



ابتكارات الحكومات الخلاقة EDGE OF GOVERNMENT

Public innovations from across the globe

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Introduction

The United Arab Emirates (UAE) and its forward-thinking leadership have long recognized the importance of innovation and the primary role it plays in economic progress. The UAE Vision 2021 highlights science, technology, and innovation as main drivers of growth and progress, and asserts their role in the UAE's transition towards a knowledge-based economy and sustainable development for the country.

Concentrating the Nation's energies even more squarely on its innovation goals, 2015 was declared as the Year of Innovation in the UAE by President His Highness Sheikh Khalifa Bin Zayed Al Nahyan. "Announcing 2015 as the Year of Innovation comes to support federal government efforts, attract national skills, increase distinguished research, as well as boost efforts to build a national cadre who are able to lead our future in this field towards more progress, prosperity and innovation" said Sheikh Khalifa. "We live today in a world witnessing rapid changes and continuous developments, full of opportunities, discoveries and inventions" he added.

In support of this, His Highness Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the United Arab Emirates (UAE) and Ruler of Dubai, launched The UAE National Innovation Strategy.

The vision is to make the UAE among the most innovative nations in the world. It focuses on building the ecosystem and infrastructure for innovation, and stresses the role of the three key contributors to progress as champions for innovation: Individuals, the Private Sector, and Government. "We have always called for creativity in every field: this strategy is a

concrete step to implement that vision. These initiatives around innovation will enhance quality of life in the UAE and take our economy to new horizons," Sheikh Mohammed said at the launch of the National Innovation Strategy.

Noteworthy among the UAE's innovation-related efforts are the role and importance the National Innovation Strategy places on government in achieving its goals. For decades governments have been concerned with the pace of innovation ongoing within their borders, and the capacity of their residents and resident institutions to pursue the type of science- and technology-based innovation widely accepted to be the foundation of sustainable economic growth. The UAE Innovation Strategy addresses these issues directly.

In framing the role of government in innovation, however, the UAE has broadened the focus, and highlighted the need for innovation in how governments carry out their own public missions. The Mohammed Bin Rashid Centre for Government Innovation was therefore set up with the ambition of supporting government entities in becoming more innovative, and in delivering on the goals of the National Innovation Strategy.

In the words of HH Sheikh Mohammed bin Rashid Al Maktoum: "We aim to make innovation a government habit, a daily practice, and a solid organisational culture..." The Centre strives to turn innovation into organised institutional work and embed an innovation culture within the DNA of Government.

Edge of Government Experience

The World Government Summit, hosted by the government of the United Arab Emirates, is the primary global forum dedicated to shaping the future of government worldwide. The Summit sets the agenda for the next generation of governments with a focus on how future governments can harness innovation and technology to solve the universal challenges facing humanity.

The Summit serves as a knowledge exchange platform at the intersection between government, futurism, technology, and innovation, and functions as a thought leadership platform and networking hub for policymakers, experts, and pioneers in human development. It is also an opportunity to showcase innovations, best practice, and smart solutions to inspire creativity to tackle these future challenges.

The Mohammed Bin Rashid Centre for Government Innovation organized a space dedicated to showcasing 'Edge of Government' innovations at the 2016 World Government Summit. It included a series of exhibits of novel and ground-breaking approaches to the globe's most urgent public challenges. The exhibits brought to life a selection of international case studies of government innovation and impact on the most important public concerns of our time - health, environmental protection, public safety, and citizen engagement.

By bringing these innovations together in one place and for a global audience, the World Government Summit was able to highlight government innovations deserving of wider notice. Some of the innovations featured are well known, but many are "below the radar." All solve important public problems and do so in a novel and impactful way. Hearing about these innovations first hand from the innovators themselves

inspired Summit attendees to think about how the ideas embedded in the featured innovations might be applied in their own work. More generally, the organizers hoped that showcasing innovation at the edge of government activity will inspire much more innovation in government.

As the many examples of innovation in government collected for this project were reviewed, certain themes emerged in how government organizations and entities are approaching their work. These themes reflect a new pattern for the public sector problem solving, and taken together suggest a new glossary of government practice.

Both the Edge of Government showcase at the World Government Summit and this companion report have been organized around this glossary, which is described in detail in the following section.

As readers go through the case studies presented in this document, and recall the Edge of Government experience itself, they are invited to imagine how these truly novel ideas might be used in their own efforts to make government more responsive, more efficient, and more effective.

Glossary of Government Innovation

Innovation in government is at the heart of good public administration and is not just about technology. It's about a relentless commitment by high-performing governments to continuous improvement and new ways to benefit the everyday lives of citizens and empower them to help themselves- in health, education, the environment, and other sectors, ensuring trust and confidence in government itself.

Incremental advances in these areas happen every day all around the globe, but looking closely at the most innovative advances, those at the very edge of government innovation, we find a unique set of common ingredients. These ingredients, taken together, point the way forward for others who would aspire to change things for the better for their own countries, towns, provinces, ministries, or agencies, anywhere in the world.

The specific programs featured in the Edge of Government showcase are representative of a larger set of novel government initiatives from around the world that define the very edge of government innovation. This larger set of government activities is remarkably diverse in the type of government functions they represent, the geographies from which they have emerged, the participants they have energized, and the impacts they have had. Despite this diversity, however, certain patterns emerge related to how these innovations function and operate. Looking closely at the entire set of government innovation at the edge reveals six distinct strategies for radical change.

