



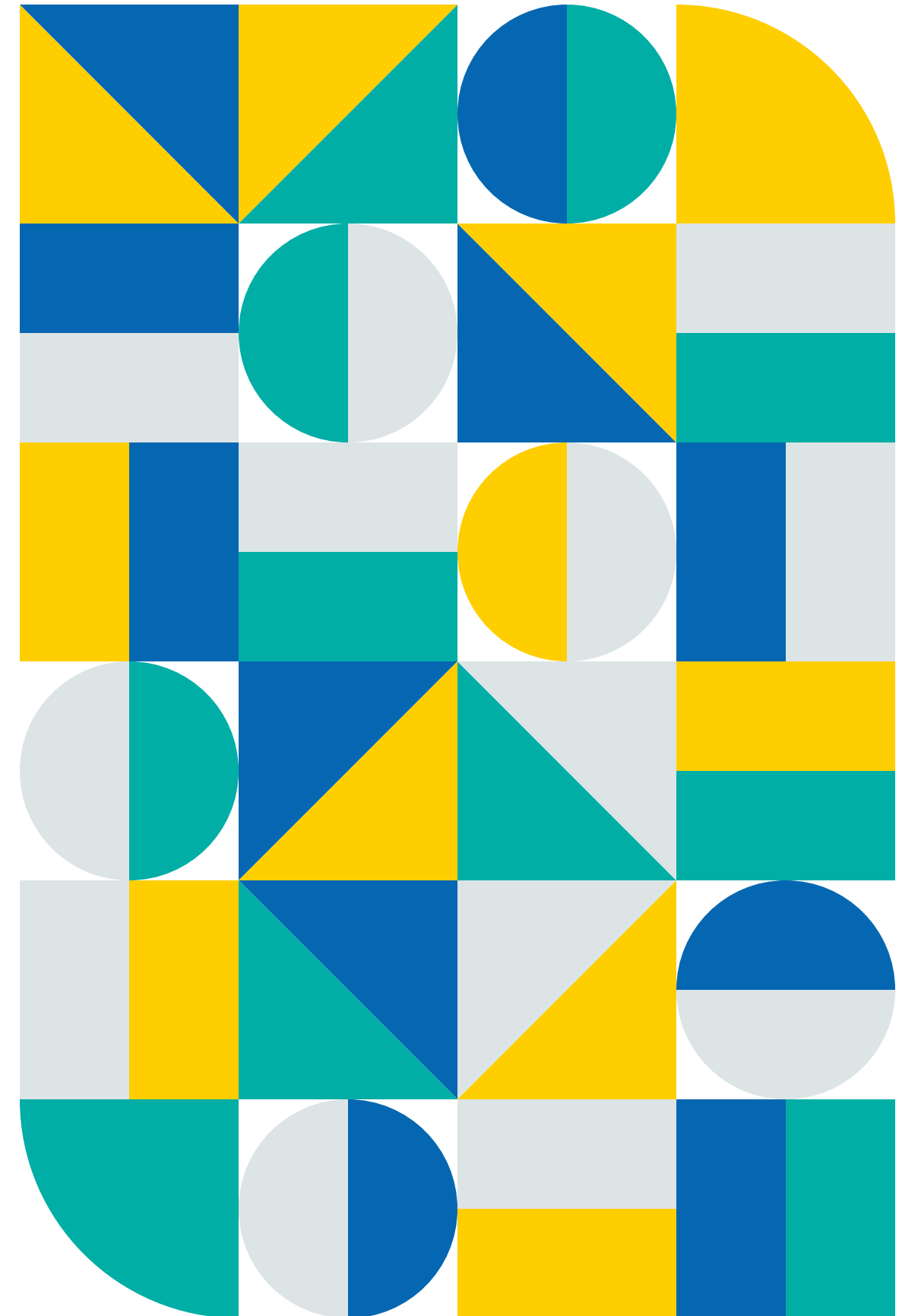
# Distributed Ledger Technology in the Public Sector: Operational Learnings from Use Cases

TOKEN Policy Observatory Briefing Paper

[!\[\]\(666e09182d4cd268646ea700ea60dcdf\_img.jpg\) Token Website](#) [!\[\]\(1ef1ef0bf9af6c6996401964cf280f2d\_img.jpg\) DLT4Gov Community](#)



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## **Acknowledgements**

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### **This is an interactive PDF.**

You can navigate it much like a website. Clicking on the table of contents will take you to the relevant section, and the “menu” icon in the top left corner will return you here. Many pages include links to related web sources. If you wish, you can also scroll through the document as you would a regular PDF.





