

How unleashing productivity in the public procurement process can finance all climate change initiatives

Introduction

Governments around the world spend a combined \$13 trillion on public procurement.¹ Despite the magnitude of spending, much of it is lost to the costs of tenders, building tender documents, collecting information, and evaluating bids. Likewise, respondents face surmounting issues as they encounter timely costs, stressed bid teams, and repetitive tendering processes. In the EU alone, \$5.6 billion is wasted on costs, where 75% of these costs are incurred by businesses and 25% by governments.² Globally, it is estimated that the costs of procurement totals £650 billion of the total £13 trillion spent on procurement (Aitenders, HEC). Given the magnitude of the superfluous costs of procurement, it is useful to examine how the public procurement process can be optimized to reallocate lost funds to more important initiatives, such as climate change. Now more than ever, there is significant demand for more green, resilient, and inclusive development. One such way of responding to this demand is by implementing Artificial Intelligence (AI) into government procurement processes in order to save costs and reallocate funds to green initiatives. On the side of the authorities, AI can be used to streamline tender-building processes, bid evaluation, and the gathering of information. On the contractor side, AI technology can coordinate team tasks, organize bid documents, and identify repetitive risks and requirements. By adopting these technologies, governments can save \$150 to \$260 billion on procurement costs that can be better allocated to climate change initiatives (Aitenders primary research). AI Technology in the procurement process is not only the solution for a more efficient industry, but for a more sustainable future.

The Costs For Authorities in the Public Procurement Process

Due to current inefficiencies in the public procurement process, government authorities globally are losing money that could otherwise be invested into schemes such as climate change prevention. It is estimated that within the tendering process, governments incur 25% of the costs and that the average competition uses the equivalent of 123 person days of resources (PWC)³. These costs are the cause of arduous and time consuming processes that must be completed in order to compile the tender document, publish it, then evaluate the responses. Often, there are also many errors included within the tender documents due to the lack of automation within the process which leaves room for human error and variation within the quality of tenders published. The consequence of this is that, due to the lack of continuity between tender documents, contractors often miss requirements and submit bids that are non-compliant. This wastes further

¹ "How governments spend: opening up the value of global government procurement," *Open Contracting Partnership*, accessed 12 July 2022. <https://www.open-contracting.org/wp-content/uploads/2020/08/OCP2020-Global-Public-Procurement-Spend.pdf>

² Strand et al. "Public Procurement in Europe Cost and Effectiveness," *PWC*, March 2011. Pwc.com

³ <https://op.europa.eu/en/publication-detail/-/publication/0cfa3445-7724-4af5-8c2b-d657cd690c03>

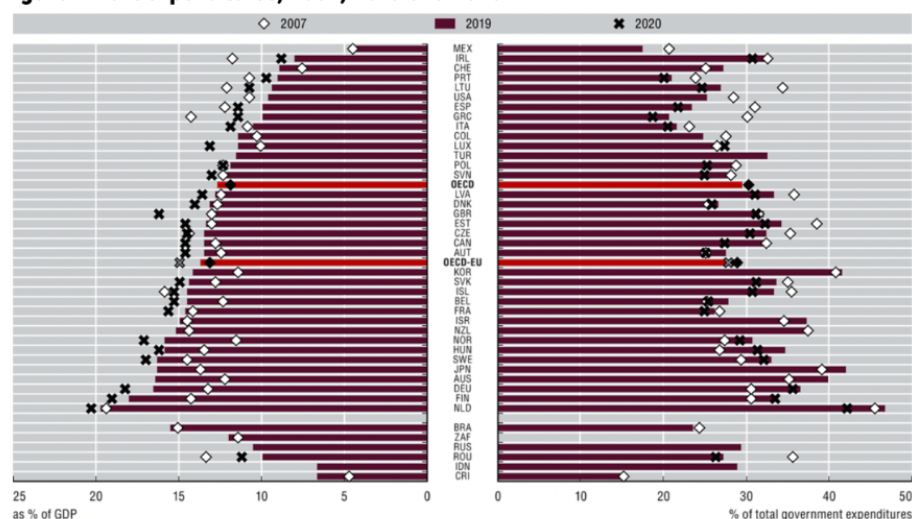
resources on both the authority and business side as governments must check and invalidate the bid whilst firms spend time and money compiling non-compliant responses.

