Indicators to diagnose the performance of a procurement market

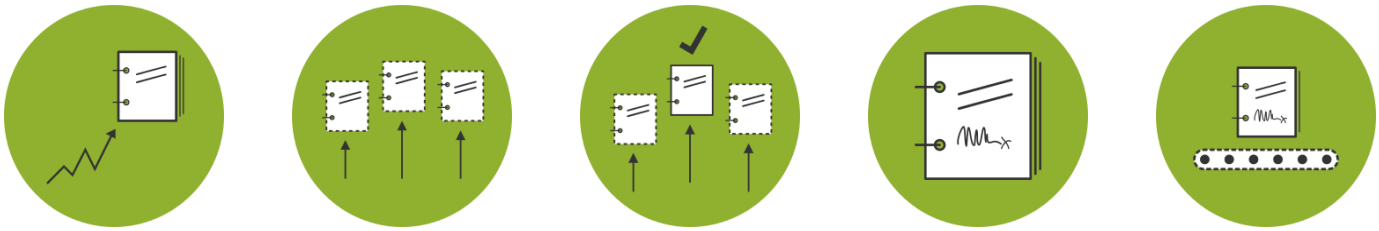
Who are the main suppliers of infrastructure projects? Has the proportion of direct awards in a particular agency gone down? How many contracting procedures had cost overruns? These are just some of the questions that can be answered with public procurement data.

This guide details a list of common indicators for an initial diagnosis of the **performance of a procurement market using public procurement data**, providing key information on different aspects of the contracting process. The main indicators proposed describe the level of competition and the internal efficiency of the processes, and signal potential risks and areas of improvement. Having a broad understanding of the procurement market can help procuring agencies design better tenders[1], promote effective competition among suppliers and obtain a better value for money for the goods and services they procure. They can also be used by civil society organizations, academia or journalists interested in analyzing procurement markets.

The indicators are grouped into three categories: competition, supplier performance and efficiency. The guide details a description of each indicator, the formula to calculate it and the data fields needed, mapped to the Open Contracting Data Standard (OCDS), which is a free, non-proprietary open data standard for public contracting, being implemented around the world.

At the heart of the OCDS is the idea that it should be possible to follow a contracting process from planning and tender, through to award and implementation.

[1] www.oecd.org/competition/cartels/42851044.pdf



Planning **Tender** **Award** **Contract** **Implementation**

First step: Describe the coverage of the data

Before calculating any of the indicators it is important to understand the coverage of the data published since this will give a general overview of the data, the fields included, context of what further questions can be answered and what considerations to have when performing the analysis.

Question	Description	Observations
How many contracting procedures?	Count the number of contracting procedures published and calculate the proportion.	The coverage will determine what conclusions you can derive from the data and give context to the analysis.
How many procuring entities?	Counts the number of procuring entities that are in the dataset and calculate the proportion.	Calculate using the name and the id, to see if there are differences. If there is more than one name for the same id, the variable should be cleaned.
What stages of the contracting process are covered?	This gives an overview of what stages of the data are being published and thus what types of analysis can be done. For instance, if there is data about the award stage but no data about the tenderers, it is not possible to analyse competition or to know how many firms or individuals are participating in the market or being excluded from tenders.	
What is the time period covered by the data?	Calculates the time period of the published data.	

How many contracting procedures were issued by year?	Counts the number of procedures by year.	If the numbers vary a lot over the years, it is better not make year to year comparisons.
How many contracting procedures by procuring entity?	It is important to know not only how many procedures are being published but to what institutions they belong to, the status of the tender and the years of the tender. Describing the number of procedures by these three categories gives a better understanding of the coverage of the data and could give context to other questions. For instance, if most of the contracting procedures are published by the Ministry of Defense, questions like the top 10 suppliers, items, etc, will relate to this institution and do not give an overview of the whole procurement market.	Check if there are entities with the same id but different names, which could be due to typos.
What is the number of tenders by procurement category?	This classifies the tenders by goods, works and services.	
What is the number of tenders by item procured?	This gives a more granular overview of what is being procured. For report purposes, only include the top ten items.	
How many suppliers are in the market?	Counts the number of unique suppliers in the dataset.	Check if there are suppliers with the same id but different names which could be due to typos.

