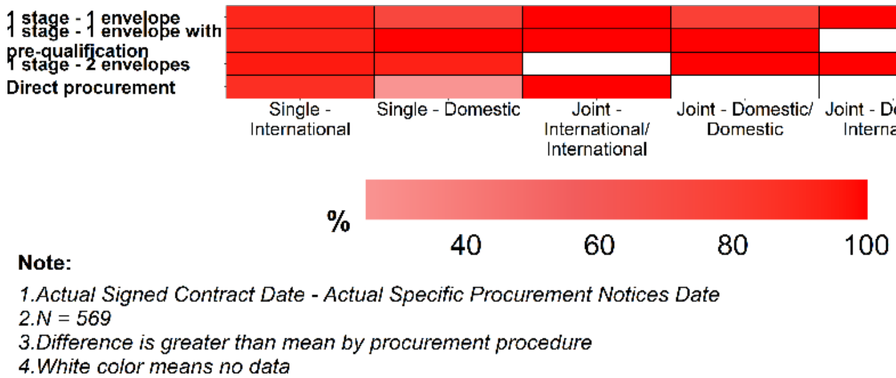
Figure B.19 Average Duration of Actual Procurement Cycle by Procurement Method and Supplier Structure and Origin



Source: World Bank.

Contracts won by joint ventures of international suppliers were more likely to have their actual procurement cycle duration above the average of the planned procurement cycle duration (Figure B.20).

Figure B.20 Share of Contracts with Actual Procurement Cycle Duration Above Mean of Planned Duration by Procurement Method and Supplier Structure and Origin



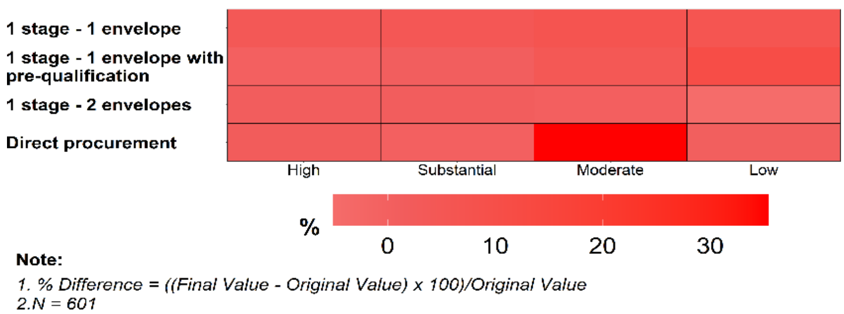
Source: World Bank.

B.4 Cost Overruns

The analysis compared three different contract values: final, original, and estimate. Whereas there seemed to be little cost overrun (that is final compared to original), the estimates tended to be higher than the original and final values.

Contracts procured using direct procurement and rated moderate procurement risk were most likely to experience cost overruns (Figure B.21).

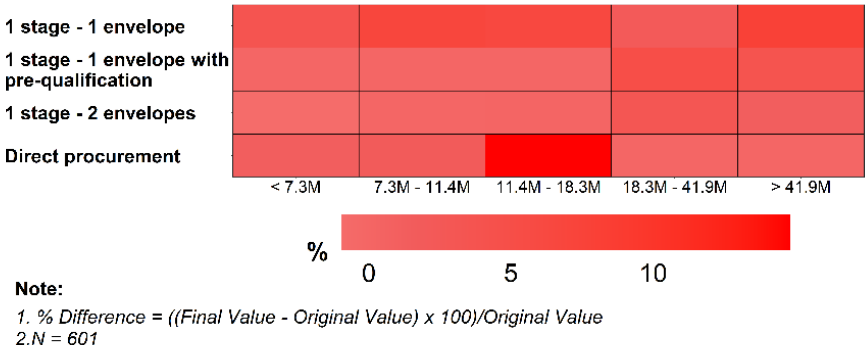
Figure B.21 Cost Overrun by Procurement Method and Risk



Source: World Bank.

Direct procurement contracts with values between US$11.4 million and US$18.3 million were more likely to experience cost overruns (Figure B.22).

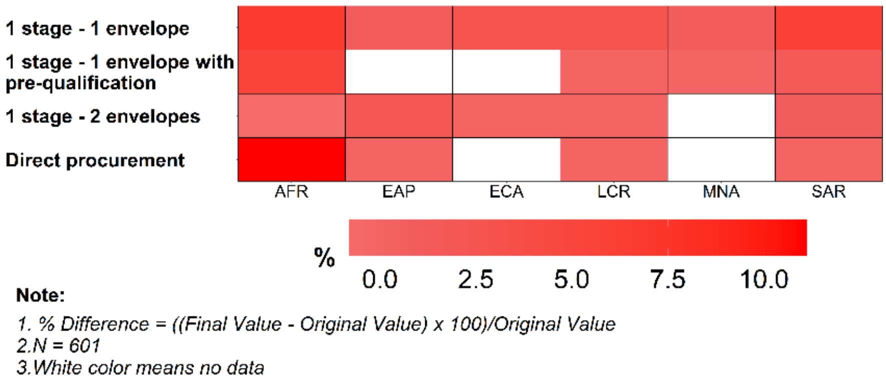
Figure B.22 Cost Overrun by Procurement Method and Contract Value



Source: World Bank.

Direct procurement contracts from the AFR region were more likely to experience cost overruns (Figure B.23).