## What is TOKEN?

TOKEN, or, the *Transformative Impact of Distributed Technologies in Public Services*, is a research and development project funded by the European Union's Horizon 2020 programme. Launched in January 2020, the project will run until the end of 2022.

TOKEN aims to ease the adoption of Distributed Ledger Technologies as drivers for more transparent, trusted, and efficient public services. TOKEN furthermore develops an experimental ecosystem to enable the adoption of DLTs. The ecosystem's value is established via replicable [Use Cases](#), which contribute to transforming governance approaches towards openness and collaboration.

TOKEN also acts as a hub for actors interested in how decentralized technologies can impact and improve the work of public organizations. To get informed and engage with us, you may [join the conversation on our DLT4Gov platform](#), [visit the project website here](#) and follow us on Twitter [@TOKEN\\_EU](#).



The TOKEN platform and components will continue to run independently after the conclusion of the project.





## What is a TOKEN Policy Observatory?

TOKEN Policy Observatory events bring together policy makers, practitioners, thinkers and researchers to discuss the possibilities of DLTs in the public sector. The Observatories mobilize experts across Europe in an effort to share ideas and knowledge. The Observatory sessions are organized by a TOKEN consortium partner, think tank [Demos Helsinki](#).

They mix co-creative methods, such as facilitated foresight work and workshops with expert presentations and panel discussions. There will be a set of five Observatories organized during the project.

TOKEN publishes Briefing Papers such as this one to disseminate the findings of the Observatories.





## Introduction

### Concrete lessons from real use cases

The use of Distributed Ledger Technologies (DLTs), such as blockchain, has been quite a new development overall and even more recent in the context of the public sector and public services. At the same time, the direction of development seems to be clear: a recent [landscape review of public sector blockchain projects](#) found over 167 cases on the national, regional and local levels in Europe. The [European Blockchain Services Infrastructure \(EBSI\)](#) continues its development, with defined use cases also in pilot phase, while funding is being provided on the EU (e.g. through [the Digital Europe Programme](#)) and national levels and regulation is being developed to provide legal certainty, for example with the establishment of [a EU regulatory sandbox on blockchain](#) being launched.