These strategies connect directly to broader trends in society and technology such as the rise of collective decision-making, the growing use of big data, and the ubiquity of mobile personal technology. Collectively, these trends define a glossary of government innovation. In essence, this glossary describes the key ingredients that have enabled government innovators to deliver significant impact to their citizens. The glossary also sets the stage for the future of government, introducing emerging public sector practices that have already proven their effectiveness in the field, and hold great promise for greater adoption by policymakers going forward.

The six terms in the new glossary for public sector approach to problem solving are:

- **Process Transformation:** adapts the knowledge and technology embedded in existing processes to create radically new approaches to public challenges.
- **Active Infrastructure:** involves deploying infrastructure that is flexible, multi-purpose, and able to provide evolving, real-time responses to public needs.
- **Behaviour-Inspired Government:** exploits systematic patterns in human cognition and behaviour to dramatically improve government policy and program effectiveness.
- **Technology Reinvention:** applies existing technology and established scientific principles to new challenges.
- **Collective Intelligence:** incorporates input, insight, and involvement from orders-of-magnitude more participants in the processes of government and collective decision-making.
- **Data-led Effectiveness:** makes distributed data publically available and easily integrable for use in diverse government and civilian applications.

The correlation between government innovation and what is going on in the outside world is reassuring. Responsive governments need to accommodate global trends into their work. The most innovative governments, however, go beyond mere accommodation.

They set the pace for creativeness and imagination, and define what is going on at the very edge of innovation. Rather than be passively impacted by these trends, they have actively exploited the profound social and technological changes underlying them. They have created new and dramatically better ways to deliver public value in key government mission areas, including health, education, the environment, public safety, and law enforcement.



Process Transformation

Process Transformation in the context of government innovation involves more than merely changing how things are done or improving the measurable performance of government services. As the name implies, process transformation involves reconceiving the entire process for achieving a specific goal.

Sometimes such transformation is the only way to make meaningful advances in government service. Over a century ago, Ransom Olds and Henry Ford transformed the manufacturing process with their vision of the assembly line. Using no new technology, Mr. Ford was able to reduce the time to manufacture a complete Model T car to an astonishing 93 minutes, simply by reimagining the process for automobile assembly.

Those on the the edge of government innovation have conceived of similar game-changing process transformations. Faced with only marginally effective mechanisms for delivering important - in some cases life saving - government services, these pioneers took a step back from the challenges they faced and asked: is there another way to do this? Consider one of the most ubiquitous government processes: detection of hazardous substances. It's something done everywhere by governments to ensure public safety. Traditional detention processes rely on hardware-based sensors. At the same time, zoologists have long known that some mammals have over a thousand different types of odour receptors in their noses. Is it so hard to imagine how a government might exploit this remarkable fact to reimage the process for detection of public hazards? Not when one is working at the edge of government innovation

Active Infrastructure

Infrastructure, of course, is at the core of government services considered indispensable. It provides stable roads and bridges needed for automobile traffic; leak-free literal and virtual pipes through which flows the world's water and data; attractive public spaces that enhance the quality of life to countless millions. Until now, infrastructure is almost always passive. Faced with

accelerating environmental change, innovative governments have begun to deploy a whole new category of infrastructure: infrastructure that actively engages with its surroundings to improve conditions. This new generation of active infrastructure is providing solutions to such challenges as pollution, constrained urban spaces, and even the need for convenient ways to charge electric vehicles. As the global population expands and urban centres grow denser, the built environment will need to be multi-purpose. Consider, can the beautiful façade in front of a building do something more than merely look nice? Those on the edge of government innovation would say 'yes.'

Behaviour-Inspired Government

Much of the work of government involves influencing decisions. This includes everything from encouraging people to maintain healthy diets to discouraging companies from polluting. Historically, government has taken a simplistic and largely punitive approach in its attempt to affect decisions - rules are set and people and organizations are punished if the rules are broken.

The most innovative governments are beginning to use a more effective approach. This new approach designs public policies and initiatives around human psychology, and uses an understanding of how people behave to encourage them to make good decisions. The growing understanding of how cognitive biases affect decision-making is being considered in a wide range of policy areas including include public health, crime prevention, financial decision making, energy efficiency, and tax collection, among many others. Central to this innovative strategy for government is making the right choices easy for people. Threatening punishment only goes so far as an incentive. Millennia of experience with public policy makes that clear. Consider the challenges of recycling. Many local governments have programs meant to encourage citizens to recycle consumer materials such as the paper used to produce magazines, newspapers, and consumer packaging. Some municipalities actually fine people for failing to recycle. Despite this threat of

punishment, millions of tonnes of waste paper goes unrecycled each year, piling up in landfills or into illegal dumping grounds. People throw waste paper away rather than recycle it because throwing things away is easy. If governments are serious about recycling, they need to appeal to people's natural behaviour and make it easy to recycle the things they no longer want.

Technology Reinvention

The history of innovation is filled with instances in which technical approaches from one field of endeavour have been applied to entirely new areas. Indeed, some of the most radical and impactful innovations are of this kind. Years ago, the U.S.-based multinational corporation 3M developed a breakthrough approach for preventing infections associated with surgery after getting input from a theatrical-makeup specialist with experience preventing facial skin infections. The same opportunity to apply existing technology in new areas to solve old problems exists in the government. Consider the application path for the technology used in video games. For years the combination of a microprocessor, a video processor, and a video screen were used to create games marketed largely to children and youth.

As the technology improved and game images became more lifelike, games became more serious and a large adult market for video games emerged. Eventually, someone realized that the same technology could be used to teach someone how to fly an airplane. Teaching aspiring pilots to fly using real aircraft is inherently risky. Thus was born the flight simulation training business. It's only a matter of time before the flight simulation success inspires uses for the same technology in other areas where practice for the untrained is dangerous, and someone on the edge of government innovation is likely to be the one to find that new application.

