FUTURE CITIES CANADA

TECHNOLOGY PROCUREMENT: SHAPING FUTURE PUBLIC VALUE

COMMUNITY SOLUTIONS NETWORK
RESEARCH BRIEF

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Executive Summary

We are currently in the midst of a global pandemic. Governments are working to address a public health crisis and a wide range of related economic impacts. It's a time when the relationship between public and private sectors is evolving rapidly. Governments are using emergency procurement powers to make policy choices more quickly and with less scrutiny. This is an exceptional moment in terms of public process, but it is also the most recent development in a long arc that has defined the trajectory of the public sector during the past four decades: privatizing technical capacity and digital infrastructure.

The idea that digitization provides governments an opportunity to embrace innovative products and services, streamline existing processes, and broadly improve operations has become a default assumption over these past few decades. And technology procurement (government purchasing) is where a range of digitization related issues—power, control, and democratic accountability—are surfacing. The tensions inherent to these themes play out every day in real-world cases of government technology operations, several of which are documented in this brief.

Our brief focuses on one core idea: ***that future public value can be better defined through technology procurement***. And the good news is that new procurement approaches can be used within existing policy frameworks without the need for regulatory change. This is helpful because they present a surface area to improve public technology without having to wait for the next wave of laws, standards, and other (rightfully) slower processes that address emerging and long-standing digital rights and digital governance issues. As we discuss, procurement can also be a tool to engage with longer-term strategic opportunities. And finally, as we emphasize throughout this brief: any procurement process must support and retain space to say no to a proposed technology if its use is not defensible from a public value perspective.

Although future public value is created by a broad set of policy actors, most of them are under-represented during technology procurement processes. Technology procurement is increasingly falling to a narrow subset of experts in government IT, innovation, and digital service departments, and, in some cases, the external advisors and strategists they solicit. A central goal of this brief is to offer senior policy experts across government some insights into how to better define and direct future public value through technology procurements, and to offer incentives for them to be involved in these processes.

This brief describes a range of approaches to support improved technology procurement that creates and protects public value. Three of the suggested approaches to achieve this are: stakeholder engagement, scoping tenders, and designing procurement as a process with a series of defined steps. After describing these approaches, we move into defining and exploring some of the risks and opportunities related to technology procurement in terms of protecting future public value. We look at this topic in both the long and short term, and in the context of strategic and tactical considerations. From a risk perspective, we take a look at legacy IT, freemium/trial products, lock-in, loss of accountability, and lack of democratic process. From an opportunities perspective, we explore digital infrastructure planning, improved stakeholder engagement, improved processes to mitigate value loss and foreclosure, hard and soft standard setting, and more.

Procurement is unique to each particular government context, and there is an ever-expanding array of themes in the politics of technology in government. Many of them will not be addressed in this brief. We do not focus on waste avoidance or efficiency, for example, and we do not focus on digital service excellence. Several organizations, notably Open North, 18F, Open Contracting, and Code for America, have significantly advanced work on these ideas and created resources in support of this work. This research brief is intended as a complement to these existing resources (for a list of some of these resources please see Appendix B). Finally, we would like to thank Kevin Webb for his contributions to this piece in helping define digital public infrastructure and assessing the Waze program from a democratic accountability perspective.

Foreword

by Open North

First defined in 2018 by Lauriault, Bloom and Landry, an Open Smart City is one where all actors, including residents, collaborate in mobilizing data and technologies to develop their community through fair, ethical, and transparent governance that balances economic development, social progress, and environmental responsibility.

As Canadian communities across the country explore smart city initiatives, there is a pressing need to better understand the opportunities and risks presented by data and emerging technologies and put open smart city principles into practice.

Open North has commissioned a series of research briefs for policymakers and practitioners to provide insight into how data and technology intersect with challenges local communities are grappling with, such as food security and shared transportation. The research briefs identify complex policy issues from an open smart city lens, describe their importance and provide key considerations for policymakers.

New technologies are raising a wide range of uncharted digital rights and digital governance issues, while also challenging long-established processes, sectoral relationships, and power structures in municipalities. This research brief tackles the long-standing problem of ensuring that technology procurement leads to long-term public value to city governments and residents. It does so by framing technology procurement as a space of defining future public value, while also identifying tactical issues for communities that are adapting to a new landscape of technologies and business models.

Acknowledgements

The authors would like to thank Kevin Webb for his contributions to this piece in helping define digital public infrastructure and assessing the Waze program from a democratic accountability perspective.

The research builds on the Open Smart Cities Guide, which provided the first ever definition of an Open Smart City. It was published in 2018 as a part of a year long collaborative research project led by Open North and funded by Natural Resources Canada's GeoConnections program in 2018. The authors are Dr. Tracey P. Lauriault (Carleton University), Rachel Bloom (Open North) and Jean-Noé Landry (Open North).

These research briefs are produced for the Community Solutions Network, a community-centric platform for communities to connect and build a national centre of excellence in open smart cities. As the project lead, Evergreen is working with lead technical partner Open North and other partners to provide valuable information, learning opportunities, advisory and capacity building services to Canadian communities in key areas of data and technology, helping to improve the lives of residents.

We offer—at no cost to communities—a comprehensive Advisory Service for Canadian communities interested in developing and implementing open smart cities projects. To learn more about the Advisory Service, please visit communitysolutionsnetwork.ca.

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Introduction

As we continue to integrate new technologies into our lives, the digital governance issues that come along with them are becoming more apparent. In some cases, new technologies are challenging long-established governmental processes, sectoral relationships, and power structures. In other cases they appear entirely new, without precedents or existing legal frameworks. As governments continue adapting to this rapidly evolving terrain they should look to procurement as a space of great policy opportunity—a space to help guide and direct new technologies and services, and to manage the risks they bring.