The integration of artificial intelligence into public procurement presents opportunities for government authorities in its ability to optimize both sides of the process. Automating public procurement helps to bridge the gap between government authorities and businesses by streamlining tender documents as well as ensuring that they're consistent and clear. Automation also boosts collaboration and communication between both sides of the process, reducing the prevalence of non-compliance

The monetary and person-time costs endured throughout the procurement process

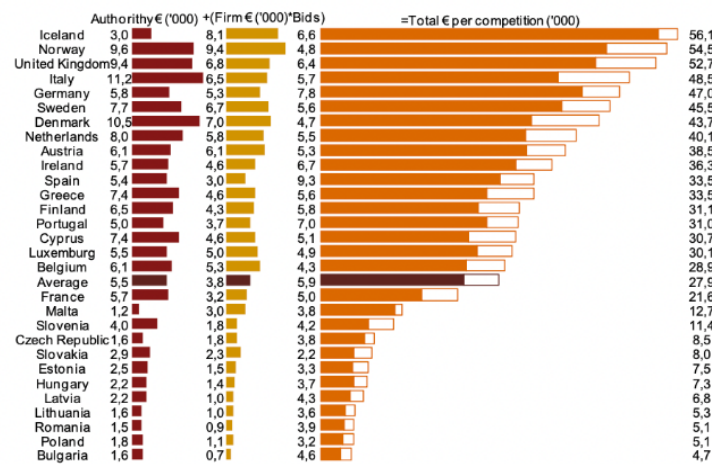
The first and most obvious cost for government authorities is monetary. For example, governments in the European Union incur an average cost of 5500 euros for basic contracts, and upto 9000 euros for more complex procurement processes such as restricted procedures (PWC). When one considers that over a four year period, the EU governments published and awarded over 540,000 contracts, which totalled to a value of 1.3 trillion euros (PWC), the scale of the costs of tendering become more apparent, and the need for automation becomes clear. Furthermore, public procurement comprises a large percentage of many country's GDP, such as the UK, where it accounts for 16.1% (OECD)⁴. Thus, due to its integral role in the global economic environment, it is necessary that public procurement is optimized to free up money that can be put to better use, such as funding green procurement practices.

8.1. General government procurement spending as a percentage of GDP and total government expenditures, 2007, 2019 and 2020



⁴ <https://www.oecd-ilibrary.org/sites/18dc0c2d-en/index.html?itemId=/content/component/18dc0c2d-en>

Figure 2.12 Typical cost of a competition (weighted averages)



The first graph above shows the % of GDP that public procurement accounts for in many of the most developed nations. However, the costs of the tendering process differ between certain countries and types of procedure, which also stresses the need for a more cohesive centralized platform for public procurement whereby all countries can ascribe to a certain standard to ensure that they do not incur excess costs. The second graph above highlights the disparity in cost between various countries of the European Union and shows the need for the implementation of AI, especially in high wage countries, such as Iceland that has an average cost of 56,000 euros per tender, and Italy which has an average authority cost of 11,200 euros.

The labor costs demanded by each contract are also very high for authorities. The average time taken across all procedures is 108 days (PWC), though the average person-day costs for authorities is 38 days (PWC). This is reflective of the time-consuming nature of the process and again shows the opportunities for gains in productivity and efficiency with the implementation of AI, which is estimated to boost productivity by 20-40% within procurement (Aitenders, HEC).

Maximizing the Positive Competition Effect

In order to benefit from positive competition, government authorities must foster competitive environments within the public procurement process. By increasing competition, authorities benefit from advanced levels of innovation as well as the ability to drive down prices. According to the existing empirical auction literature, 7–8 firms are required for a tender to be competitive enough to take full advantage of the expected positive competition effect (Gupta 2002, Iimi 2006, Estache and Iimi 2008a)⁵. However, the actual level of competition is well below this, with

an average of 5.4 firms competing for each tender (PWC). This lack of competition is due to inefficiencies within the tendering process and creates a cycle of positive feedback as less competition leads to further inefficiency. However, as with the cost of tendering, there are also major inequalities in the level of competition between different countries, which is shown in the graph below.