Collective Intelligence

Government decision making has historically been top-down, and reflected the input of only a very limited number of people. Outside views are collected through slow and cumbersome processes, and subject to lobbying and other influences that invite potential corruption. They also often work against the wishes of the populace.

And while mechanisms exist to inform the formal legislative process, the overwhelming portion of government decisions are made outside of law making. There is no good mechanism to collect citizen views, for example, on practical questions such as how wide to make a new road, on what day to establish a new public holiday, or where to put the maps for public transit.

Advances in technology and a growing appreciation for the wisdom of crowds have led new mechanisms for government to gather and respond to the aspirations and ideas of the masses. These new mechanisms are inherently inclusive in their design,

and allow virtually anyone and everyone to participate in public decision-making processes. In allowing for mass input, new platforms for collective intelligence also provide for targeting of narrowly defined groups in ways that have not been previously possible. For example, a local government may want to solicit ideas on community redevelopment from as many of the residents of a particular neighbourhood as possible, but only from residents of that neighbourhood. Collective intelligence is the tool that enables this combination of mass participation and precision targeting.

Data-led Effectiveness

The use of so-called big data in problem solving is no longer newsworthy. Even in government, there has been much recent use of large datasets to refine government processes and services. To be at the edge of innovation, governments must do more than merely use lots of data. First, they must commit to making available as much of government's own data as possible. Second, they must structure open data in a way that facilitates ease of use. This means datasets from different public sources stored in different formats be made 'mashable' and easily used in tandem. It also means that government open data can be downloaded, analysed, and visualized with ease, through use of an interface that invites the outside world to want to interact with the data.

Setting up open data repositories in this way is what will drive outside use of the data. Freely available and easy-to-use data will unleash an entire ecosystem of creative individuals and organizations to develop data-led solutions to public challenges. Such data will lead to everything from better investment decisions by companies that want to contribute to local economic development, to apps that help parents make better school decisions for their children.

Impact as the Common Theme

Each of the glossary terms described here emerged as common themes observed across a number of edge innovations in government. The uniting factor across all of these themes is how the concepts they described have led to dramatic improvement to the bottom line of government performance: better service, expanded coverage, reduced cost, happier citizens, and more engaged public employees. As these terms become a more consistent part of the vocabulary of government innovation, this bottom line must always be born in mind. Invention without impact is not innovation. True innovation happens only when lives are improved. True edge innovation happens when lives improve in a dramatic enduring manner.

Case Studies from the Edge of Government Experience

To select innovations for inclusion in the Edge of Government showcase, novel approaches from around the world were considered. Three criteria were used to evaluate each case study of government innovation:

- > Novelty
- > Replicability
- > Impact

Novelty considers how significant a departure from current approaches a new solution is, and the extent to which a government innovation relies on new models, new processes, new technology, and new participants to provide its impact. A new solution that uses the same basic processes and technology as an existing approach, or involves the same people and organizations in providing inputs to a specific government function, is less novel than one that relies on entirely new processes or technologies, or includes individuals and entities not previously involved in helping government to provide service.

Replicability involves two distinct dimensions: replicability of the problem being addressed, and replicability of the solution. Replicability of the problem considers how widespread the public challenge that government innovators set out to address is. Some problems are particular to specific geographies, because of unusual circumstances related to weather, demographics, level of economic development, etc. Other problems are universal, and are thus faced by governments everywhere. The more general or universal the

problem being addressed, the more replicable an innovative solution was considered. Replicability of solution considers the ease with which the solution can be adopted in other locations. The more a solution relies on some unique asset or capability, or involves very significant financial investment that would be hard to replicate for small or less developed nations, the less replicable that solution is. On the other hand, innovations that can be easily and practically reproduced virtually anywhere are more replicable.

Finally, impact considers the scope and severity of the public problem being addressed by each government innovation, and the extent to which the created solution has improved the circumstances surrounding the problem in question. A government innovation created to address a widespread and severe problem is considered more impactful than one aimed at solving a narrower problem, or a problem whose consequences are limited. Similarly, an innovation that totally or nearly eliminates a particular public problem is considered more impactful than one that merely reduces the severity of a problem.

Each of the innovations selected for the Edge of Innovation Showcase scored highly on these three criteria, of course, but there was variation across these metrics.





Detector Rats



Mozambique
and Tanzania

Glossary Term

Process transformation

Summary

Mozambique and Tanzania have taken a novel approach to dealing with two significant challenges: the public health crisis caused by tuberculosis, and the threat to public safety and development posed by landmines and explosive remnants of war.

Both the Tanzanian and Mozambican government are working with APOPO, a Belgian non-governmental organization with headquarters in Tanzania, to address these humanitarian problems. APOPO has developed an innovative system deploying trained African giant pouched rats, using their remarkable sense of smell to detect unexploded landmines or tuberculosis, thereby dramatically speeding up the detection process, decreasing cost, and saving lives. Deploying these extraordinary animals helps to curb the spread of a prevalent and highly infectious disease and to reduce the danger posed by landmines and explosive remnants.