In this research brief, we explore contemporary technology procurement through the lens of future public value. Future public value can be defined as the monetary or non-monetary worth of an asset at some point in the future, including the rights or capacity to control an asset. A key distinction of future public value is to differentiate from the present value of a technology, which is immediately bought, sold, or contracted. The concept of future public value is challenging to pin down with a simple definition, so we will provide concrete examples throughout this paper.

Technology procurement has an impact on the public interest because it can define the way a technology is used, in the short-term, as well as the long-term conditions of those uses. Procurement is one place where the public sector can lose or gain its influence over a technology design process, and where the possibility of shaping the technology's use in the future can be either ensured or foreclosed. For these reasons, procurement is an important tool to proactively decide how future public value is defined, created, and protected.

This topic is particularly relevant at the time of writing as the world deals with the coronavirus pandemic. During this time of economic fracture, conversations about post-COVID rebuilding, and the threat of impending austerity measures, it is vital to focus on future public value capture. Many new efficiency-boosting technologies are on offer, and many existing technologies look newly appealing. But governments cannot embrace these technologies without clear-eyed attention to the potential of future revenue loss, nor can they afford to be locked-in to long-term relationships that foreclose the possibility of future public value—more directly, money and control—to private actors.

Consider the "freemium" pricing model that many technology vendors use. Technology products are offered "for free" to start, or try—an offer that is particularly appealing to governments when budgets for non-essential functions are disappearing. For example, in July 2020 the City of Toronto announced a potential sole-source contract with PayIt, a digital platform that offers payment services for residents to pay government bills such as parking tickets, property taxes, etc. The company's website states that the technology is "free to the government".

PayIt makes its money by acting as a financial intermediary between government and residents, billing residents directly. In other words, the government procures, residents pay, and the vendor controls (and profits). This business model is not new, but it is newly appealing when the budget is shrinking, and the technology could mean fewer in-house staff on payroll. But contracts like this one have long-term implications for municipal finance, public sector technical capacity, resident service, and democratic accountability. In terms of future public value the product offers immediate public value, but only by trading long-term, future public value. Considering procurement as both a tactical and strategic tool can reveal these tradeoffs and help to manage them appropriately.

There is no one-size-fits-all policy to mitigate these potential harms or to promote effective procurement. Each jurisdiction, each technology, and each domain is unique. This research brief is a resource for governments to become familiar with some of the potential risks and opportunities that can arise from technology procurement by considering it through the lens of future public value. It provides a foundation on which civil servants can evolve and expand strategies and tactics that fit their specific contexts, to maximize public value in both the short and long term.

With an understanding of the specific challenges related to public value and technology procurement, policy makers and practitioners can approach technology procurement as a strategic mechanism for immediate interventions and as a central element of long-term strategy for civic engagement, digital rights and law, public infrastructure design, and economic development.

Defining Technology Procurement and Future Public Value

Definition

Procurement is a complex process and it is unique in every government. Factors like the size of a city or level of government, the balance of revenue streams, and the number of staff involved in the process all define the boundaries of any single procurement, and will inform the broader procurement policy. Government procurement—even technology procurement—has a long history, and is changing rapidly. For the purpose of this research brief, technology procurement in the public sector is loosely defined as: the process that a government uses to purchase a technology product, or technology development services, from a private sector technology vendor.

Standard government technology procurement has several basic building blocks. Procurement typically begins with a clear need that can plausibly be solved—whether or not a solution already exists. The state of the market and the plausibility of new solutions are explored, in some cases through a formal public Request for Information (RFI). The core of procurement is a technical scope, or Request for Proposals (RFP), that defines the government's needs and information about possible solutions. The RFP document lays out what is being sought, standards, and the conditions a vendor must meet in order to qualify to submit a proposal. Once posted publicly, vendors reply to an RFP with bids, and the government selects a vendor based on the criteria defined in its procurement policy. Procurement policies sometimes include, for example, an obligation to select the lowest-cost solution if the scope falls within a particular price bracket, or process exceptions for sole-source technologies. Procurement policies may also include a process for "approved vendors," which facilitates repeated contracts. The winning vendor negotiates a contract with the government, and the technology is delivered, or the project is carried out. The contract may specify subsequent evaluation criteria or ongoing maintenance requirements.

In recent years, governments have begun experimenting with different models, such as "challenge-based procurement" or "innovation procurement." In the former, governments leave more space to the vendor to define how they would solve a problem rather than defining a solution from the outset. In the latter, governments "procure" an innovation process, as a collaborative partnership with a small company. Though these may address some of the known issues with standard procurement, they also create new ones. The Risks and Opportunities section (pg. 15) elaborates these emerging problems, and Appendix A includes examples of challenge-based and innovation procurement.

Two Important Historical Notes

There are two key things to keep in mind when considering the history of government purchasing, and how they impact the process today: how technology procurement is different from traditional procurement, and how the role of IT in the government has evolved in the last few decades.

Technology procurement versus traditional procurement: Most things that governments buy or lease—from paper clips to pick-up trucks for the parks department—are unit-based, off-the-shelf products, produced by vendors in a stable industry. This is not true of most contemporary technology products. Software (computer programs) are never finished. The products themselves (not to mention their political and social implications), by definition, change over time, becoming more or less valuable, costly, or effective, as they are used. They gain and lose features and become more or less integrated with other software and hardware—very unlike a stapler or a chair. Any purchasing decision must consider how a product might change, how that change relates to the initial contract, and who decides whether the technology continues to uphold the public interest after the change.

The role of the Information Technology (IT) department: When governments began using digital technology more broadly, they created IT departments responsible for core digital functions and infrastructure, such as making sure ID badges, computer systems and employee email functioned properly, that files were accessible to those that needed them, and that digital systems were secure. Over time, that role has expanded beyond basic internal services because more government operations rely on technology. Today IT departments are centrally involved in many kinds of decisions and are responsible for many kinds of operations. In a tender process, the role of IT sometimes eclipses the role of domain-specific

departments such as transportation, social services, parks, human resources or planning and development, despite the fact that specific departments may be more directly impacted by a technology decision or have a better sense of residents' needs in a particular domain.