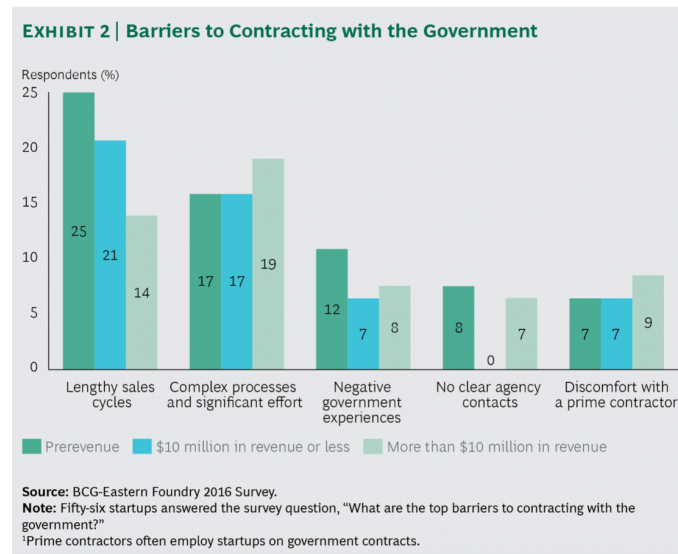
Indicator	Average difference between top and low performers
Cost (percent of procurement volume)	4 % of total procurement volume (overall average is 1.4%)
Costs (in person-days)	71 person-days (overall average is 38)
Number of bids	7 bids (overall average is 5,4)
Incidence of cross border wins	40% (overall average is 3.4%)
Time taken by the procedure	180 days (overall average is 108)

By utilizing AI, government authorities can reduce the costs of the tender process by 20-40% (AiTenders, HEC). This would lower the barriers to entry of the public procurement process, which in return would lead to greater levels of competition and more innovation within the industry. Moreover, enhanced competition would in turn induce bidders to reveal their true valuations and result in lower contract prices, which helps both from the authority and business side in creating clarity (Estache)⁶.

Gains From Entrepreneurial Innovation Within Procurement

Startup companies offer a new frontier of innovation within the Public Procurement industry, but as of yet they are unable to effectively engage in procurement due to the lengthy sales cycle of government contracts and the complexity of RFP's. Currently, the public procurement market is slow to change and set in its inefficient ways. However, the implementation of AI into the market

would create a less exclusionary landscape that would allow for startup companies to engage in public procurement.



As seen in the chart above there are many barriers for startups in regards to contracting with the government. The two main issues are lengthy sales cycles and complex processes. This is due to the arduous and time-consuming nature of procurement which is often very repetitive and for small teams such as startups, it is often impossible to dedicate the time and money to bidding on a public tender. As a consequence, authorities are left with the same established contractors bidding on contracts and the process remains highly inefficient. This creates an exclusionary system whereby innovation is slow within the public procurement process and authorities are unable to benefit from the aforementioned positive competition effect. Moreover, by excluding companies that are driving advancement authorities lose out on the gains in efficiency that cutting-edge technologies have to offer. However, the implementation of AI into the process would lower the barriers to entry by increasing the productivity of the process. This would allow for startups to engage in public procurement and thus for the industry to benefit from rapid innovation and gains in efficiency.

Moreover, the technologies that startup companies have to offer would accelerate the shift towards Green Public Procurement (GPP)⁷. This would drastically reduce the impact of the

⁷ https://ec.europa.eu/environment/gpp/index_en.htm

procurement process upon the environment as well as appease public opinion on climate change. For example, according to Stevens, “Citizens' procurement preferences are not stand-alone attitudes, but reflect their social and socio-economic situation as well political attitudes” thus by optimizing the market using AI, authorities gain economically as well as politically.

Solutions for authorities

The implementation of AI into the public procurement process is the solution for unlocking an unparalleled amount of productivity in a now inefficient industry. There are many applications of AI that could revolutionize the process on both the authority and business side. The four that would yield the greatest immediate benefit for authorities are:

- 1) The creation of a pan-authority bidding system that allows for a centralized platform for public procurement and the sharing of best practices,
- 2) The use of automation to control tender documents before they are sent to respondents
- 3) The use of automation in the evaluation of bid responses,
- 4) The introduction of automation systems within contractors working with the government

The creation of a centralized pan-authority bidding system

One of the largest problems for authorities and contractors is the lack of consistency between tender documents inefficiencies within cooperation. Furthermore, as evidenced throughout this paper, there is also a lack of unity between the practices of different authorities which leads to some being more productive than others.