Region and Location:

Africa, Mozambique and Tanzania (tuberculosis detection); Mozambique (landmine detection)

Entities

The National Tuberculosis and Leprosy Programme (NTLP), Ministry of Health of Tanzania; Ministry of Health, Mozambique; APOPO vzw; National Institute of Demining (IND), Ministry of Foreign Affairs, Mozambique; Eduardo Mondlane University, Mozambique

Problem Background

Tuberculosis (TB) is a widespread and deadly disease, and highly contagious, making effective detection critical to slowing its spread. In 2014, there were an estimated 9.6 million new tuberculosis patients and 1.5 million TB deaths worldwide. Of these, an estimated 28% of all cases were identified in Africa, with Tanzania and Mozambique accounting for approximately 420,000 new TB patients and 48,000 TB deaths annually. Local public clinics are typically units of decentralized, underfunded, and understaffed neighbourhood health clinics and hospitals. TB diagnoses are conducted by under-paid, under-trained, and overburdened general lab technicians in laboratories with limited resources that mainly use microscopy for TB diagnosis. This type of testing is of limited effectiveness even when performed by properly trained experts under ideal conditions. Because of this, 50% of TB cases presented at public clinics go undetected.

Landmines and explosive remnants of war (ERW) pose an obvious serious danger to populations living in their vicinity. 110 Million anti-personnel mines are currently in the ground and they kill 15,000 to 20,000 people every year and severely maim countless more. Although 162 nation states (80% of the world's countries) have signed the Anti-personnel Mine Ban Convention (APMBC) and demining efforts are ongoing, the Landmine and Cluster Munitions Monitor recorded 3,308 new casualties in 2014, a global average of nine

casualties per day. Almost half (46%) of the civilian casualties are children. In many areas, casualties go unrecorded, so the actual number of casualties is likely to be higher. In addition to causing death and injury, landmines cause fear, cut communities off from basic needs such as water sources, and inhibit development. APMBC provides a compliance framework for the removal of landmines, and encourages countries not affected by landmines to assist those that are, but there is still much critical, hands-on, and dangerous work to be done on the ground. Demining processes that limit the risk to human deminers as much as possible is critical for the continuation of mine action activities.

The Innovation Solution

The government of Mozambique worked with the non-governmental organization (NGO) APOPO to address both pressing humanitarian challenges. African giant pouched rats have a highly developed sense of smell, are trainable, and easy to handle. They are also locally sourced and widely available, cheap to maintain, and too light to trigger landmines. APOPO trains rats (called HeroRATs) to sniff out TB in human sputum samples and detect buried landmines.

Tuberculosis

The Tanzanian Ministry of Health, through the National Tuberculosis and Leprosy Programme (NTLP), has been collaborating with APOPO since 2007. Since its inception, the TB detection programme in Tanzania has expanded to 24 collaborating clinics in Dar es Salaam, Coast region and the city of Morogoro. The Ministry of Health in Mozambique partnered with APOPO in 2013, intending to replicate the successful results of the TB detection rats in Tanzania and set-up a TB project in Mozambique. The project was designed to contribute to the Mozambican National TB Control Programme by effectively increasing the number of identified TB patients in the city of Maputo.

APOPO offers second-line screening to its partner hospitals. This means that APOPO collects sputum samples that have already been tested by microscopy in partner clinic labs and re-tests them via the TB detection rats. APOPO uses specially trained motorcycle liaisons that collect TB sputum samples from participating public clinics, ensure they are properly labelled, and then deliver them to the APOPO screening centre. Upon delivery, the samples are inactivated (i.e. rendered unable to cause disease) and prepared for examination by the rats.

The TB detection rats evaluate series of 10 sputum samples in a line cage. The samples are placed underneath the cage and the rats walk from one side to the other, sniffing out the sputum samples one by one. When the rats detect TB they indicate its presence by pausing over a sample for three seconds. Their correct indications on known positive samples are rewarded with a food treat. Each sample is examined by four rats, and rat indications on samples previously tested

as negative by the clinics are retested by APOPO trained technicians using highly sensitive light emitting diode fluorescence microscopy (LED-FM). The procedure reduces the number of samples requiring LED Microscopy to about 20% of the original samples.

Due to their unique speed and sensitivity, APOPO TB Detection Rats have increased TB detection rates of public clinics in Tanzania and Mozambique by over 40%. Rats can screen samples 50 times faster than the average lab technician, and produce same-day results at a very low cost per sample. Individual rats find on average 67% of positive cultures (as opposed to the 48% detection rate for a human technician), and a group of four rats will find 78% of cases.

Landmines

African giant pouched rats can be trained to detect unexploded landmines, using their exceptional sense of smell. During a vigorous 9 months program, the rats are trained to search for and indicate the scent of TNT (explosive used in landmines). Unlike manual deminers with metal detectors, APOPO's Mine Detection Rats (MDR) only detect the scent of explosives and thus ignore scrap metal. They can detect both metal and plastic-cased landmines, making them highly efficient landmine detectors. A single MDR can search an area of 200 square meters in 20 minutes. This would take a technician with a metal detector between one and four days, depending on the level of metal contamination. Moreover, unlike humans, the mine detection rats are too light to detonate an active mine by stepping on it, making the detection process much safer. Mine-detecting rats began working in Mozambique in 2003, and ever since, they found 13,294 landmines and helped to clear over 11 million square meters of land. APOPO was an important part of the demining operations that allowed His Excellency Minister Oldemiro Júlio Margues Baloi, Minister of Foreign Affairs, to declare Mozambique "free of all known landmines" in September of 2015.

Replicable Success Factors

- Identification of a specific source of large-scale public risk whose chemical composition is detectable by trained rats (or other animal).
- Close coordination between animal training agency (such as APOPO) and formal government entities, to plan effective use of animals.
- Supporting infrastructure required for programme success, e.g. motorcycle-based TB sample collection.