When other departments don't have adequate room at the table or power in the decision-making process, there are serious technical and political implications. There is a natural tendency for IT, innovation, and digital service departments to focus on or over-index areas where they have proficiency (security, efficiency, technical features) while domain-specific and contextual factors (resident needs, operational integration) may not receive as much attention.

Furthermore, this distribution of responsibility shapes how an RFP is written (the requirements included, the products and services considered, the conditions for long-term maintenance), government's dependency on vendors, technical capacity-building across specific departments, and, at the highest level, long-term political priorities. On a relational level, centralizing responsibility for everything related to technology in the IT, innovation, or digital service department—including and especially procurement—can cast members of other departments in a defensive role, making them out to be critics if they have issues with a proposed technology. In the long-term, it may even constrain their capacity to perform their role, if they have to work through the IT, innovation, or digital service department.

For these reasons, we emphasize how technical products change over time—an issue of future public value, as described below—and explore the tactical and strategic opportunities that exist when domain-specific stakeholders have a larger, more proactive role in technology procurement.

Tying the Idea of Future Public Value to Technology Procurement

Conventional procurement is focused on mitigating known risks (poor technology, corrupt process) and ensuring basic value (product or service delivery). Building on that foundation, we introduce the idea of future public value as a critical reorientation. The term "future public value" is different from language that is typically used in discussions of government technology procurement. But there are familiar examples, such as parking management, which illustrate the two basic concepts behind future public value.

The first concept is ***public value***. Consider the square footage of a parking space. It can be used in many different ways, including parking an idle car, of course, but also for green space, outdoor dining tables, or alternative retail (communities around the world exuberantly demonstrate these uses every year on "Parking Day", when spaces are reserved for anything but parking cars). What those alternative uses make clear is that parking spaces hold the possibility of public value, because of their location, ubiquity, size, etc. That value may not be quantitatively matched in parking meter revenue, and it could potentially accrue to different stakeholders (shopfront stores, residents, bicyclists). Determining what uses deliver the most public value should be an integral part of technology procurement.

The second concept is ***future value***. Consider a procurement that leads to a parking payment app built by a private company. On a technical level, the app is excellent, and on a design level it streamlines parking payment for citizens. The app creates significant monetary value through a new, uniquely digital, possibility: it allows the city to institute a dynamic price model that fluctuates with demand (such as

raising prices on the night of a festival when demand is high, to incentivize public transit over driving), which the city captures through a revenue share model with the vendor. Furthermore, the app saves the city thousands of dollars each year, because there is no longer need for internal operations to manage parking payment.

This app seems like a terrific value proposition—but it forecloses future public value. The contract is written in a way that prohibits the government from reallocating parking spaces for alternative uses—even for a single day of the year, like Parking Day. Furthermore, the app vendor has proprietary control of parking usage data, making it impossible for civil servants to evaluate when and where streets could most effectively transition to alternative uses. Years later, during the coronavirus pandemic, when restaurants are only allowed to operate if they can offer outdoor seating, the city government finds itself unable to reallocate parking spaces for ad-hoc outdoor dining, unless it either pays the full hourly cost of each parking space, or requires restaurants to pay. The price of parking is determined by the proprietary algorithm, and the vendor has no obligation to modify it. The government is unable to support local restaurants, and many close.

This example is intentionally extreme to help illustrate the idea of public value with something physical, tangible, and known (parking), and how it can be supported or foreclosed into the future. The example prompts several questions: What does it mean to allow a platform operator to set up the hardware and software that mediate core government operations like parking? Are new technologies desirable in the long-run, or are there elements of existing non-digital systems that would be beneficial to maintain? Under what conditions should either be true? How do legal options or remedies to break contracts come into play? An effective procurement process should ask these questions, explore the various possibilities for future public value, and the various risks and tradeoffs they imply.

The basic principle of future public value resonates across a wide range of public sector operations today. Because government needs and technical solutions are unique to a context, the variety of risks and opportunities they present is limitless.

Procurement as a matter of public infrastructure

> *Though many critical layers of public infrastructure are privately operated, we hold them to a higher standard and exercise greater public accountability and control to ensure they operate effectively, and in the public interest. We define standards to ensure the safety and compatibility from operators—the gas and electric grids operate the same way throughout the country or region, with extremely high expectations for reliability and safety—and, at least ideally, in the cases where monopoly provision is offered necessary efficiencies, we govern the business models and rate setting ability of infrastructure operators to ensure they're aligned with public goals and providing universal, fairly priced access... A growing range of new digital technologies now operate in similar ways as these existing physical forms of infrastructure. But unlike the physical infrastructure, which coordinates movement of people, things, and energy, or providing physical conduits for information, these new digital forms of infrastructure coordinate new layers of information that are increasingly part of public life.*
>
> **- Kevin Webb, Co-founder, SharedStreets**

Therefore, when we lace sensors throughout physical spaces, when we collect data, when we use technologies to support core public services (tax collection, administrative and licensing functions) we should begin with a specific consideration of public value, and how present decisions will play out in the future. Procurement matters because it is an essential tool for protecting the role of the public sector in defining future public value. These stakes are elaborated further in the section "Why Technology Procurement Matters" (p.11).

Real-Life Examples of the Issue

Two technology products illustrate how technology procurement can shape future public value in real-world situations: the Waze for Cities program and Elerts Transit Safety App. Both are used in a number of Canadian and US cities.