The implementation of a centralized pan-authority bidding system that allows for consistency across contracts and projects would increase productivity within public procurement exponentially. First, the system, powered by AI, would allow for respondents to bid for tenders much more efficiently due to increased clarity between projects and tender documents. This would increase competition as the costs of tendering, in terms of labor and economic cost, would decrease thus reducing the barriers to entry. Moreover, this system would also begin to allow for the introduction of startup companies into the industry, which would boost innovation and invigorate the procurement process.

Secondly, the system would also allow for authorities to examine their own practices and adapt them in response to systems that work well for other authorities. By creating an intelligence network, inefficient authorities would be able to target areas of improvement and cooperate with other members of the process. Moreover, the centralization of the tender process would aid communication between the businesses and the authorities, thus leading to less instances of miscommunication, helping to reduce time and money spent rectifying simple mistakes caused by such inefficiencies.

The automation of tender documents

The compiling of tender documents is a time consuming and arduous process that is often done subject to human error. The inefficiency of the process drives up costs both in terms of labor and economic cost. The implementation of AI into the compiling of tender documents would greatly increase productivity by speeding up the process as well as reduce its propensity for error.

First, often tender documents are repetitive between projects of a similar type, thus AI could be used to auto populate fields that remain constant between tender documents. For example, systems of machine learning and natural language processing would greatly streamline the tender compiling process. Moreover, systems such as smart searches would allow for the team compiling the tender to quickly check whether they have included all of the correct requirements and modify any mistakes previously made. Systems of automation also help to increase productivity by improving collaboration and cooperation between team members as well as external agents being brought into the procurement process. This helps to cut valuable time off of the tender process by facilitating real-time questions and answering functionalities which would iron out the misunderstandings within the procurement process.

The creation of smart templates would also allow for authorities to more efficiently compile specific projects and detail specific requirements. This would also allow for contractors to recognise specific requirements and improve the speed and compliance of their tender responses.

The automation of bid response evaluation

Another aspect of the public procurement process that is extremely time consuming for authorities is the evaluation of bid responses. AI holds incredible potential in optimizing this process. For example, AI systems such as smart searches can quickly scan documents to check for compliance, thus reducing the amount of time and labor that it takes to check for certain requirements. Moreover, AI systems facilitate cooperation on tender evaluation, allowing for leaders to assign their teams to specific parts of the document and view the progression of the evaluation from a smart dashboard. This allows for teams to efficiently handle long tender documents and minimizes the risk of human error. The automation also allows for teams to share comments and view iterations of the documents in a single centralized platform thus boosting inter-team productivity.

Implementing automation on a contractor side

The benefits of AI are apparent on both the authority and the business side. By implementing automation on the contractor side, the costs of bidding are reduced for businesses. This helps to

reduce the barriers of entry into public procurement as well as increase competitiveness which has benefits for authorities due to the aforementioned positive competition effect. Moreover, systems of automation on the contractor side helps to increase the likelihood of full compliance thus authorities have to waste less time evaluating tender bids that are non-compliant.

Authorities are in a position whereby they could work with contractors to implement such systems of AI to increase productivity on both sides of the procurement process. In doing so, time and money would be saved across the whole process which could be reinvested into schemes such as green public procurement. In increasing productivity to the full potential that AI has to offer, enough capital can be released to solve more pressing issues such as climate change.