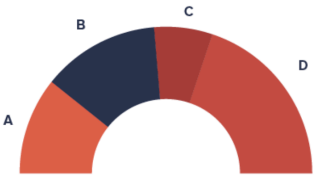
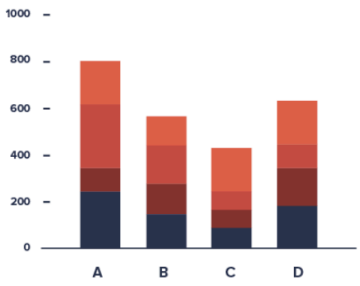
Main indicators

Competition

These indicators can be useful to:

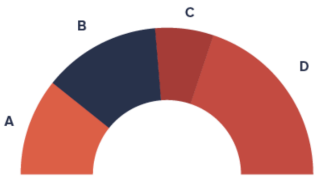
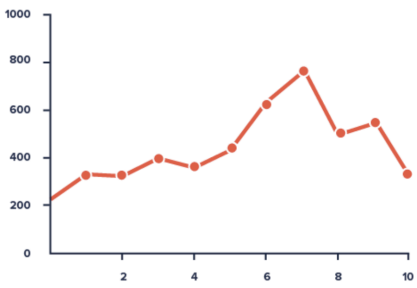
- Understand what is the level of competition in the procurement market, in particular institutions and for different items.
- Identify if there is a high proportion of single bid tenders that could signal limited competition in particular agencies or tenders.
- Identify which goods or services have fewer suppliers, less competition or are ‘captured’ by particular firms.
- Find markets that are highly concentrated.

Proportion of open tenders

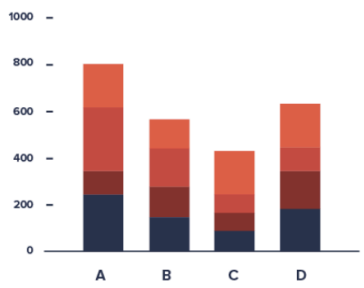
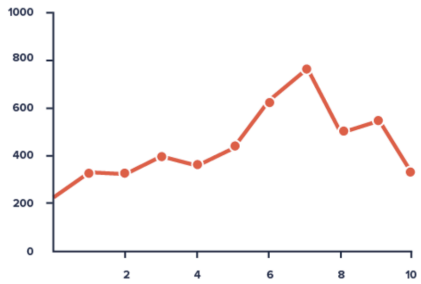
Description	This indicator calculates the proportion of competitive tenders in the whole procurement market.	
Considerations	Consider open tenders and other types of procurement methods that allow competition. It is important to check local regulations regarding the different types of procedures that apply and the threshold values for competitive tenders. This can be calculated for each procurement agency and by year.	
Formula	$\frac{Number\ of\ open\ tenders}{Total\ number\ of\ tenders} * 100$	
Interpretation	A higher value can signal more competition and integrity (transparency) while having more direct awards may signal a risk.	
Data needed	Classification of tenders by procurement method **tender.procurementMethod**	
How to illustrate the results	For a single category:[2]  *Donut chart*	For different categories:  *Stacked bar*

[2] Images taken from https://datavizproject.com

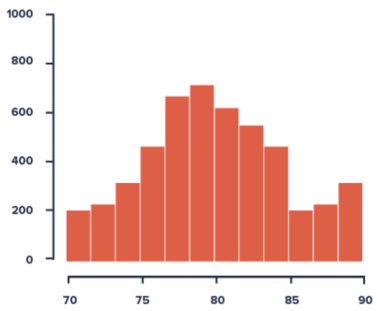
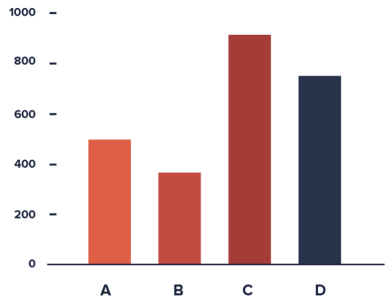
Proportion of single bid tenders