Droneports



Rwanda

Summary

Like many emerging economies, Rwanda lacks the road and rail network required for just-in-time delivery of medical and commercial supplies, contributing to lower health and economic outcomes in remoter parts of the country. To provide cheaper, faster, and more reliable transportation of these goods, the government of Rwanda is working with the Swiss-based charitable foundation Redline, developed out of the renowned École Polytechnique Fédérale de Lausanne, and with the architect Lord Norman Foster and his firm Foster + Partners, to establish the world's first national "droneport" network.

The droneports will act as multi-purpose hubs to enable small unmanned aircraft to deliver critical medical supplies and larger cargo drones to carry other commercial goods to areas which are difficult to access by other means. This will not only save lives but will also help create new jobs by encouraging local participation in the drone economy. To support this effort, the Rwanda Civil Aviation Authority will work together with ministries, the military and legal experts to produce a national regulatory framework for cargo drones.

Region and Location:

Africa, Rwanda

Glossary Term

Process transformation

Entities

Government of Rwanda; Redline Foundation; Afrotech EPFL; Foster + Partners; International Committee of the Red Cross; Latham & Watkins

Problem Background

Rwanda is hilly and often muddy. It currently has neither railways nor a robust road infrastructure. This results in difficulties transporting necessities to many remote areas where they are needed. This challenge, in fact, exists in several regions in Africa. Furthermore, and again like many countries in Africa, Rwanda's population is expected to expand far more quickly than the infrastructure can accommodate, making it likely that many parts of the country will continue to be inaccessible by rail or road well into the 21st century. The significant resources required to build an extensive road or rail system are simply not available. In order to address the important challenge of urgent materials delivery within the country, Rwanda needed a truly new process for transporting goods, one that ideally would pave the way for other countries facing similar challenges.

The Innovation Solution

The transportation challenges faced by Rwanda, together with its compact size, make the country an ideal test area for a national drone system, which can provide reliable transportation of middle distance goods without the enormous investments required by a highway, rail system, or airports for manned aircraft.

The Swiss-based charitable foundation Redline is developing low-cost flying robots, drones, with a cargo capacity of 10 kilograms on flight ranges over 100 kilometres. These cargo drones will fly over open rough terrain, delivering emergency goods to isolated areas.

To support drone operations, Redline will build the world's first cargo drone network, populated with affordable droneports built by Lord Norman Foster. Redline plans to develop workable solutions quickly, using as little technology and expenditure as possible while still emphasising logistics and serving citizens in need.

Rwanda was chosen as the initial site for developing the droneport concept because of its forward-thinking government, which wants to be at the forefront of technology development and innovative government service enhancement in Africa.

In the long run, drones hold even more promise for easing the burden of transportation over difficult terrain in other African countries, such as such as Angola, Congo, and Central African Republic. Redline's humanitarian partner, the International Committee of the Red Cross, envisions the drone technology, once proven, could also be used in persistent humanitarian emergencies, such as than ongoing in Darfur.

Once proven in Rwanda, the droneport concept will have wide-scale application across Africa and possibly other parts of the world, with the potential to lead to the formation of several new African companies

The drones themselves are designed to be:

- Price competitive with motorbikes
- Able to fly in most conditions multiple times a day
- Operable by semi-skilled personnel
- Droneport compatible
- Capable of modular payload deployment
- Simple to build and repair at droneports
- Able to fly 50,000 kilometres without a major breakdown
- Able to crash with no penetration of roofs, vehicles, or creatures

Redline expects one early drone use in emerging economies will be the delivery of emergency blood supplies. Timely blood deliveries to isolated regions will help save the lives of many who would otherwise die from anaemia, sickle cell disease, bleeding out during childbirth, road traffic accidents, and other trauma.

Redline plans to partner with the government and commercial pharmacies to deliver HIV and diabetes medications through smart pharmaceutical warehouses: a country the size of Rwanda may be served with as little as four such warehouses, with timely deliveries going by cargo drone. Redline also expects its operations to aid in improving

epidemiological data gathering, and to support research in understanding the value of healthcare cargo delivery by drone for poorer communities.

The droneports, each of which will cost about the same as a petrol station, will be of modular design and will accommodate drone operations and also act as multi-purpose commercial hubs (for couriers, traders, chemists, digital fabricators, e-commerce vendors, etc.) and as technological centres which will encourage local participation in the drone economy (e.g., for hardware, software, logistics, and repair). Redline plans to build three droneports for the first phase of operations.

In order to accommodate this novel form of cargo delivery, the Rwanda Civil Aviation Authority will create a legal framework to allow safe operation of drones and lay the groundwork for their expanded use in the future. The new laws will emphasise the complete avoidance of manned airspace and deployment of braking technologies on drones to limit ground impact to safe levels (less than 66 joules).

Future plans include the deployment of "Blueline" routes using large cargo drones with a capacity of 100 kilograms and a range of 200 kilometres using clean energy solar-charged batteries. Blueline services will enable an increased variety and payload of cargo to be hauled, allowing poorer communities access to more goods, and stimulating economic growth. The ultimate goal is for every small town in every emerging economy to have a droneport by 2030.

Replicable Success Factors

- Low cost, easy to operate, easy to maintain technological solution (drone-based) for transportation of goods.
- Close cooperation between government, outside technical and legal specialists, and the private sector.



Pocket Parks



Mexico

Glossary Term

Active Infrastructure

Summary

Building large-scale parks is prohibitively expensive in dense urban environments. At the same time, cities are filled with abandoned or underused sites that provide nothing of value to the inhabitants of the neighbourhoods in which they are located. However, when governments try to redevelop urban spaces without consulting local communities, they often meet resistance from those communities. The Mexico City Public Space Authority (AEP), working with the NGO EMBARQ, developed a process for small-scale, highly local urban beautification driven by community involvement.