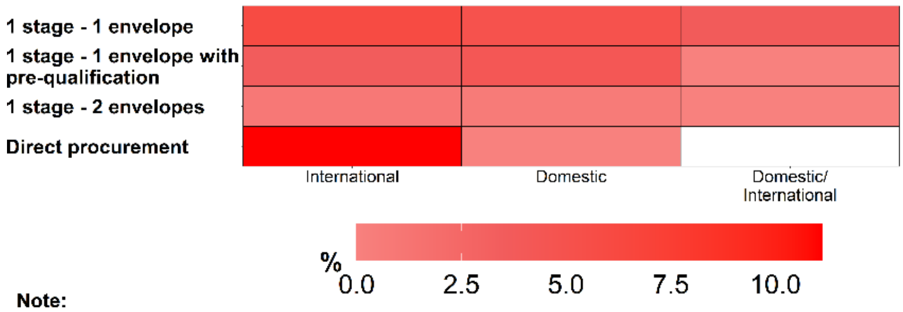
Figure B.23 Cost Overrun by Procurement Method and Region



Source: World Bank.

Direct procurement contracts with international suppliers were more likely to experience cost overruns (Figure B.24).

Figure B.24 Cost Overrun by Procurement Method and Supplier Origin



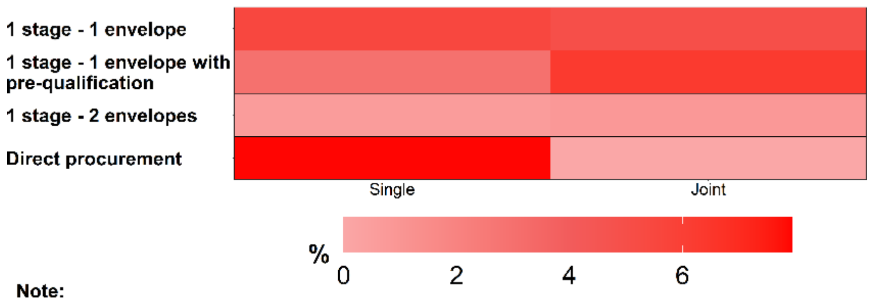
Note:

1. % Difference = ((Final Value - Original Value) x 100)/Original Value
2.N = 601
3.White color means no data

Source: World Bank.

Direct procurement contracts with a single supplier were more likely to experience cost overruns (Figure B.25).

Figure B.25 Cost Overrun by Procurement Method and Supplier Structure



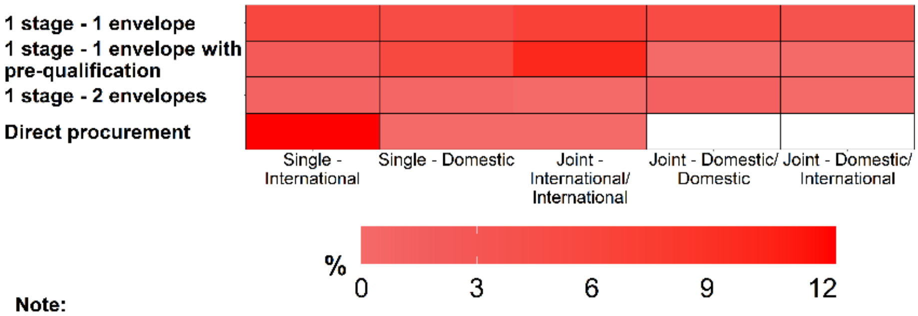
Note:

1. % Difference = ((Final Value - Original Value) x 100)/Original Value
2.N = 601

Source: World Bank.

Direct procurement contracts with a single international supplier were more likely to experience cost overruns (Figure B.26).

Figure B.26 Cost Overrun by Procurement Method and Supplier Structure and Origin



Note:

1. % Difference = ((Final Value - Estimated Value) x 100)/Estimated Value
2.N = 650
3.White color means no data

Source: World Bank

Appendix C: Glossary

Contract	A mutually binding agreement that obliges the seller to provide the specified product or service or result and obligates the buyer to pay for it (Brannan and Lee 2007).
Contract risks	Are contract-level risks resulting from the procurement of individual contracts that form part of the same project. A common example of such a risk would be when the procurement approach adopted results in too many, or too few bids, undermining performance and giving rise to delays. It also includes risks associated with the implementation of specific contracts such as the works contract and supervision**.**
Project	A temporary endeavor undertaken to create a unique project service or result. Projects are temporary and close down on completion of the work they were chartered to deliver (Weaver 2010). A project may have more than one contract.
Project risks	Are project-level risks resulting from poorly procured and managed projects which cause consequences on the execution of individual contracts. A common example would be when shortcomings during project preparation and design result in delays during implementation of the main works contract.
Public procurement	The process by which governments purchase goods, services, and works from the private sector (World Bank 2021). In relation to infrastructure projects this comprises the coordinated process of creating and fulfilling each of a project's constituent contracts, typically including planning, preparation, construction, and supervision (ISO 2020).
Risk management	An integrated process of assessing a project's risk profile and responding to unforeseen changes over the life cycle of a project (Beckers and Stegemann 2013).
Tender	The process through which buyer invites bids for a purchase or contract. Tender methods can vary depending on the type, value, and risk of goods, services, and works to be procured. The main types of government tenders are: open tender, direct purchase, negotiated purchase and accelerated public tender (emergency procurement and non-emergency accelerated procurement) (OECD 2023).

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