Description	This indicator calculates the proportion of tenders that received a single bid out of the total number of tenders where competition was expected. To complement this metric the total value awarded in single bid tenders can be calculated.	
Considerations	This has to be calculated for open (or limited selected) tenders where competition is expected. Single bids can be analysed by procuring entity or by item category. For some markets (or items) single bids can be a result of specialised goods or limited suppliers.	
Formula	$\frac{Number\ of\ single\ bid\ tenders}{Total\ number\ of\ competitive\ tenders} * 100$	
Interpretation	Having a high proportion of single bids in tenders that should be competitive is considered a risk in procurement, since it might signal limited competition, a low capacity of procurement agencies, result in higher prices, lower quality, weaker political accountability.	
Data needed	Classification of tenders by procurement method **tender.procurementMethod** Number of tenderers in each tender **Tender.numberOfTenderers**	
How to illustrate the results	For the proportion (single category):  *Donut chart*	Proportion over time:  *Line chart*

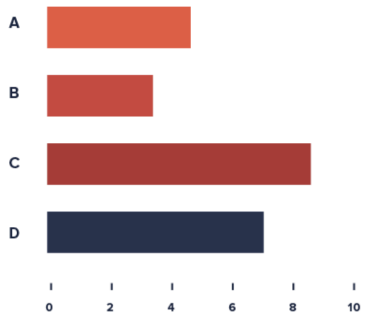
Proportion of value awarded in single bid tenders versus competitive tenders

Description	This indicator calculates the total value awarded in tenders that received a single bid in comparison to the value awarded in competitive tenders.	
Considerations	This has to be calculated for tenders where competition is expected. This can be calculated by procuring entity or by item category.	
Formula	$$\frac{\sum Award\ value\ of\ tenders\ with\ a\ single\ bid}{\sum Total\ value\ awarded} * 100$$ $$\sum Award\ value\ of\ tenders\ with\ a\ single\ bid$$ $$\sum Award\ value\ of\ tenders\ with\ more\ than\ one\ bid$$	
Interpretation	Having a higher value awarded in non competitive tenders may signal less competition in high value tenders, or higher prices as a result of no competition.	
Data needed	Classification of tenders by procurement method **tender.procurementMethod** Number of tenderers in each tender **Tender.numberOfTenderers** Award value **award.value**	
How to illustrate the results	Award value comparison:  *Stacked bar*	Award value over time (use two series):  *Line chart*

Average and median number of tenderers (bidders) per tender

Description	This indicator calculates the average and median number of bidders per tender.	
Considerations	This has to be calculated for open (or limited selected) tenders where competition is expected, so direct awards should be excluded. It can be calculated also by procuring entity or by year	
Formula	$mean(number\ of\ bidders\ per\ tender)$ $median(number\ of\ bidders\ per\ tender)$	
Interpretation	Having a higher number of tenderers per tender signals a higher competition, while receiving few offers can be considered a risk.	
Data needed	Classification of tenders by procurement method **tender.procurementMethod** Number of tenderers in each tender **Tender.numberofTenderers**	
How to illustrate the results	Distribution of the number of bidders:  *Histogram*	Mean or median by different categories:  *Bar chart*

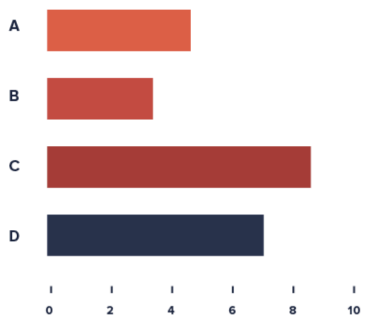
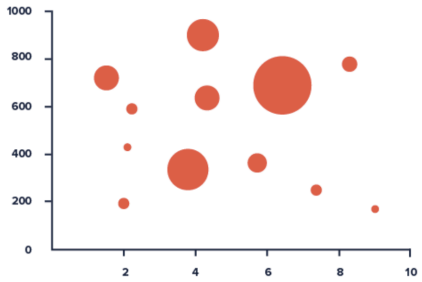
Market concentration