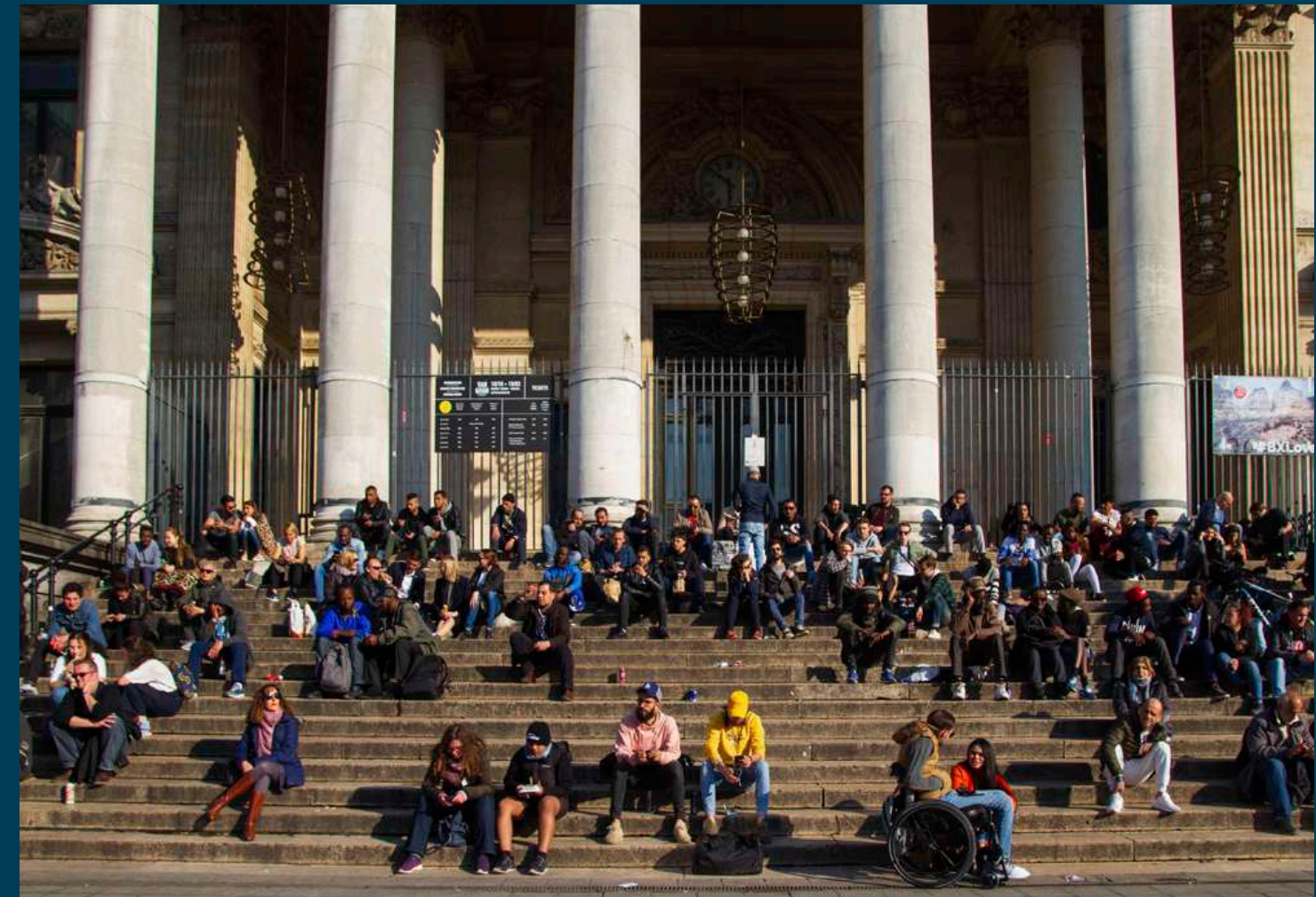
With such a wealth of developments under way, it is vital that the different streams of development can iteratively learn from each other and establish feedback loops so that policy, regulation and innovation can be based on the latest information and develop based on the most up to date knowledge. Especially focusing on gathering from concrete use cases is crucial: on the ground experience of what works and what doesn't are useful for those seeking to develop or scale similar projects in public services and for policymakers and regulators to see where possible pain points or unclarities lie.





Overall, drawing together these lessons from real use cases – 4 from the TOKEN project and one from Interreg funded [BLING project](#) (Blockchain in Government) – we hope that we can provide inspiration, guidance and concrete experiences for the use of DLT in public services. Simultaneously, we think that the conversation and development of an ecosystem of actors working around these themes should continue to flourish.

Thus, we invite you to reach out to us, to the use cases and more widely the [DLT4Gov community](#) to continue to share learnings, to ask questions and to explore together what the role of DLT in public services should be, to uncover and move past challenges and to refine best practices together.





## Methodology

### How did we extract the learnings?

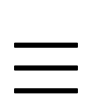
The learnings were initially gathered at the TOKEN Policy Observatory session, 14th September 2022. The session was held physically at the FIWARE Global Summit in Gran Canaria and streamed online. The Observatory gathered professionals working with applications of distributed ledger technologies (DLTs) to discuss the policy landscape, operative learnings and scaling potential of DLTs in the Public Sector.