Community driven “pocket parks” represent focused redevelopment based around the needs of the community and incorporating existing uses of the small spaces that are transformed. Thirty pocket parks have so far been built around the City, with a goal of approximately 150 to be completed in the future.

Region and Location:

Latin America, Mexico

Entities

Mexico City Public Space Authority (AEP); EMBARQ

Problem Background

Living in over-developed cities like Mexico City can be overwhelming for citizens, especially in the absence of quiet and beautified places such as parks. Public renovation projects to improve underutilized or unpleasant locations often are not done because they are prohibitively expensive for local communities.

On the other hand, when the central governments attempted to improve smaller-scale areas without local community buy-in, local government and communities often responded negatively. Local communities are resistant to change, even when the change is intended to improve a locality and its environment and surroundings. People naturally want to be included in any planning that affects the area where they live, and want to ensure that plans for change accommodate existing uses for the space to be redeveloped.

Because of lack of local funds and resistance to “outside” planning, many attempts to create parks within Mexico City were unsuccessful. As a result, many vacant or underutilized properties are left as-is, serving neither an aesthetic nor a practical function.

The Innovation Solution

Learning from previous unsuccessful attempts to beautify selected areas of Mexico City, the Secretary for Urban Development and Housing of Mexico City and the Public Space Authority of Mexico City (AEP)

worked together to find a better way to make improvements to the City’s unpleasant areas. Given past experience in the City, the AEP wanted a mechanism for park planning that would be acceptable and positively regarded by the communities surrounding those locations.

The solution created the AEP, who led the project, was the introduction of community-inspired “pocket parks.” A pocket park is a relatively small space, between 100 and 1000 square meters, which has been renovated to be a pleasant and fun location for the local community. The ideal location for a pocket park is a previously unused or underutilized location such as abandoned road remnants, vacant lots, or unused street corners. By improving these locations, the AEP hoped to have a dramatic impact on the overall feel of the neighbourhood in a relatively short timeframe and for minimal cost, which on average is around USD 50,000.

In order to ensure adequate community involvement, AEP sought help from the NGO EMBARQ Mexico as a consultant. AEP and EMBARQ hosted a series of workshops examining approaches of community-based planning from around the world. Using the learnings from these workshops, they hosted meetings with community members about their needs with respect to parks.

Many novel ideas for the park were proposed, and important information about needs and current uses of proposed park space was collected. The planning team discovered that accommodating certain commercial or other uses were key to acceptance and support for planned parks. In other words, the parks were not merely attractive places for rest and recreation; they also actively served other important public needs. For example, a car-sharing service agreed to maintain a planned park in exchange for including two parking spaces within park borders that could only be used by shared cars. By adding this to the design, the government cut costs, appealed to local businesses, and increased mobility options around the city.

Another meeting with a community in a different neighbourhood saved the planners from making a mistake that would have significantly damaged their relationship with the local businesses. They had been unaware that the space marked for pocket park development included an area necessary for the delivery trucks of local businesses. The planned park would have eliminated this much needed delivery space. Space for the delivery trucks was added to the final design of the park and won approval from the local community, who now saw that the government was willing to work with them to develop a park that would support their needs rather than ignore them.

To date, over 30 community workshops have been held and 30 parks successfully constructed around the City, with a goal of approximately 150 to be completed in the

future. In addition to meeting successfully with individual communities, the AEP held a workshop for representatives of neighbourhoods across the City. 70 neighbourhood delegates attended, representing 14 of Mexico City’s 16 major neighbourhoods. Planning for each of the successful pocket parks began with a community workshop, but cooperation was not limited to this single occasion. Plans were routinely reviewed with the community for approval, and community ideas were frequently incorporated in park design to make sure planned parks aligned with the needs of neighbourhoods.

The review process included popular site visits, at which representatives from the AEP and community members would discuss plans on-location, and map out exactly where each element of the park would go. Being able to physically see where changes would be made and having their input about those changes heard and accommodated helped communities gain a sense of ownership that made the new pocket parks part of the community rather than something forced from the outside. The result was the revitalization of underused property into beautiful, valuable, and enjoyable public spaces.

Replicable Success Factor

- Availability of relatively small parcels of unused or underused land available for beautification.
- Process for urban planning that incorporates significant input from the community.



Air Purifying Façade



Mexico

Glossary Term

Active Infrastructure

Summary

Air pollution is a persistent problem for almost all large metropolitan areas in the world. To help ameliorate the highly polluted air in Mexico City, the Ministry of Health has installed specially designed façade modules on the Torre de Especialidades of the Hospital General Dr Manuel Gea González. The modules are painted with a pigment containing titanium dioxide, which, when activated by sunlight, reacts with toxic nitrogen oxide and other pollutants in the atmosphere and converts them to harmless nitrates and water. With 2,500-square-meters of façade installed, the structure neutralizes the pollution produced by 1,000 vehicles every day.

Region and Location:

Latin America, Mexico City

Entities

Mexico City Ministry of Health; Hospital General Dr Manuel Gea González; Elegant Embellishments

Problem Background

Mexico City has long suffered from very high levels of air pollution, especially from the large number of automobiles in use. Although air quality has improved somewhat since its worst point in the 1980s, 4.5 million cars are registered in the city and the number is growing.

The Mexican government has committed \$20 billion to improve the country's health infrastructure, and passive pollution-fighting architectural innovations are part of the solution.