Description	This calculates the market share of the largest company in the market (total value awarded to the firm/total value awarded in the market). Another measure of market concentration is the Herfindahl-Hirschman Index (HHI), that is the summary of the squared market shares in each market. The indicator ranges from 0 to 10000. Higher values (above 4000) indicate a higher concentration.
Considerations	This has to be calculated for each market, and not for the whole procurement market. To segment by markets different approaches can be taken. For simplicity, each item can be considered as a separate market. It is important to check for outliers (high value contracts in particular markets).
Formula	For each market: $MS = \frac{Total\ value\ awarded\ for\ each\ firm}{Total\ value\ awarded\ in\ the\ market} * 100$ $HHI = \sum \quad MS^2$
Interpretation	Firms with a higher value are the ones that concentrate most of the value awarded and thus this may signal less competition in particular markets. For the HHI, the indicator ranges from 0 to 10000. Values under 1 500 points indicate a non-concentrated market. Values between 1 500 and 2 500 indicate a slightly concentrated market and values over 2 500 indicate a highly concentrated market.
Data needed	Items awarded (to segment markets) **award.item.classification.id** Suppliers of each award **award.suppliers.id** Award value **award.value**
How to illustrate the results	For each market select the firm with the highest MS (plot biggest markets), or plot the HHI index value for each market. 

	Horizontal bar chart

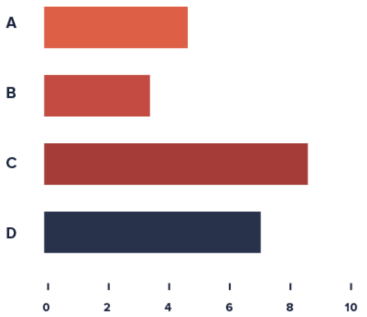
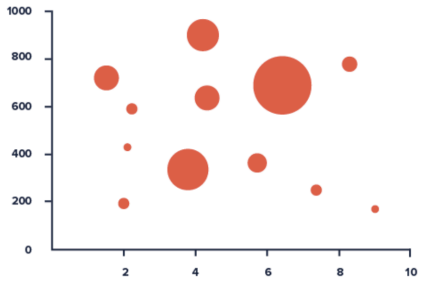
Number of suppliers by item

Description	This calculates the number of awards by item and number of unique suppliers.	
Considerations	Having few suppliers for a single item could signal a lack of competition, but also it could be a result of rare goods in that particular market.	
Formula	Grouping by award item: $\sum Number\ of\ unique\ suppliers$ $\sum Number\ of\ unique\ awards$ $\sum Award\ value$ $awardSupplierRate = \frac{Number\ of\ unique\ awards}{Number\ of\ unique\ suppliers}$	
Interpretation	Comparing the total number of awards with the total number of suppliers for each item allows to identify items with more or less competition. A higher value in the award/supplier rate per item, suggests suppliers concentrate a high number of awards. In addition, having fewer suppliers by item can increase the risk of bid rigging, since this practice is more likely to occur when a small number of companies supply the goods or services.	
Data needed	Items awarded **award.item.classification.id** Suppliers of each award **Award.suppliers.id** Award value **award.value**	
How to illustrate the results	Select top 10 items with the higher number of awards:	Compare the number of unique suppliers (x axis), the number of awards (y axis) and total value awarded (size of bubble). Each bubble represents an item:

	 *Horizontal bar chart*	 *Bubble chart*

Number of unique suppliers by institution

Description	This calculates the number of unique suppliers by procuring entity.	
Considerations	This can be calculated by year.	
Formula	Grouping by procuring entity: $\sum Number\ of\ unique\ suppliers$ $\sum Number\ of\ awards$ $\sum Award\ value$	
Interpretation	Calculates the number of unique suppliers per procuring entity for each item procured. A low number of suppliers signals less competition.	
Data needed	Procuring entity **tender.procuringEntity** Suppliers of each award **award.suppliers.id** Award value **award.value**	
How to illustrate the results	Select top 10 procuring entities with the higher number of awards:	Compare the number of unique suppliers (x axis), the number of awards (y axis) and total value awarded (size of bubble). Each bubble represents a procuring entity:

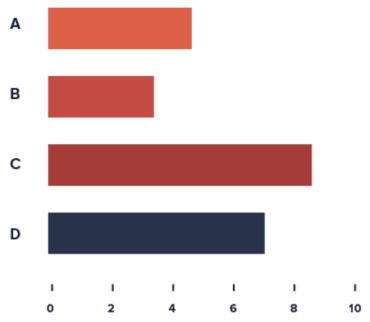
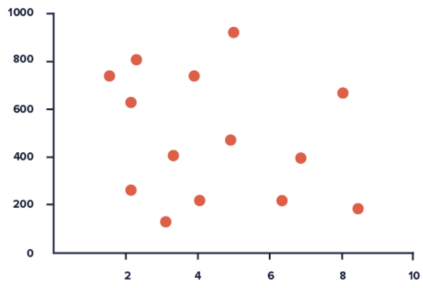
	 *Horizontal bar chart*	 *Bubble chart*

Supplier participation

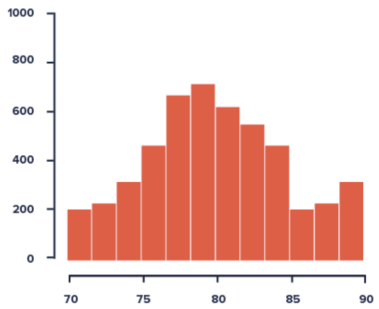
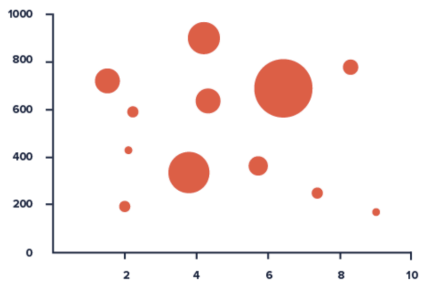
These indicators can be useful to:

- Understand who are the main suppliers of the procurement market
- Identify which suppliers are being awarded non-competitive contracts and how much money they are being awarded.
- Account how many suppliers are not succeeding in the market and how many have a high winning rate.

Top suppliers

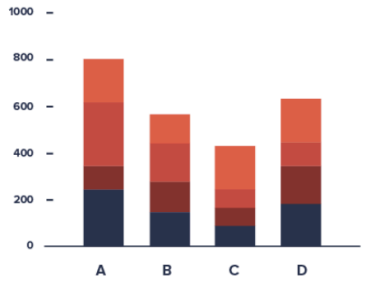
Description	This calculates for each firm the total value awarded and the number of awards.	
Considerations	It can be calculated segmenting by procurement method, to identify if companies are being awarded high value contracts without competition, by market, year or by other relevant variables. Report top 10 for each category.	
Formula	For each supplier: $\sum Award\ value$ $\sum awards$	
Interpretation	This is a descriptive indicator to identify who are the top suppliers.	
Data needed	Suppliers of each award **award.suppliers.id** Award value **award.value.amount** Award currency **award.value.currency** Optional: **tender.procurementMethod** **Award.items** (for markets)	
How to illustrate the results	Top suppliers:  *Horizontal bar chart*	To compare number and value of awards:  *Correlation*