Problems for Respondents

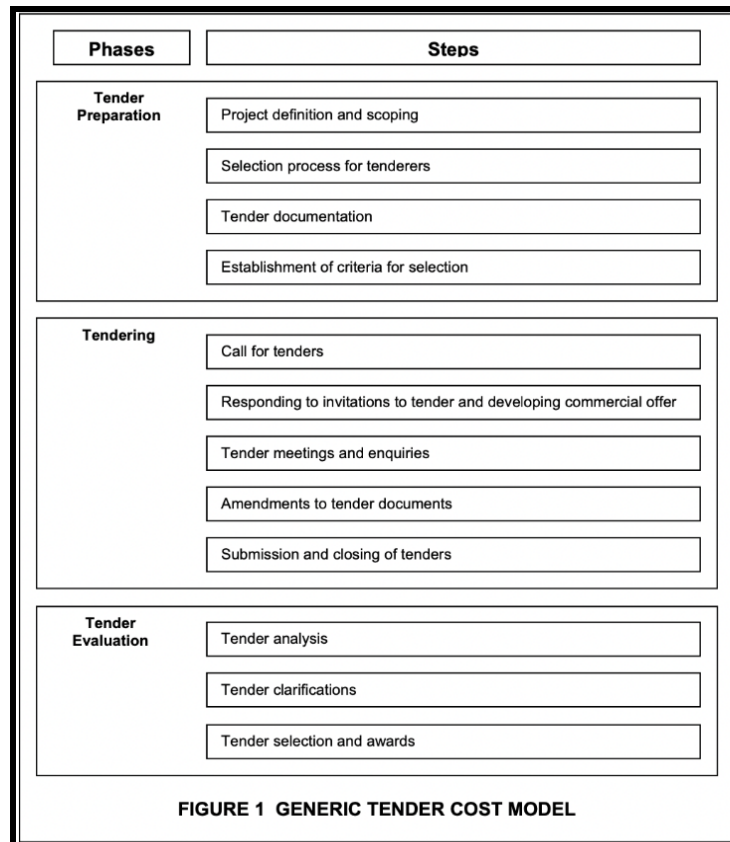
The inefficiencies of the procurement process affect respondents to a greater degree than it affects the issuing authority. Recalling the study conducted by PwC, in the EU, 75% of the £5.6 billion costs are incurred by respondents or businesses. This section of the paper examines what makes up those costs and how they can be mitigated.

A: Costs

Huge Monetary and Labor Costs

All respondents face timely and monetary costs that harm the efficiency of the procurement process. With a streamlined procurement process, companies would have the opportunity to save time and money that can be put into development ideas on more sustainable development practices. Recent estimates suggest that the cost of tendering accounts for as much as 5% of spending within the industry, which would equate to roughly \$650 billion in today's market (Aitenders, HEC). This is due to the cumbersome nature of the public procurement process that demands economic and labor costs at each stage of the bidding process. In fact, due to the complexity of many tenders and the multitude of requirements that must be met to ensure that the bid is compliant, tenders require a huge amount of human effort, with there often being a team of 2-3 people working on a tender at any set time. This effort is elucidated by the graphic below, and shows how anywhere between “0.25% to 6% of turnover [may be] expended on competitive tendering” (Porkka et al).⁸

⁸ <https://centaur.reading.ac.uk/12125/1/File12125.pdf>

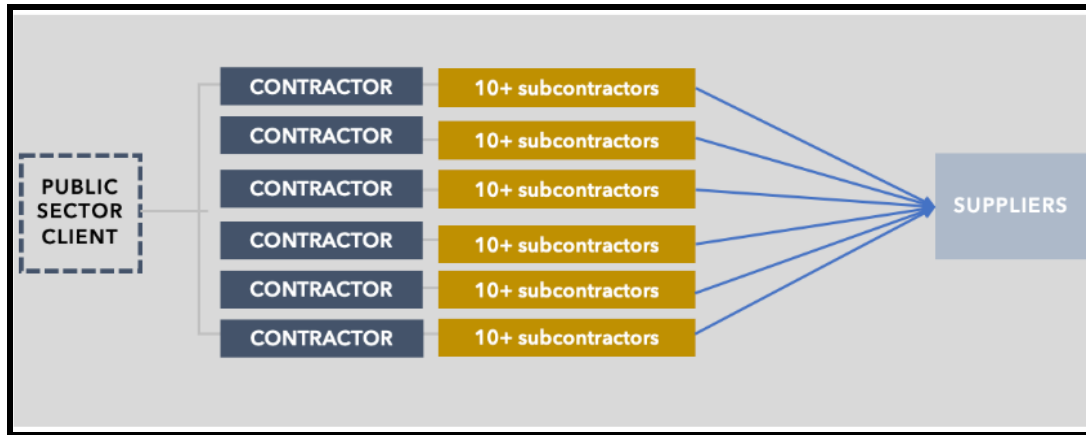


Source: ‘Cost of tendering: Adding cost without value?’ John Dalrymple

A breakdown of the costs is further presented by Dalrymple et al, who postulate that “if a public sector client seeks tenders from six capable contractors for a design and construct project; each of these is likely to seek tenders from, say ten subcontractors”, with each company involved in the tendering process set to endure costs.⁹ They further argue that the cost of tendering averages around 0.5% of the value of the contract for simple construction projects, which equates to 3% of the contract value when split between 6 contractors (Dalrymple et al). However, the cost of tendering does not remain constant for more complex projects, for example, in design-build projects the cost of tendering may rise to 3% for each contractor, which when multiplied out by six contractors equates to roughly 18% of the contract value.