First, the attendees followed the presentations of the four [TOKEN Pioneer Use Cases](#). Then, a Use Case from another European Union funded project titled Blockchain in Government ([BLING](#)) was presented. This BLING Case, titled the Energy Wallet, was included in the programme since it has been quite successful in scaling up from the pilot phase. The session

concluded with a panel discussion moderated by the think tank [Demos Helsinki](#). In the panel, presenters joined a discussion on their successes and challenges in e.g. finding users for the pilot projects, involving stakeholders, privacy legislation and energy use.

The insights and recommendations presented in this Briefing Paper are a distillation of the discussions within the Observatory. Next, we will describe the five presented Use Cases as well as introduce their learnings and recommendations. These recommendations are intended for professionals who are commissioning, developing and deploying DLT in public sector projects. The Paper will conclude by reflecting on the presented learnings and recommendations.





## Use Cases and their learnings

We will now describe the four TOKEN Use Cases and the additional Use Case from the BLING project. After each description, we will present the learnings and recommendations related to each Case.

1

### **FundingBox**

Public funding distribution platform based on SSI and verified credentials, for SMEs, startups and Funding Distributors

2

### **Katerini, Greece**

The Transparent Management of Public Accounts

3

### **Leuven, Belgium**

Last Mile Logistics & Dynamic City Access Management

4

### **Santander, Spain**

Data Valorization Services

5

### **Emmen, the Netherlands**

The Energy Wallet



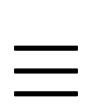
## 1 FundingBox

# Public funding distribution platform based on SSI and verified credentials, for SMEs, startups and Funding Distributors

The process of applying for public grant schemes is tedious, long, and costly for both the small and medium-sized enterprises (SMEs) and the granting bodies. After selection, due diligence processes can be lengthy, further burdening both parties. In addition, the processes suffer from a general lack of transparency and trust due to red-tape, data silos, double granting and biases in distribution. For example, on average, a successful innovator seeking public funding spends 10% of the funding and 12 months just to be awarded. SMEs can spend up to 50 hours preparing a proposal and wait four weeks to know if they have been successful. Moreover, funding applications only have a 5% success rate.

Partners involved:  
**FundingBox Accelerator**

The TOKEN Use Case implemented by FundingBox aims to simplify the granting process, reduce the administrative burden of granting and increase transparency and the level of trust. It aims to make selected granting processes faster for both applicants and funding distributors, decreasing the time and cost by automatically validating the information provided by the applicants to the open calls. There's thus no need for due diligence by the granting bodies. In addition, the Use Case aims to improve data protection with a trust framework complying with the EU's General Data Protection Regulation (GDPR).

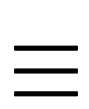


## 1 FundingBox

In this case, selected startups and SMEs will use a decentralized, self-sovereign identity, which means that by having control over their data they can easily submit their applications. They will also be able to get certifications about their key data from different authorities such as universities or chambers of commerce. This is done through the provision of a funding passport that gives applicants access to a pool of funding opportunities where they are pre-qualified and their data is automatically validated. Applications and their evaluation by the granting bodies can thus become much easier.







## 1 FundingBox

### Lessons Learned

**A clear value proposition for users and stakeholders is key for ensuring take-up and scaling,** also in projects with DLT components. Time consuming tasks (such as standardization of data) take up resources and in order to convince parties to commit to these, benefits need to be clearly communicated.

**Don't talk about DLT or blockchain.** For many users, stakeholders and parties involved in the Use Case, technical language can act as a factor that pushes them away. Although the technical details are important, focus should be on what are the implications and value-added of DLT. This also makes it easier for all involved parties to critically assess the benefits and consequences of the technological components. These can and should be talked about through finding a language that is suitable for the stakeholder in question.

**Protect users and do not put personal data on the blockchain.** Overall, data about users should be stored in a way that when a user wants to leave the application, there should be an option to delete data about themselves completely. GDPR compliance needs to be assessed in all cases.



2

## Katerini, Greece

# The Transparent Management of Public Accounts

The second TOKEN Use Case aims to increase the transparency of public procurement with a blockchain-based platform. It operates by incorporating blockchain into active smart city projects in the municipality of Katerini, Greece.