Success rate of bidders

Description	This calculates the ratio between the number of tenders won versus the number of tenders a firm bid for.	
Considerations	This can be calculated for the whole market or for each market. It is better to exclude single bid tenders. Suppliers with For reporting: use the average and median success rate of bidders (plot the distribution) and calculate the proportion of bidders with a success rate of zero and 100%.	
Formula	For each supplier: $\frac{\sum awards}{\sum tenders\ each\ firm\ bid\ for} * 100$ $\sum Award\ value$	
Interpretation	Companies with a low success rate close to zero (always submit bids but never win) or a high success rate (always win the tender) can suggest a suspicious bidding pattern and possible bid rigging.	
Data needed	**ocid** Suppliers of each award **award.suppliers.id** Number of tenderers in each tender **tender.tenderers.id**	
How to illustrate the results	Distribution of the success rate:  *Histogram*	Compare success rate (x axis), number of tenders (y axis) and value awarded (size)  *Bubble chart*

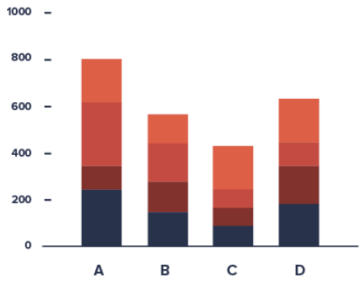
Share of single bid contracts

Description	This calculates for each firm what proportion of the awards won where single bid tenders. To compliment that indicator the proportion of the total value awarded in single bid tenders can be calculated.
Considerations	For reporting it might be useful to select companies with a high number of awards or high value awards (the value will depend on the context) and report the top 10 suppliers.
Formula	For each supplier: $\frac{\sum awards\ from\ single\ bid\ tenders}{\sum awards\ won} * 100$ $\frac{\sum awards\ value\ from\ single\ bid\ tenders}{\sum awards\ value\ won} * 100$
Interpretation	Having a higher value is considered a risk factor, since it signals companies that "are winning tenders recurrently without effective competitive pressures".
Data needed	**ocid** Suppliers of each award **award.suppliers.id** Number of tenderers in each tender **tender.tenderers** Award value **award.value**

How to illustrate the results	For each firm compare proportions (report only top suppliers):  *Stacked bar*

Share of direct awards

Description	This calculates for each firm the ratio of the total number of direct awards versus the total number of awards received.
Considerations	Check the local context regulations, since direct awards might use for particular cases. For reporting it might be useful to select companies with a high number of contracts (the value will depend on the context) and report the top 10 suppliers.
Formula	For each supplier: $\frac{\sum direct\ awards}{\sum awards\ won} * 100$
Interpretation	Having a higher value of direct wards is considered a risk factor, since companies are being awarded without competition and it can undermine transparency in the procurement system.
Data needed	**ocid** Suppliers of each award **award.suppliers.id** Classification of tenders by procurement method **tender.procurementMethod**

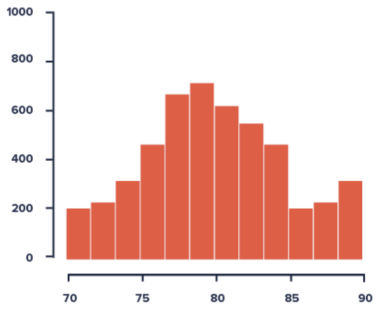
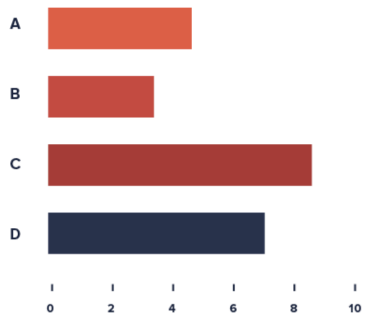
How to illustrate the results	For each firm compare proportions (report only top suppliers):  *Stacked bar*

Efficiency

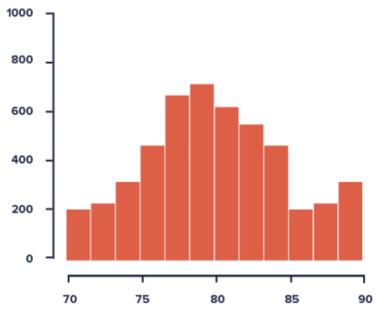
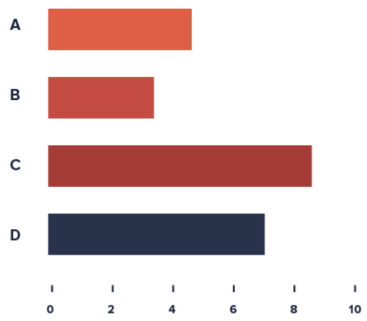
These indicators can be useful to:

- Identify institutions with short and long tendering and award periods.
- Account how much money is being saved (or not) during the procurement process.
- Identify institutions with a high number of cancelled or unsuccessful tenders.