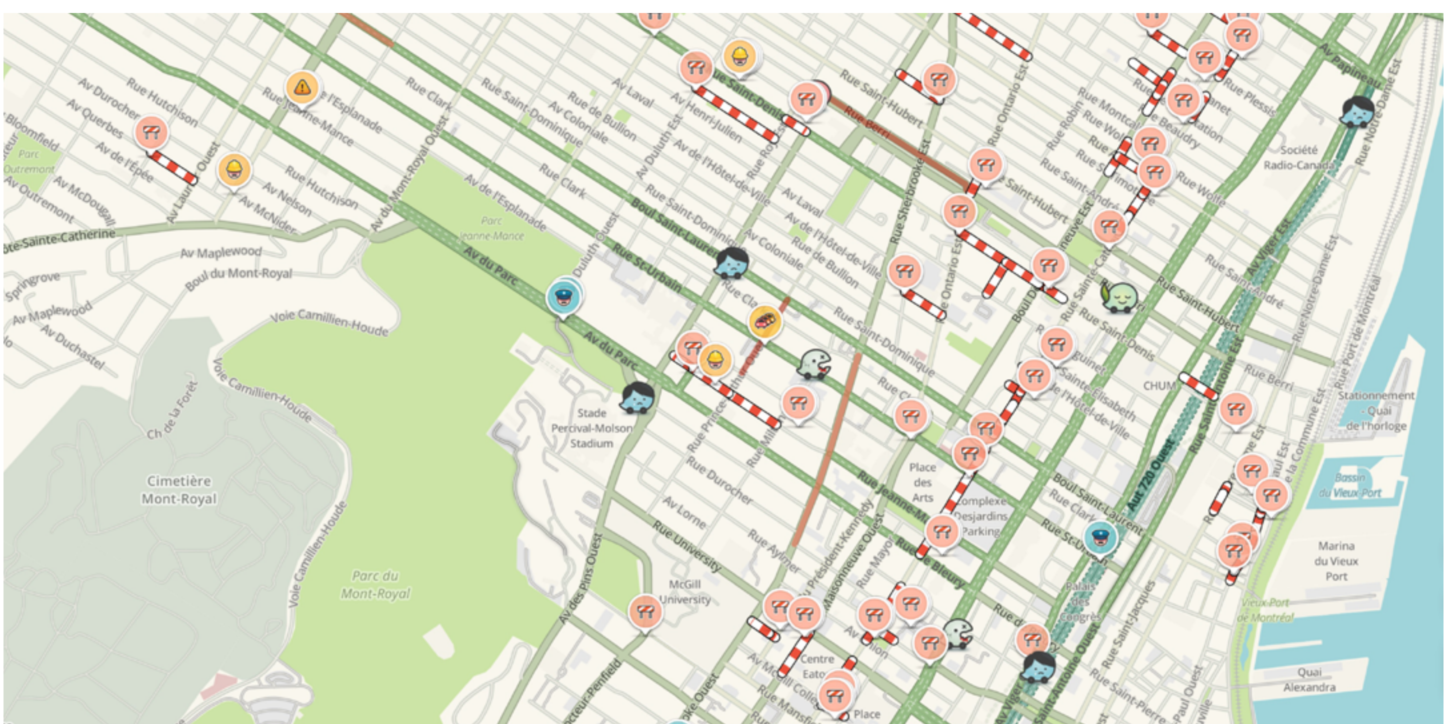
Waze for Cities

Waze is a traffic and navigation app for drivers. The technology collects data about traffic speed and road conditions, and allows drivers to contribute this information for the benefit of other app users. Waze facilitates trip planning, and shows unexpected road closures, for example. This program raises three different issues related to public value.

The first is bilateral data exchanges replacing conventional open data programs. In one Waze program, municipalities share data about road closures to Waze, using Waze-provided tools. This data is generated by government staff, and it creates public value, including improved routing and informing residents of roadway status. That public value, however, is exclusively available to Waze customers, and it is brokered through Waze. In return for exclusive access to city-created data, Waze trades access to transport data collected by the app in the form of traffic reports. In essence, Waze barters access to city data in return for providing access to already commercially available data. As reported when the City of Toronto joined the program: "No money is changing hands under the partnership. This is categorized as a "free" product, allowing it to bypass certain procurement processes. Waze earns revenue via in-app advertising based on the location of the user."

The first set of questions is: How can we determine the value of the data that each party gave and received? Is it equivalent, in this bilateral, "free" agreement? Would the city be better served by paying the market value for traffic data, and opening up road closures data as a public service, rather than an arrangement exclusive to Waze? And how might this be contemplated through a new approach to technology procurement?

The second issue is that Waze is well-positioned to take part in emergency management notifications and planning/response, because it has entrenched this bilateral partnership with many city governments. In some cities it is already integrated in municipal emergency protocols. Does the Waze partnership advance public interest? Perhaps, if it improves the speed and efficiency of emergency response. But consider the long-term implications. There are examples of companies abusing their central position in emergency response (see Uber's history of exorbitant surge pricing during



emergencies). Furthermore, by relying on the Waze infrastructure for collecting and publishing closures data (arguably a critical aspect of operating public roads), cities do not invest in publicly owned, non-Waze alternatives. This is a clear foreclosure of future public value.

The third issue with this technology is democratic accountability and the relationship between residents and mapping platforms like Waze. In this barter relationship it's not simply "Waze-created" data being shared with the city—the data is collected by Waze from residents who are using the Waze app. This raises entirely new questions about public rights and responsibilities when collecting and sharing resident-generated data. The exchange of more detailed resident-generated data, showing precise travel patterns, is now expected as part of permitting requirements for mobility services. And in 2019, the City of Los Angeles went as far as attempting to require that mapping platforms, including Waze, share detailed travel data, as well as alter routing algorithms to prevent traffic increases in wealthy neighborhoods, changes that are likely discriminatory. While mapping platforms like Waze play an increasing role in shaping travel behavior, and impact transportation systems at a city scale, we do not yet have clear expectations for resident privacy or rights of municipal governments in governing these systems. While we're still early in determining the proper structure for mapping platform partnerships, it's clear the bilateral, "free," Waze-directed model does not allow cities to navigate these issues well. With a new approach to technology procurement, cities could take an active role in shaping these conditions.