Public procurement processes have typically been rigid, time consuming and error prone due to fragmentation, limited use of technology, and communication silos among civil servants as well as departments. Dividing the tasks of initiation, supervision and management of procurement between different units has caused errors and delays. Moreover, the processes have lacked transparency in their timeline, procedures, requirements and fund allocation.

Partners involved:  
**CERTH – The Centre for Research & Technology,  
Hellas & the Municipality of Katerini**

The platform enables establishing a central system to be used by civil servants in order to avoid procurement's fragmentation and to enable real-time expenditure monitoring. Creating an audit trail increases transparency by granting citizens and policy makers access to information on how public funding is spent. This Use Case also works to implement a blockchain-based e-voting system to enable the municipality's residents to participate in the decision making processes related to public procurement.



2

## Katerini, Greece

### Lessons Learned

**Motivate civil servants via communication and training.** All civil servants are not motivated to take up using new technology. It may be challenging to communicate the benefits of blockchain technology to civil servants, especially if their experience in technology use is limited. Explaining the direct benefits of the technology for the civil servants helps create trust and motivation – as do training sessions tailored for them.

**Break administrative silos.** In Katerini's case, a substantial problem has been the fragmentation of procurement. It has caused communication breakdowns and delayed processes. Encouraging civil servants from different departments to work together using a centralized system is challenging but rewarding if successful.

**Engage citizens to increase trust in the administration.** An open list of procurements creates transparency – not only for the different administrative departments, but for everyone, including the municipality's residents. Participatory decision making, such as creating polls for citizens to take part in procurement processes can engage citizens and increase the trust they have for their municipality's authorities.





3

## Leuven, Belgium

# Last Mile Logistics & Dynamic City Access Management

The third TOKEN Use Case investigates how to promote last-mile deliveries and the local economy in the city of Leuven, Belgium. Due to the effect of COVID-19, the city's farmers and stores have faced increasing challenges distributing and selling their food locally. Moreover, Leuven is looking for solutions to promote more sustainable mobility. The Leuven Use Case operates by granting access to the city and parking services based on sustainable practices.

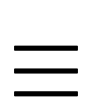
Prior to the Use Case, logistics service providers were driving half empty in and out of the city, which produced congestion. Entering the city outside a certain window of times required filling out a request, which then needed to be manually verified by city officials. Logistics service providers were not

Partners involved:

**imec & Flanders Institute for Logistics (VIL)**

rewarded for investing in more sustainable solutions, such as increased loading ration, green vehicle types or decreasing transport distances.