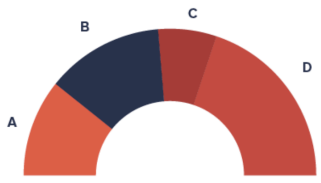
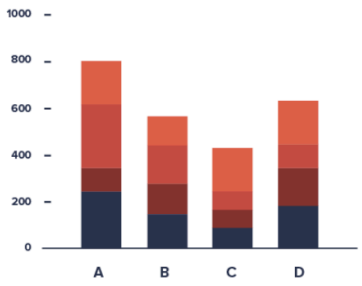
Average duration of the tendering period

Description	Number of days between the tender start date and its closing date.	
Considerations	Check if tendering period times are set in local regulations. This can be calculated by procuring entity to compare between institutions or by markets.	
Formula	$duration = Tender\ period\ end\ date - Tender\ period\ start\ date$ $mean(duration)$ $median(duration)$	
Interpretation	Having a shorter time frame to submit bids may reduce competition, while having longer tender periods may signal inefficiencies in the procurement process.	
Data needed	Tender start date: **tender.tenderPeriod.startDate** Tender end date: **tender.tenderPeriod.endtDate**	
How to illustrate the results	Distribution of the duration:  *Histogram*	Compare median duration by entity:  *Horizontal bar chart*

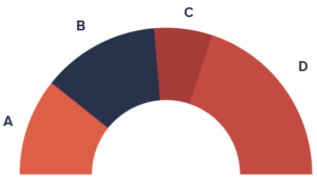
Average duration of the award period

Description	Number of days between the tender end date and the award date.	
Considerations	Check if award period times are set in local regulations. This can be calculated by procuring entity to compare between institutions or by markets.	
Formula	$duration = Award\ date - Tender\ period\ end\ date$ $mean(duration)$ $median(duration)$	
Interpretation	Having longer tender periods may signal inefficiencies in the procurement process.	
Data needed	**Ocid** Award end date: **award.date** Tender end date: **tender.tenderPeriod.endDate**	
How to illustrate the results	Distribution of the duration:  *Histogram*	Compare median duration by entity:  *Horizontal bar chart*

Proportion of canceled tenders

Description	Calculates the proportion of canceled or unsuccessful tenders.	
Considerations	This can be calculated by procuring entity, procurement method, year or other relevant variables.	
Formula	$$\frac{\sum cancelled\ or\ unsuccessful\ tenders}{\sum Total\ tenders} * 100$$	
Interpretation	Having a high value in this indicator could signal inefficiencies in the procurement process.	
Data needed	Classification of tenders by procurement method **tender.status**	
How to illustrate the results	For a single category:  *Donut chart*	For different categories:  *Stacked bar*

Proportion of contracts with savings and overruns

Description	This calculates the proportion of contracts that had a lower or higher price than the expected tender value.
Considerations	This can be calculated by procuring entity, method, year.
Formula	$Difference = award\ value - tender\ value$ $if\ difference < 0\ savings$ $if\ difference > 0\ overruns$ $if\ difference < 0\ same\ value$ $Savings = \frac{\sum awards\ with\ savings}{\sum Total\ awards} * 100$ $Overruns = \frac{\sum awards\ with\ overruns}{\sum Total\ awards} * 100$
Interpretation	Having a higher proportion of contracts without cost overruns, could signal a higher efficiency of the procurement process.
Data needed	**ocid** Tender value **tender.value** Award value **award.value**
How to illustrate the results	Compare proportions:  *Donut chart*

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Resources

[Use case guide: Indicators linked to OCDS]