Elerts Transit Safety Apps

Elerts is a company that sells generic public transit safety apps. These apps can be customized to the preferences of a local public transit authority. The adapted apps are made publicly available to be downloaded by transit riders so that they can report any number of safety issues while riding transit. As the company describes it, the apps are for "real-time incident reporting from passengers and employees".

There are three value/values related topics to consider with apps such as these. The first is that through Freedom of Information requests made about the use of these apps in the Bay Area it was found that the app was used "disproportionately on Black and homeless public transit riders." If equity is a core value of public service provision, what does it mean to support increased "community policing" by procuring technologies such as these?

Secondly, what is the opportunity cost? Apps such as these "create investments in enforcement rather than community". Governments could instead fund a public education campaign to teach residents how to support people that are being harassed or bothered on public transit and avoid this surveillant approach entirely. Teaching community care through public education and programming is a very real opportunity that governments can play a larger role in supporting.

The third and final issue relates to ending a contract. These apps have low adoption rates, and their efficacy is not generally publicly disclosed. If it were internally recognized that the app was not serving an adequate purpose, how might a transit authority end the contract? What are the political pressures associated with reversing course on a purchase such as this? Sometimes the most innovative thing that can happen in government IT is to stop the usage of a product or service, rather than continue allowing its usage. It's also important for this type of intervention—ceasing the use of a technology—to be protected from the narrative of "government tech failure".

In summary, while both Waze and Elerts offer value, they also bring trade-offs in terms of control, dependency, ethics, equity, quality of service, systems design, and future revenue streams. These apps mediate residents' experience of the city, and they control real-time information about users' surroundings. Even if products are "free" for residents, these partnerships and programs are exchanges of value between corporations and communities.

Why Technology Procurement Matters

Key Considerations From a Policy Perspective

At the time of writing, during a global pandemic, the economic development engine that most cities rely on—real estate development—is grinding to a halt. As this compounds with changing provincial and federal subsidies, emergency budget reallocations, and unanticipated costs of pandemic response, cities are facing a looming spectre of bankruptcy. In response, governments are hastily creating and implementing ad hoc economic recovery plans, and claiming emergency procurement powers. Whether or not they are justified in the short term, these measures bring a heightened risk of selling off future value and future control without appropriate consideration.

As law and policy around digital governance has been slow to evolve and be formalized, governments should consider every one-off technology procurement independently in order to properly manage the issue of future public value. The requirements written for procurements, as well as the contract negotiations that occur as part of a tendering process, allow governments to assert control over a range of issues. These include: defining how certain technologies must work, the conditions for their use, the conditions for their maintenance, mandatory training to build in-house capacity and expertise, negotiating opportunities to leverage purchasing with other cities, issues of warranty, and more. Other issues that require consideration include intellectual property and its value, how accountability is maintained after a technology is iterated (as in: an upgrade is released or the company pivots), and under what conditions the revenue model should change.

Technology procurement can be used to keep future public revenue streams available, and to define who can tap into them. It can define how the access to a public service is managed; it can ensure that private actors are not monopolizing public assets, from streets to parks, with business models that erode those vital public goods for others; it can even define business models in the public interest. The design, governance, and effects of technology are choices—choices that must be made by democratically accountable actors, in service of the public and the public interest.

In the past two decades, there has been considerable political pressure for cities, provinces, regions and nations to be seen as innovative, tech-forward, modern, and progressive. The entrepreneurial lens sees every corner of public life as an opportunity for disruptive innovation. The role of IT, innovation, and digital service departments has grown hand in hand with the expansion of the smart city and broader "public interest" technology sector. This has given momentum to the growing trend of "innovation procurement"—which focuses on purchasing not a product, but a process of innovation, where the steps are emergent and the outcome is unknown (see Appendix A for examples in Amsterdam and Boston).

These goals—progressiveness, technical sophistication—may be best achieved through a strategic and tactical approach to procurement in conventional domains. Many new technologies have the potential to create civic value, and many do not. Technologies will constantly evolve and we must ensure that departments have the opportunity to build technical capacity at the same pace. It is critical that subject matter and domain experts are the ones driving the changes to how a government operates. Public value is at stake, and our present decisions will have long-term implications, be they parking and road toll revenue, transit revenues, user fees for services, lock-in and dependence, monetization of databases, access to public spaces, technical capacity-building, and more. Procurement of any kind of technology needs to happen with an informed strategic approach. We highlight three key factors of such an approach: stakeholders, scope, and sequence.

Stakeholders, Scope, and Sequence: The Role They Play in Technology Procurement and Why They Matter

Stakeholders

As entrepreneurs increasingly focus on developing products for governments, governments increasingly find themselves responding to products rather than determining how any technology product should operate (let alone actively participating in the design process). Moreover, IT, innovation, and digital

service departments often lead the procurement process for technologies that are used in other parts of the organization (e.g. case management software, or a routing app for waste management). From the perspective of a government employee, or a resident, these two trends are functionally equivalent. They result in technologies that are sometimes disconnected from public service delivery realities, and disconnected from resident needs.

Although both are generalizations, the overarching message is that there is an opportunity for a broader set of stakeholders to be involved in technology procurement. Governments can adopt procurement policies that require content and subject matter experts to drive product requirements and purchasing decisions. They can create processes that bring beneficiaries to the table to be part of the RFP definition and product evaluation. Governments can embrace norms that emphasize those roles while giving cross-cutting departments (such as IT and economic development) a necessary but supportive role.

Technical capacity and distribution of power are non-trivial hurdles in achieving these goals. Government departments must have the opportunity to define policy (and beneficiary) needs in nontechnical language as a starting point for procurement. Running an effective technology procurement should be possible without prior technical proficiency, although it could lead to increasing technical familiarity, and could go hand in hand with technical capacity-building among staff. In short, the goal is for staff to be in control of technology, rather than being dependent on a black box. In these ways, the throughline of a procurement process is attention to future public value (what future revenues will be available or foreclosed by a particular business model? Who owns a technology after its second version is iterated? And so on). It is crucial for senior administration to be involved in answering these questions throughout the design and decision-making process.