The graphic below highlights the level of involvement that goes into working on a tender, as well as the cascading impacts of the costs endured.

⁹[https://researchbank.swinburne.edu.au/file/715446ef-53a9-4c62-8dbc-9c83f03e3f45/1/PDF%20\(Publishe d%20version\).pdf](https://researchbank.swinburne.edu.au/file/715446ef-53a9-4c62-8dbc-9c83f03e3f45/1/PDF%20(Publishe d%20version).pdf)

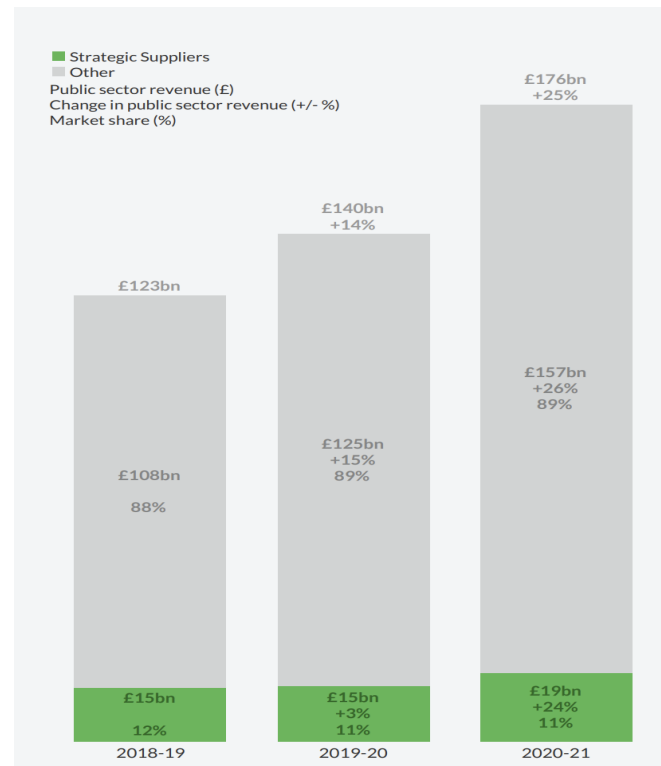


Source: AiTenders, adapted from 'Cost of tendering: Adding cost without value?' John Dalrymple

B: Lack of Competition Due to Tender Costs

The costs of the procurement process for respondents are often so insurmountable that it discourages firms from entering and completing bid processes. This is compounded by the fact that governments also tag on additional requirements or details related to the project that requires another round of bids, which many companies cannot afford. As a result, there are only a select few of companies that are hired for government projects. For example, in the UK (as seen in the figure to the right), the top 40 Strategic Suppliers accounted for £19 billion of in revenue of the total £176 billion spent on public sector procurement.¹⁰ To put this into further context, these 40 Strategic suppliers, companies that have operating revenue over £100 million, account for .3% of the total 113,00 suppliers, but earned nearly half of revenue as all the Small and Medium Enterprise collectively.

Also, in the US, studies found that in 2015, 44% of government procurement contracts went out to contracts that only had one bid, indicating a severe lack of competition.¹¹ The lack of



¹⁰ Source for Graph:: [UK Strategic Suppliers 2022 Interim Report](#)

¹¹ "New Study Uncovers Why There Is so Little Competition in Government Procurement," *Carnegie Mellon*, 14 October 2021, <https://www.cmu.edu/tepper/news/stories/2021/october/government-procurement-competition.html>

competitions allows for SMEs to be eliminated, large corporations to dominate the market, and lack of effort for projects. With a more efficient procurement process, a greater diversity of suppliers can enter the market and offer new, innovative solutions for sustainable developments.

C: Reinventing the Wheel

In addition to the monetary costs described earlier, the tendering process involved repetitive tasks that require a significant amount of time. Despite cost being one of the largest pains associated with the public procurement process, there is also a substantial amount of time that must be invested into each tender bid. Carzo estimates that “best practices show that it takes about two and a half weeks for a tendering process from the day you send the RFP to awarding a tender” (Procore)¹². This is due to the stringent requirements of many tenders as well as their repetitive nature.