The Innovation Solution

Titanium dioxide (TiO₂) is commonly used as a pigment and is known for its self-cleaning and germicidal qualities. In Mexico City, the Ministry of Health made use of these unique properties by installing a titanium dioxide containing façade on the Torre de Especialidades of the Hospital General Dr. Manuel Gea González. The modules, called prosolve modules, were developed by Elegant Embellishments, an environmental design firm. They are coated with a superfine nano-photocatalytic type of TiO₂.

This pollution-fighting technology is activated by ambient daylight, and requires no other energy to operate. Using only small amounts of naturally occurring ultraviolet light and humidity, the coated tiles operate directly on local pollution, breaking down and neutralizing nitrogen oxides, volatile organic compounds, and sulphur dioxide where they are generated. The modules effectively turn these

pollutants into harmless amounts of carbon dioxide and water. The complex contours of the façade maximize the effectiveness of the TiO₂ coating by capturing omnidirectional light where sunlight is dense or scarce. In addition, the façade naturally shades the front of the building, reducing the energy required to cool the hospital.

According to recent studies, the 2500-square-meter façade at Torre de Especialidades, Hospital Manuel Gea Gonzales is eliminating pollution equivalent to that produced by 1,000 cars every day. Although this amount will not significantly lower the total pollution in Mexico City, it does improve the air and health of hospital patients and workers as well as neighbourhood residents. The modules are also visually interesting and

can generate public attention and interest in what would otherwise be an invisible technology. Lower the total pollution in Mexico City, it does improve the air and health of hospital patients and workers as well as neighbourhood residents. The modules are also visually interesting and can generate public attention and interest in what would otherwise be an invisible technology.

Replicable Success Factors

- Availability of a public building or other large surface area on which pollution-reducing technology can be applied.
- Enabling environmental conditions, in this case minimal ambient sunlight and humidity levels.





Pandemic Preparedness 101: Zombie Apocalypse



United States

Glossary Term

Behaviour-inspired Government

Summary

The U.S. Centers for Disease Control and Prevention needed a way to motivate people to prepare for potential public emergencies. The emergency preparedness materials they placed on their website were comprehensive and easy to follow, but largely ignored because the subject of preparedness is considered boring by many and does not engage the public. In order to stimulate greater interest in emergency preparedness, the Centers for Disease Control created a “Zombie Task Force” to publish materials on zombie preparedness via its blog. By taking a serious approach to teaching people how to prepare for a zombie pandemic, the blog was in fact teaching the public how to prepare for any real emergency, such as a natural disaster, large-scale power outage, disease outbreak, etc.

Because of the widespread presence of zombies in popular culture, the Centers for Disease Control’s plan drove an enormous amount of traffic to its emergency preparedness website.

Region and Location

North America, United States

Entities

United States Centers for Disease Control and Prevention; University of Nebraska Medical Center (UNMC) College of Public Health

Problem Background

Governments know that their response to widespread disasters is greatly affected by how knowledgeable the public is. For this reason, many governments try to educate the public in basic household emergency response preparedness. Unfortunately, most people ignore government efforts to help them prepare for emergencies because the topic is inherently boring and because the public are known to underestimate the chance of being caught in an emergency situation.

The U.S. Centers for Disease Control and Prevention produced elaborate emergency preparedness materials for the public on its website, but very few people made use of these materials. For this information to benefit the public and the government, the CDC needed an effective way to convince people to access the available information.

The Innovation Solution

Based on an idea from a Twitter follower, the U.S. Centers for Disease Control and Prevention (CDC) assembled a “Zombie Task Force” and used the CDC’s Public Health Matters blog to craft a clever but also educational blog post about zombie preparedness,

while regularly referring to real emergencies like hurricanes, floods, or earthquakes. The idea was that if people were prepared for a zombie pandemic they would be prepared for any emergency. Readers were instructed regarding how to make a plan and emergency kit and how to stay informed using CDC’s emergency website. The CDC website provides up-to-date information on emergencies, tools for preparing, and training resources.

The enormous success of the initial blog post spurred an expansion of the original blog approach to include a wider range of communication materials, allowing CDC to reach a broad section of the population with engaging materials on an important topic. These materials included a graphic novel, «Preparedness 101: Zombie Pandemic,” that demonstrates the importance of being prepared in a manner that is entertaining for people of all ages. Readers follow the adventures of Todd, Julie, and their dog Max as a strange new disease begins spreading, turning ordinary people into zombies. A surprising twist at the end drives home the importance of being prepared for any emergency. Included in the novel is a Preparedness Checklist readers can use to get their family, workplace, or school ready before a real life disaster strikes.

The campaign was incredibly successful. It drove a huge amount of traffic to CDC’s emergency preparedness website, and dramatically increased awareness of the importance of preparedness. The former campaign of the U.S. Centers for Disease Control and Prevention also involved new audiences that were not previously engaged in preparing for potential public disasters.

Replicable Success Factor

- Important government education message in need of widespread communication to the public.
- An attention-getting, entertaining, well-known context into which to place the “true message” of the public communication.





E-waste Recycling

 The People's Republic of China

Glossary Term

Behaviour-inspired Government

Summary

Due to rapid advancement in consumer technology, China has a growing problem with the vast amount of obsolete electronics that pile up each year as e-waste. As an important step toward solving the e-waste problem, the United Nations Development Programme (UNDP) and online internet giant Baidu teamed up to create a app to make recycling more convenient and efficient for consumers.

This app uses image recognition software to identify categories of e-waste using images of the discarded products from users' smart phones.

It then informs users of the value of their waste electronics and connects them with certified recyclers who collect the e-waste and pay the consumers for their obsolete products. Pilot projects in Beijing and Tianjin have been very successful and the programme is being rolled out throughout China with additional e-waste recycling agencies joining the project.