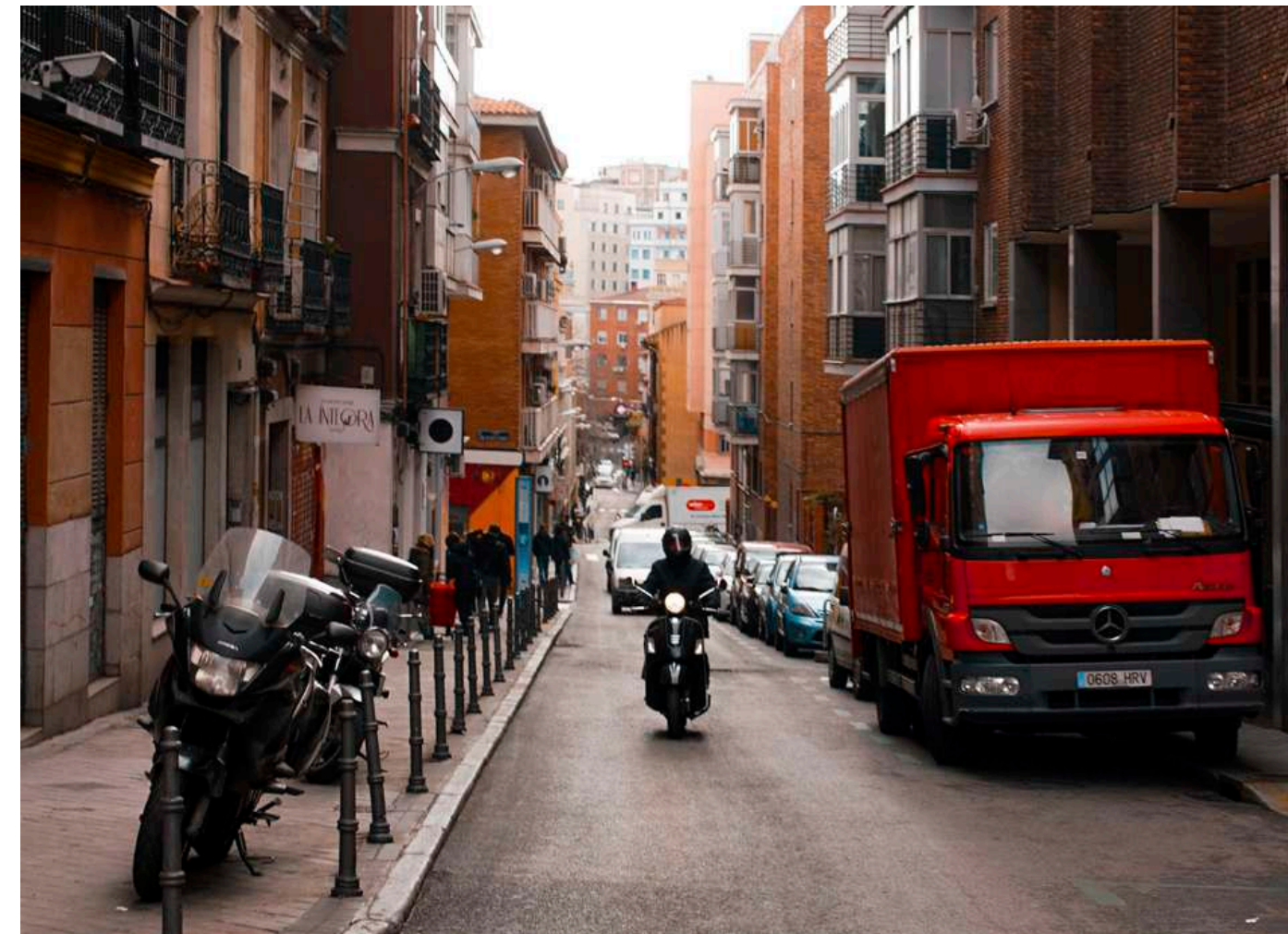
By using the capabilities of blockchain technology, such as transparency and distributed traceability, the Use Case aims to create a trusted logistics platform for all involved parties. This platform will enable effective logistics tracking and planning for local produce, and a distributed interaction with all the actors in the value chain.



3

## Leuven, Belgium

The platform will be based on an index to grant dynamically calculated preferential access to the city by combining multiple metrics such as sustainability, green mobility, and real-time traffic information. Each actor will be connected to the distributed blockchain-based TOKEN platform to enable data sharing while guaranteeing that each actor can only access the relevant information needed to execute one single step of the process. In this way, the ownership of the information is distributed among all actors. They can each control what information is shared and prevent actors from tracking the end-to-end process.





3

## Leuven, Belgium

### Lessons Learned

**Start from how to solve problems and achieve goals, not the technology.**

When faced with a problem or looking at the goals of a service, the focus should be on how to best solve or achieve these. The idea is not to think “where could I use DLT”, but rather to critically assess what processes and technologies could achieve the wanted aims. Use Cases that do this act as validation and drivers for further pilots.

**Technical expertise is not necessarily the “core business” of city officials and civil servants.**

In order to assess needs and to commission, lead and be a part of creating DLT-based public services, they might need additional capacity building, time, resources and shared processes with technical partners.

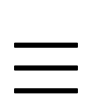
**Focus on value for different stakeholders, involved parties and business drivers.**

DLT and technological components in general can obfuscate and create confusion. In a situation where it is hard to convince users and city administrators to do something new, language should be clear around benefits, drawbacks and consequences.

**Pilots scale only when they find leaders.**

Without finding committed users and actors to lead the Use Case from pilot to wider adoption, it is unlikely that the projects will live on after their pilot phase. These leading actors can be commercial as well.