Consider

- Who drives the process? (External vendor? Internal experts? Which ones?)
- What are their stakes?
- What is their expertise vs. government staff?
- Who is the beneficiary, and are they involved in defining technical criteria?

Scope

Seemingly straightforward domain-specific technologies often carry wide-reaching and long-lasting implications. Approaching these technologies appropriately is a matter of scoping on two levels. After a diagnostic or audit of current technology systems in place—reviewing current policies, identifying internal expertise and stakeholders (HS200, lesson 1.2)—the procurement should begin with a definition of public value (both positive and negative). Instead of beginning with a priori technology, like "a new micro-mobility system," it should begin with "satisfying active transportation needs." The former leads to a catalogue-style approach: ultimately, choosing a vendor that is least expensive and most efficient in the short term. The latter invites a pro-active and multi-stakeholder consideration of cost, environmental impact, service provision across sectors, cooperation between vendors, and control over revenue/cost implications as a new system is designed. Taking a wider look at the problem being solved keeps the option of saying no to a proposed technology on the table if other approaches to solving the problem are surfaced.

It also opens the door to the consideration of multiple value streams. For example, in a city, active mobility creates value for not only traffic departments, but also for public health, parks, and economic development. Several departments might participate in defining value, and pool budgets into a joint procurement. This is also true at one scale larger: refocusing on outcomes might reveal opportunities for collective procurement together with a regional group of municipalities. In both cases, there may be a need for cross-jurisdictional oversight or alternative (shared) governance. All of these factors can be formalized in the procurement as a technology's scope.

Second, and relatedly, procurement must carefully define a technology's boundary—especially for factors that might initially appear outside of a technology's scope. Digital technologies grow ("scale") and change ("pivot") more often and more dramatically than conventional procurement was designed to address. The external actors driving that change, or internal actors with a vested interest, quickly find themselves setting and defining large swathes of government policy

by default. An important part of scoping any tech project is to imagine those potential incursions ("scope creep") and name them. This is what we mean by considering future public value. With those possibilities clearly stated, stakeholders can have an open discussion of what should be inside or outside a technology's scope, and commit to a narrow and explicit problem definition in the procurement.

In the PayIt example, the company was considered for payment technology. But through the app that they make available to residents, they are able to become the mediator of a range of transactions and interactions, not just payments. The technology could serve the function of managing non-payment transactions such as registering for services, providing news about the city, or as a way to participate in public engagement. All of these are important functions and define a government's relationship with residents. Something this important and of long-term consequence as digital infrastructure should not be decided through the procurement of a payment app.

Consider

- What future value is at stake?
- What integrations will the product require?
- What conditions will this technology create, for who?
- How to articulate future value as a product scope?
- What are the boundaries on scope?

Tactical considerations in procurement: best practices for specific procurement

- Which department(s) has/have responsibility for the procurement process?
- What is the problem and solution-space? (Background/market research, RFIs, outreach and publicity)
- How narrow vs. broad should the scope be? (Defining the solution vs. procuring an outcome or even procuring a process).
- What is the procurement process? (How the government writes the scope, defines criteria, develops the solution, and evaluates prototypes, and which stakeholders are involved at different phases)
- What integrations are necessary? (With infrastructure, existing public or private systems, deployment process, etc.)
- What ongoing maintenance is necessary? How to avoid lock-in? What are the criteria for re-evaluation (zombie software)?

Sequence

Procurement for certain technologies (particularly those that are core digital infrastructures) should never be as simple as issuing an RFP and buying the best option that comes back. Considering stakeholders and scope effectively requires a carefully designed process with several phases. A robust procurement policy can outline this process, beginning with understanding the problem and future value stakes, developing a scope, designing a product, evaluating the product, and defining the conditions for its future public value.

As discussed above, the process should be facilitated by a domain-specific department, and should begin with a definition of future public value (focused on beneficiaries) rather than a defined technology. It should explore potential negative outcomes and possibilities for auxiliary value capture, and result in a clear, tight scope. The design and evaluation process can incorporate iterative prototypes or evaluation by different stakeholders (residents, expert consultants, IT department, etc). Through this process, the conditions for future public value can be refined, before a procurement is actually executed.

In some cases, cities are creatively reinterpreting the sequence of procurement as an open ended design process, or, "Innovation Procurement." Rather than initially procuring a product, they procure a process of product definition. In so doing, government staff can assume a strong role as collaborators in the design and business model management. This approach is not suited for every situation, but can be effective for emerging issues with no clear solutions at hand (See Appendix A: Boston's "Action Research Project" and Amsterdam's "Startup in Residence")

Consider

- What needs to be understood at each phase of a procurement process?
- Which stakeholders should be involved in each phase?
- What processes, tools, or formalities are necessary at any given phase?

Strategic considerations in procurement: capturing future value

- How can refocusing on outcomes create conditions for collective procurement (as several departments; as a regional group of municipalities)? Is there a need for cross-jurisdictional oversight / stewardship?
- How can narratives be used to define the problem, the brief, the solution, the value capture, governance and distribution?
- How can the process be part of the outcome? (Creating communities of governance or maintenance; initiating behavior change)
- How does an anticipated solution inter-depend with systems, communities, policies—in positive and negative ways?
- How does an anticipated solution create shared value across municipal departments, external communities and organizations, or the vendor?
- How to build internal capacity for maintaining, developing, and governing the solution?

Potential Risks and Opportunities

A range of tradeoffs need to be considered when determining whether or not a new technology creates public value. It's not only a matter of the technology, but also the processes and business models that support it. Business models can create value or cause harm in both the short or the long term. Without consistent effort to identify and ensure future public value, cities will be perpetually caught reacting to the technologies and business models they are presented with, rather than taking a proactive role in defining how public technology should work. Procurement is one way that governments can flip this equation and take a proactive approach.