In the words of one US contractor “tendering becomes so repetitive that, say there’s 50 requirements, 40 of them are the same as previous tenders that my team has already worked on” (Aitenders Primary Research). This level of repetitiveness creates high inefficiency within the process and conversely increases the time and money needed to prepare and submit a bid. Considering how the competitive tendering process involves successive bid rounds and constant revisions of contracts, it becomes increasingly difficult to afford time and money wasted on tasks. This is yet another reason why some respondents fail to progress through the bid rounds as they cannot keep up with deadlines and costs of the process.

D: Stressed Bid Teams

The effect of costly bid processes, lack of competition, and the completion of repetitive tendering processes creates ‘bid burnout.’ The overload of tasks that are placed on individuals or small teams causes them to focus energy on a variety of tasks, inevitably leading to some tasks not being completed effectively.

Additionally, when bid teams operate off different sources of information or do not have access to a centralized platform where roles are specialized, then it is easy to become confused and overwhelmed. For example, a study done of over 20 UK contractors tracked the onerous tendering process in order to illuminate the complications encountered. The first group of the study, the Gammas, had a 6-week tender project that required over “288” hours of work on the tender process alone. There were 1053 items in the bill of quantities that had to be priced and 105 clauses in the ICE Conditions contract. The team of 12 had to have 3 major meetings in

¹² <https://www.procore.com/jobsite/how-long-does-the-bid-process-take-for-most-projects/>

order to discuss these line items, which they deemed 105 as “onerous” (Laryea and Hughes).¹³ These clauses had to be reviewed by the client.

It is also known that in the bid process, the authorities pile on new tasks and requirements as the tendering stage progresses, leading to stringent deadlines with little time to operate. The deadlines imposed on bid teams add an additional layer of stress that otherwise could be solved simply with technology that allows managers to delegate tasks, monitor deadlines, and manage resources. With this technology, managers can see if additional members on the team are needed or if they can cut back spending in some areas. This would all save time and stress.

Lastly, one of the additional stressors for bid teams is doing a lot of work on a certain bid just for that bid to be a ‘no-go.’ Given the fact that the bid-to-win ratio is, on average, 1 in 6, bid teams’ hard work on bids is redeemed only 16% of the time. Therefore, a technology that can crunch historical data on bids to predict the amount of time needed, the number of resources, and success and loss factors would lead to better worker well-being.

Solutions for Respondents

The multitude of issues encountered by respondents during the procurement and tendering process calls for a simple solution that addresses such a complex problem: Artificial Intelligence. There is a 5-step solution that can address each phase of problems incurred by respondents described above.

1. Selection Process

The bid-no-bid or go-no-go process can be very overwhelming and costly for contractors. As described previously, bid-to-win ratios are usually 1 in 6, thus making the decisions to place bids very important when trying to save costs. Luckily, there is a solution: Artificial Intelligence. With AI technology in the procurement process, the machine learning algorithm can identify risks related to technical, legal, financial, and operational issues, making it easier for companies to conduct and organize in-depth reviews of the risks and decide if they want to place the bid. Based on estimates, AI technology creates 20 to 40% of productivity gain for users who adopt the technology (AiTenders, HEC). Therefore, respondents will spend significantly less time on combing through tedious information in contracts and identifying risks. This can save the millions of dollars lost in the bid-no-bid process, where firms hire additional resources such as consultants, pay employees for the extraneous hours put into the bid process, and lose valuable time that could be used for focusing on winnable contracts. T

¹³ Laryea and Hughes. “Risk and Price in the Bidding Process of Contractors,” *Journal of Construction Engineering and Management*, September 15, 2010.
https://centaur.reading.ac.uk/8158/1/Risk_and_price_in_the_bidding_process_of_contractors.pdf

2. Analyze

A lot of time and money is wasted on identifying requirements and reading contracts. This is an unnecessary expense that is easily fixed by AI technology. In the tendering process, Artificial Intelligence can help respondents analyze requirements embedded into extensive contracts by extracting repetitive information and responses from past tender documents. This solves the granular costs related to the 'reinventing the wheel' pains that respondents incur, the timely and monetary costs, and the stress that bid teams face in the silos process. By doing this, much time is saved from perusing through the lengthy documents and responding to each requirement.