4

## Santander, Spain

# Data Valorization Services

Smart cities collect a significant amount of data from several sources with the aim of providing new services to citizens. This is the case of the city of Santander in Spain, which in the last decade has deployed a relevant IoT infrastructure to collect data all around the city with the aim of developing new services and improving the existing ones. This data, used by the municipality, is also exposed through the SmartSantander platform to be utilized by third parties.

The goal of the fourth TOKEN Use Case is to set up a transparent solution for the evaluation and valorization of the use of data by third parties in smart cities. The Use Case will integrate the SmartSantander marketplace with a blockchain-based platform enabling radical traceability. This integration will

Partners involved:  
**Municipality of Santander & University of Cantabria**

increase knowledge about how third parties make use of urban data offered by SmartSantander, providing value to the data exposed in the marketplace.

The valorization of data will be an incentive for third parties to share their own information through the marketplace, creating a new business ecosystem based on the value of data. In addition, the platform will provide additional trust and transparency mechanisms to municipality processes such as public procurements and citizen participation that can be supported by the marketplace.



4

## Santander, Spain

### Lessons Learned

**Start with small-scale piloting.**

Continuous cycles of feedback from users and stakeholders create inclusive and iterative development.

**Finding users for pilots is not always fast or easy.**

In addition to clear value propositions and making sure there are enough resources for outreach, make sure to use the expertise and knowledge of civil servants. Collaboration with those who already work with potential users can help hone messages, utilize existing networks and point out gaps in the project plan.

**The municipality can be the engine, but it can't do it all alone.**

Successful projects, including DLT-based ones, require garnering involvement from a wider group of stakeholders in addition to the municipality. It is important to incentivize stakeholders to take part from early on and provide transparent processes for participation.

**Make sure to resolve questions of GDPR and data immutability well beforehand.**

Especially in a project whose goal is to expedite the use of data sets, questions of what kind of data can and should be stored on distributed ledgers should be resolved in advance. Meticulous attention should also be paid to meeting GDPR requirements.



5

## Emmen, the Netherlands

### The Energy Wallet

The Energy Wallet is a blockchain-based application distributing subsidies to citizens. These governmental subsidies are meant to boost energy-saving measures undertaken by the residents of the municipality of Emmen in the Netherlands. The Energy Wallet aims to allocate the subsidies in a fair and effective way – while also improving citizens' energy awareness.

In practice, residents earn points in exchange for answering a questionnaire about saving energy. The points can then be used in local hardware stores to buy products enhancing energy efficiency, which simultaneously stimulates the local economy.

#### Blockchainlab Drenthe

The Energy Wallet is a Use Case from another European Union funded project titled Blockchain in Government ([BLING](#)).

The application does not collect personal data from citizens, as answers to the questionnaires are stored anonymously and only clustered on the level of neighborhoods. Thus, the municipality gains better knowledge about the operating context, which can help formulate more efficient energy policies and energy-saving practices in the future. Automating the process of granting these subsidies also requires less human monitoring and therefore lowers costs for the municipality. Using blockchain technology furthermore keeps the subsidy recipients from committing fraud.





5

## Emmen, the Netherlands

### Lessons Learned

**Communicate not collecting personal data to the users.**

Comply with the GDPR requirements; don't collect or store users' personal data on the blockchain. It pays off to explicitly communicate this compliance to the users. In addition to trust building, it will make it easier to collect other, non-personal data points when people know those cannot be traced back to them.

**Do collect other anonymized data to gain better societal impact and improve the technology.**

Consider whether it would be beneficial to collect and cluster anonymized data related to the educational or other societal functions the technology is serving, such as energy efficiency knowledge by neighborhoods in the Energy Wallet's case. Collecting anonymous data on the technology's usability to improve it may also be justified.

**Tailor communications and focus on the benefits for the users.**

Pay extra attention to clear, precise communication. Communicate to the group you are trying to reach in an approachable way. Users want to know what the benefits of the technology are for them, as do the civil servants. Communication focusing on the technology itself may scare away people who are not technology experts.