When considering procurement through the lens of future public value, a number of tactical and strategic risks become apparent. Tactical risks are immediate considerations that should be mitigated in existing procurement processes; strategic risks are longer-term considerations that should be incorporated into a government's holistic approach to technology.

Moving from a position of reactive buying to one of proactive definition requires organizational changes, policy-commitments, and capacity building. A number of resources enumerate the enabling conditions of robust procurement, including processes for auditing existing systems, vendor sourcing guidelines, and clear policy models. Implementing this guidance is neither simple nor fast, but governments can begin to embrace these reforms to protect and uphold the public interest. Below, we offer several tactical and strategic structural groupings to support process evolution and change.

Potential Risks Presented by Technology Procurement

Tactical

Low expectations due to legacy IT: The state of many government IT systems is poor. In this context, new technology is inevitably framed as 'better than the status quo.' There is also a persistent pitch that a new technology product or service can "leapfrog" existing systems, replacing them and their maintenance costs entirely. With an honest and well-justified desire to improve user experience, this context can push decision-makers to make steep compromises, sometimes accepting the lowest common denominator to achieve a fast fix and ignoring longer-term matters of public control and public value.

Lacking buy-in: Without a robust transparent procurement process that involves the appropriate stakeholders, there is a risk of committing to a product before there is buy-in from crucial departmental stakeholders or resident-beneficiaries. Buy-in is crucial because the success of any given technology depends on its adoption and use, both of which are conditioned by the relational process of stakeholder buy-in.

Lock-in: Many technologies present the risk of lock-in - acquiring a technology today can mean living with it in perpetuity. Lock-in can occur in a number of ways: it can happen through design, where a disparity in technical expertise enables the lock-in. But just as often, lock-in is the result of a poorly defined contract, or a governments' unwillingness to revisit prior years' budgets or service requirements. Digital systems quickly become entrenched and shift to maintenance rather than iterating, building, or, if necessary, canceling. Over time, lock-in can bring technical stagnation, decreasing quality, or ballooning cost, at the discretion of the vendor. This is a particularly problematic issue when a provider is the sole supplier of a solution. In addition, the following two specific risks (freemium pricing and pilot projects) are both ways of initiating lock-in.

Freemium pricing: This is when software is offered cheaply (or for free) at first, often with future costs obscured. Alternatively, a simplified version may be offered for free, but long-term utility and support come at a cost. During an initial phase, the buyer (in this case, government) becomes locked-in: relying on the technology, and building interdependent technical systems, bureaucratic structures or organizational processes around it.

Pilots and demonstrations: Some businesses, such as Uber, are notorious for launching in a city, operating at a loss in order to secure a user base, then applying political pressure for a contract or regulatory exception. This is an extreme version of a much more common, though equally important, risk implied by pilot programs and public demonstrations. Similar

to freemium pricing, businesses launch a small "beta" version of a technology, often at a financial loss, in order to build technical dependency within government or political and public support. Pilot projects are much easier to politically justify than long-term investments, and they can often happen without the necessary scrutiny of a procurement process.

Strategic

Lack of accountability: The large network of stakeholders associated with technology procurement can cause a fundamental strategic risk: no one actor assumes accountability for the various effects of a technology. This is particularly true for entirely new classes of technology or technology business models where there are no existing norms or legal frameworks to ensure accountability (ie: automated decision-making (software) where transparency is blocked by trade secrecy, contact-tracing apps). In these cases, procurement is where some accountability can be defined by government legal teams in contract negotiations. But this requires that legal teams have capacity and incentive to take on this role. This is generally not the case, which is one reason that technology procurement represents a significant vulnerability. Technology should be procured under the condition that there is clear accountability for its potential effects, and capacity for those accountable to act accordingly (including, but not limited to, regulation and contract negotiation). The downside of contract negotiation is that it can be obscured from public transparency due to commercial concerns. This is an item that should be identified in the RFP, so that any bidding vendor will expect transparency (within reason) during the contracting process.

Bypassing democratic engagement: Procurement is a long process that involves checks and balances, review, testing, and deliberation. Those redundancies and inefficiencies were designed into procurement for a reason. In some cases, they are legacies of the stapler-procurement era, but in others, they serve an important democratic purpose. Each procurement process—and specifically, the definition of what should be deliberative, what should be open to expert review, and what should be unilaterally decided—is a delicate issue. However, it is increasingly common, especially in discussions of technology procurement, to treat those procedural elements as red tape. Cutting that tape is particularly risky when there are sharp disparities of technical expertise and in cases of emergency. In the long-term there is a strategic risk of losing democratic control over the deployment of technology. This requires explicit attention in procurement policy.

Potential Opportunities of Taking Early Action on Technology Procurement

Tactical

Engaging residents: This step will strengthen accountability by collaborating with the appropriate stakeholders at each phase (defining the scope, solution and implementation) and also seeks to distribute accountability across all actors that are affected. The challenge is to identify which stakeholders are relevant at any given phase (including the challenge of mitigating the risks of perverse incentives or process capture) and how their accountability is formalized.

Engaging adjacent government stakeholders: Departmental domain experts can contribute early in the process, helping to define features, product requirements, and future public value. This expands their role from simply using and maintaining off the shelf products, or ones scoped and procured by other actors. This is a major operational shift, and significantly advances both the quality of outcomes and staff morale in the short-term and encourages technical capacity building in the long-term. To facilitate these kinds of processes, governments may need to re-write job roles or redefine categories.

Building narrative capacity: By effectively engaging a wider cast of stakeholders in a procurement process, governments can build narrative capacity. The details of any procurement are often specific, interconnected, and discussed with terms of art, which render them highly inaccessible. Bringing in more and different stakeholders to discuss and define a shared vision for the technology's future value requires shared language. Governments can use new tactics, like policy prototypes or design workshops to achieve this goal. In this way,

a process is developed to support buy-in and user adoption where warranted and to stop problematic projects when the narrative isn't defensible.