3. Comply Stage

The compliance stage of respondents' tenders and deliverables are two of the most fundamental stages of the tender/procurement process that Artificial Intelligence can optimize. Projects with important documentation and that requires a collaborative review of requirements or multipartner reviews can be difficult to navigate manually. AI Technology offers a software that streamlines the collaborative review process insofar as documents can be uploaded to the platform where positions can be assigned to each portion of the contract, validation is made easier with the simple click of a button, and comments can be made to flag, emphasize, or take notes on certain parts of the contract. Overall, AI technology leads to a quick and easy requirement extraction, a single source of truth for all information to be extracted, and the elimination of silos.

4. Response

AI Technology is essential for the tender response process. With technology that scrapes past responses to similar questions and documents, artificial intelligence allows respondents to save time spent on lengthy and repetitive responses.

5. Contract Management

The full reach of AI Technologies in the procurement process extends beyond the bid phase. Once respondents' bids are accepted, artificial intelligence can assist in claiming the project and tracing the steps of completion.

Conclusion

Artificial intelligence has the potential to release the capital lost to inefficiency within the global public procurement process in order for authorities to finance schemes such as green procurement. As of now, authorities and businesses are yet to completely adopt climate-friendly procurement procedures due to their increased cost. However, AI offers a solution to this by unlocking 20-40% more productivity (Aitenders, HEC) within the process which would negate the increased costs of green public procurement (GPP). AI optimizes both sides of the process, by increasing cooperation and efficiency between both authorities and contractors; it holds the key to a more sustainable, productive future though it requires authorities and contractors to adopt it.

The state-of-the-art technology offers a critical solution to global challenges that not only impacts authorities and respondents, but the world. In a \$13 trillion procurement market, artificial intelligence can release \$500 billion of productivity. Streamlining the procurement process is one of the easiest, yet most impactful ways of leading the world towards a more sustainable future. Yet, despite the overwhelming benefits artificial intelligence can offer in the procurement process, governments and contractors globally are yet to widely adapt such solutions.

Figure 24. Industry adoption and use of automation

	Aerospace, Defense	Banking, Insurance, Financial	Engineering, Construction, Real Estate	Healthcare, Pharma, Chemicals	Manufacturing, Processing	Oil, Gas, Minerals, Utilities	Public Sector, Government	Services, Consulting, Outsourcing	Technology, Software	Telecoms
Front-end contract request / selection interface to business unit	24%	47%	22%	25%	38%	31%	33%	35%	37%	48%
Ability to assemble standard contracts from templates	35%	12%	22%	25%	46%	17%	13%	50%	27%	40%
Ability to assemble contracts from a clause library	6%	0%	6%	8%	38%	14%	0%	18%	13%	20%
Defined and automated workflow for non-standard terms or agreements	6%	0%	6%	8%	23%	7%	7%	12%	20%	16%
Monitor reviews / approvals status	24%	41%	19%	50%	46%	26%	13%	18%	30%	44%
Automated document circulation, redlining	12%	0%	9%	8%	23%	17%	13%	21%	20%	16%
Risk scoring	18%	12%	13%	0%	8%	17%	7%	12%	20%	32%
Repository of signed contracts	65%	82%	34%	75%	62%	55%	33%	65%	67%	52%
Contract obligation extraction	12%	0%	0%	17%	15%	7%	0%	26%	23%	24%
Post-signature monitoring of compliance with contract terms	18%	6%	6%	8%	23%	12%	0%	18%	30%	20%
Integration with other key applications (ERP, financial systems etc.)	18%	18%	28%	0%	8%	31%	13%	12%	10%	12%
Management reporting / dashboard	29%	18%	28%	42%	31%	36%	13%	24%	53%	24%
Contract analytics – individual agreements	6%	0%	3%	0%	15%	10%	13%	21%	17%	12%
Contract analytics – portfolio of agreements	6%	0%	6%	8%	15%	12%	7%	24%	23%	12%

Source: IACCM Benchmark Report 2019

As seen in the graph above, despite the overwhelming benefits Artificial Intelligence can introduce into the procurement market, 0% of customers use artificial intelligence for contract obligation extraction in the Banking and Construction industry, which are some of the largest industries in major countries. In order to incite real change, authorities and contractors must act to implement AI into the public procurement process and revolutionize a process that has historically been resource draining. AI puts contractors and authorities on the edge of a productivity precipice, set to increase efficiency by 20-40%, all they need to do is *take the leap*.

To find out more about how your company can always stay a step ahead, head to <https://www.aitenders.com>, an industry leading, revolutionary AI solution to public procurement.