**Money is a great incentive – distribute it fairly.**

A monetary subsidy is an efficient incentive for the users. When distributing economic subsidies, special attention needs to be paid to fairness, i.e. starting with the neighborhoods that need the subsidy most and then expanding gradually. Using blockchain is beneficial in preventing fraud with immutable data as well as lowering costs compared to other ways of distributing subsidies, since the blockchain-based infrastructure requires less or no human monitoring.



5

## Emmen, the Netherlands

### Lessons Learned

**Build trust through communication when working with a municipality.** Working with a municipality requires trust-building, which takes considerably more time than implementing the technology itself. Also financial processes, such as allocating subsidies, take time to process administratively. To build interest and trust with public officials, developers need to be able to communicate clearly that their technological concept will not only help reach societal goals such as energy awareness, but also lower administrative costs and be energy efficient in its operation. Communication with all parties is essential: in the Energy Wallet's case, e.g. a helpdesk, a website and instructions for shop owners were necessary.

**Expect push-back and prejudice against blockchain.** Many people lack the knowledge to make an educated assessment of why and when to use blockchain. Often, people who are not technology experts, will base their arguments on news on Bitcoin. This bias is then used as a justification for maintaining the status quo. When using blockchain to simplify administrative processes, expect civil servants to push back because they fear for their job – although they will likely deny it. Especially governmental bodies are very risk averse; they want proof of similar successful projects, which in turn, are difficult to find at this phase of the technology's development. It's thus critical to gain a commitment from management as soon as possible and to recruit interested people from the organization to help with implementation.



## Conclusion

In this Briefing Paper, we have presented learnings based on TOKEN's Policy Observatory work, concentrating on five operational Use Cases. Since Distributed Ledger Technologies are emerging and often still in the piloting phases – especially in the public service context – we view the learnings as contributions to inform forthcoming pilots, cases and policy conversations.

To conclude, we will highlight four of the learnings presented above that seem to be shared by the Use Cases.

**First, users' personal data should not be collected on the blockchain.** This not only ensures compliance with the GDPR but also enables collecting other data such as feedback on how the potential societal, political and educational goals of the public service are being achieved, since that information cannot be traced back to the individual user.

**Second, developing new technologies for public services and implementing those with civil servants requires trust building and training.** Novel technologies may face opposition, which accentuates the need for communication and training.

**Third, tailored communication about the implications of DLT use to each user group is key.** Technological specifics are often not interesting to users but should be available if requested.

**Fourth, and perhaps most importantly, solving problems in the public sector should be the starting point** and the technological solution should follow if it is indeed the best way to solve these problems. Use Cases, such as the ones presented here act as validation to test that capacity in practice.





## Conclusion

We hope that the lessons from the Use Cases presented, and more widely the conversations within and around the TOKEN Policy Observatory and TOKEN more generally offer concrete ways of thinking about the usefulness and possibilities of DLT in the public sector. Our work in the TOKEN project will continue until the end of March, 2023. Before TOKEN's conclusion, we will publish a fifth Briefing Paper on the basis of the fifth and final TOKEN Policy Observatory, which was held on November 7th, 2022. After that, we will publish a compilation of all the Briefing Papers, which will reflect the policy learnings throughout TOKEN's duration.

If you are interested in the learnings offered here, the Policy Observatory work, TOKEN's Pioneer Use Cases or the TOKEN platform and service components being developed, we invite you to [join the DLT4Gov community](#), [book a time for a demo](#) of the services and platform on the TOKEN website, follow us on social media, subscribe to our newsletter or to get in touch with us directly to talk further. We hope that we can keep the conversation going with the readers of this Paper.





# Join the discussion and come work with us towards making the vision a reality.

Be part of the conversation and join the Community

[JOIN DLT4GOV COMMUNITY](#)





## Partners



FIWARE Foundation e.V.



FundingBox Accelerator  
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Vlaam Instituut Voor  
De Logistiek VZW



Information Technologies  
Institute



Demos Helsinki



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University  
of Cantabria



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of Katerini







#trustworthiness #transparency #privacy #efficiency

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