New discovery processes: Procurement can be a process of discovering potential technical answers to real-world questions. Tactically, each phase can be structured around a specific question: What is the problem? What is the status quo? What is the state of the market, and what is involved in creating a new technology? How should a technology be contracted? And so on. Each question seeks to validate or iterate the technology or define the conditions of its use. Crucially each question should reasonably consider the answer "no"—and to discontinue the process mid-way. An under-discussed role of procurement is to reframe the problem.

Cooperative procurement: In many cases, exploring future public value will identify opportunities that do not fall neatly into departmental buckets—between parks and health, for example, or between two contiguous cities. Take city bike systems as an example. In some areas, many small cities and towns sit close together. It would be prohibitively expensive for a small town to procure a full contract, and being constrained to a small town would limit the desirability for users. In short, the technology is only effective as a regional system. This was the case in the Boston area, where a cooperative procurement (brokered by the Massachusetts Area Planning Council) defined a hybrid model: pooled resources, private sponsorship, revenue share between cities and with the vendor, and co-governance by six cities and towns. Building capacity for writing cooperative procurements, within and across municipalities, is an important tactical opportunity.

Strategic

Digital infrastructure planning: By creating an iterative digital infrastructure plan, governments can define the ways that they want their digital infrastructure system to work, from hard and soft standards and interoperability to maintenance to priorities. By defining and designing the way the entire system should ideally function, it can use each independent tender to build towards that future, rather than each tender becoming a siloed project. This plan would also define the parts of core infrastructure that should be retained under government responsibility for building and maintenance. The plan should be revisited and adjusted frequently, and there may be exceptions to its dictate, but having a long-term intention helps every independent step track towards a plan that has democratic buy-in and accountability and is informed by broader government planning strategy.

Process as outcome: In many cases, a technology's success depends on factors like political expectations, patterns of deployment, and stakeholder buy-in. Imagine a procurement that specifies a requirement for an initial prototype deployment, with evaluation by a residents' panel. Not only do residents shape the technology, but they are also engaged in the process, and could continue to be, to support ongoing maintenance and accountability. This would require funding so it does not fall on those that can afford to volunteer, reproducing equity issues. There is a strategic opportunity to consider the procurement process as a tool to shape the downstream outcomes. As with all examples, it's vital to keep the option of saying no to the proposed technology on the table. If these exercises are turned into mitigation exercises where rejecting the technology is never allowed then it's best to avoid them.

Distributed accountability: Incorporating stakeholders across and outside of government (residents and partner organizations, for example) in specific stages of a procurement process creates shared stakes. These shared stakes encompass the benefits and risks of a technology as it is finally deployed. For example, bringing a community garden organization into the parks department's equipment procurement may cultivate a vested interest in the technology's use and maintenance. In the long term, the organization may adapt to incorporate the equipment, take on responsibility for its upkeep, and hold the vendor accountable for its ongoing efficacy. Procurement offers a strategic opportunity to reinforce public accountability in a positive way.

Soft and hard standards: There is a strategic opportunity for developing standards and norms through procurement. A well-scoped procurement document can have broad ramifications, in terms of shifting industry supply or common practices. For example, many cyclist deaths are caused by

large trucks and service vehicles. The City of Boston required all municipal contractors to install inexpensive side guards on their vehicles. This caused widespread fleet upgrades, and has dramatically reduced cyclist deaths. Similarly, soft standards can also extend across cities—as in the case of municipalities making a coherent demand that new mobility companies structure data in a common government-defined format. In this way, cities could do comparative analysis of trends, invest in shared software, and hold companies accountable. These show that procurement is an opportunity to strategically shape industry practices, even beyond direct vendor contracts.

Appendix A: Reimagining Procurement

Actors around the world are reimagining procurement, considering it as a tool that can be used in new ways. The ideas listed here can lead to positive or negative outcomes. The risks and opportunities listed above are certainly present in "action research projects" or "reverse procurement." These are simply examples of procurement being used in new and different ways.

There is increasing attention toward "innovation procurement." This includes new technologies, as well as ones that are promising but still within the R&D phase. Particularly in the case of the latter, governments procure a collaborative process of defining, designing, and deploying a technology. The broader goal is to balance market-driven innovation with demand-driven innovation. Innovation procurement has become a key policy initiative for the EU, the OECD provides guidelines for effective innovation procurement processes, and a growing number of networks and broker organizations have emerged to support matchmaking.

One example is Amsterdam's Startup in Residence (SiR) program. There were initially many programs and efforts to support local entrepreneurs, particularly those focused on public sector challenges and technologies. However, civil servants found that technologies were often ill-fit to municipal priorities, or that it was difficult to procure from small, early stage companies. SiR was essentially an innovation in procurement. Through this program, departmental stakeholders write a challenge, and commit to sponsoring and shepherding an innovation process. The challenge is issued, technically as an RFP, across the EU (conforming to procurement regulations). Respondents "bid" to win a 6 month collaborative program, and deliver an innovation process, in collaboration with municipal sponsors. At the end, the city has actively shaped the technology, and can choose whether or not to purchase it (through a conventional procurement).

Similarly, the Boston Mayor's office of New Urban Mechanics has pioneered innovation procurement as "action research projects." This is primarily a tactic to work with discretionary spending limits. The municipality pays up to $9,999 (under the discretionary limit) for a process of discovering and evaluating the potential of a particular technology. This allows for a pilot project, or a collaborative innovation process, in order to develop a relationship with a small innovative company. The city invests a small amount of financial capital, but a significant amount of political capital and human capital.

A final example of reimagining procurement is what Taiwan's Digital Minister, Audrey Tang, calls "reverse procurement." This is "when citizens develop prototypes like a site to keep track of face-mask distribution and then the government implements them. This is not government for or with the people, but after the people (they got there first)." This is a bottom-up approach to sourcing technology.

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