Region and Location

Asia, China

Entities

Foreign Economic Cooperation Office under the Ministry of Environmental Protection of China; United Nations Development Programme; Baidu

Problem Background

As a rapidly developing country, China produces vast quantities of electronics goods, many of which are sold in China itself. Unfortunately, the fast pace of innovation quickly renders these goods obsolete and so new products are always being purchased and old ones discarded. As a result, in 2014 China produced 6,032 kilotons of waste from discarded electronics.

Electronics are difficult to dispose of safely because they often contain rare materials and hazardous chemicals. However, when properly recycled it is possible to extract significant value from the e-waste. Unfortunately, most people do not bother to recycle their e-waste because there is no convenient way to do so. This has led to the creation of informal recycling stations that extract precious materials and then discard the toxic leftovers.

These leftovers are a source of persistent organic pollutants and greenhouse gas (GHG) emissions, both of which are threats to human health and environmental wellbeing. Contaminants also pose significant health risks to those who work in the informal recycling centres. All of these difficulties spring from the underutilization of proper recycling

facilities by consumers, and it is that underutilization that the United Nations Development Programme (UNDP) and Baidu sought to address.

The Innovation Solution

Recognizing the opportunity for applying big data to societal problems, UNDP partnered with the Chinese web services giant Baidu to develop a long term solution to the growing e-waste challenge. UNDP and Baidu formed the UNDP-Baidu Big Data Joint Laboratory to develop big data solutions. The first challenge the laboratory elected to tackle was the problem of leftover electronic goods that were not properly recycled.

Inspired by Uber, the laboratory conceived a new and more efficient model of recycling, they pictured a mobile application serving as the interface between the individuals with excess electronic goods and the specialized facilities capable of safely and successfully recycling those goods. In late 2014, the first version of the app, called Baidu Recycle 1.0, was piloted in Beijing and Tianjin.

Baidu Recycle 1.0 was a test case designed to gain feedback and data about how a recycling app could function. This first edition of the app allowed users to photograph their discarded electronics, and the app automatically identified the broad category of the object (TV, washing machine, digital products, etc.) Identification is an important step because different electronic devices will contain different materials that need to be recycled by agencies with different certifications and specialties. After the object is identified, the app provides an estimate of the price an officially sanctioned recycling agency will pay for their old electronics. If they user chooses, they can enter contact information and the app will send a message to qualified recycling agencies to arrange for door-to-door pick up. The app thus makes it very easy and even financially rewarding to recycle.

To further improve the app, the Big Data Joint Laboratory team has developed Baidu Recycle 2.0 with several new features and improvements. The team has included a significantly larger number of licensed recycling agencies with the updated version of the app. A larger number of recycling agencies allow the app to function in a broader geographical area with an eye toward eventually covering all of China. The team also formed an "E-Waste Alliance" network together e-waste recyclers from around the country to scale up the coverage of the app. In 2015, the number of recycled items through the app exceeded 60,000.

Beyond expanding the reach of the recycling program, several improvements are being made to the app itself. Forms were added to handle customers that want home appliances removed and to allow individual e-waste collectors to follow through with the removal. The app also now features a

two-way feedback system where individuals and e-waste collectors can rate one another, allowing those following good practices to establish good reputations. Finally, the app has also expanded the list of electronics it can identify and facilitate the recycling of to include smaller items such as cell phones and laptops.

Considering the future of their recycling efforts, the laboratory has designed versions 1.0 and 2.0 of the Baidu Recycling app to collect a significant amount of data to help answer important questions about recycling, such as:

- Which electronic goods are most widely recycled, and which require further targeting to encourage recycling behaviour?
- Do certain demographic groups recycle more than others?
- Which geographical areas are in need of better recycling facilities?
- Does recycling become an ingrained habit (i.e. a behaviour likely to repeat itself automatically) or is persistent external influence required to maintain good consumer practice?
- What kind of incentives (e.g. high scrap value vs. convenience) work best to encourage recycling?

By answering these questions and others that arise in the process of analysis and development the laboratory hopes to further refine their approach to recycling. Already, Baidu Recycling 1.0 and 2.0 have created a positive impact on the e-waste challenge in China.

Replicable Success Factors

- Improved convenience and added direct monetary value for consumers that provided powerful incentives for use.
- A pre-qualified set of licensed recyclers participating in the program.



Virtual Health Lab



United Arab
Emirates

Glossary Term
Technology Reinvention

Summary

The training of surgeons is challenging because it is not possible for surgeons to practice their skills in a realistic setting. Nor is it possible to assess new surgeon skill levels outside actual operating environments. To address this issue, the Ministry of Health of the United Arab Emirates, in cooperation with the United Arab Emirates Telecommunications Regulatory Authority, designed and developed a virtual reality based surgery operating lab. The system fully simulates real surgical procedures in detail, allowing surgical students to practice their skills and senior doctors to train and assess the skills of junior surgeons. Not only does the system allow face-to-face interaction but it also allows remote participation in the same virtual environment from multiple locations, making remote teaching and advising possible. This feature is especially valuable for regions where surgeons are geographically distributed and there is a scarcity of surgical trainers. The immersive capabilities of the system also enhances the communication between the surgeons and their patients.

Region and Location

Middle East, United Arab Emirates

Entities

Ministry of Health, United Arab Emirates;
Telecommunications Regulatory Authority,
United Arab Emirates.

Problem Background

The training of surgeons is an inherently difficult process because it is not possible for new surgeons to practice their skills in a realistic environment before working on living human beings. Trainees are limited to practicing on animals, a poor substitution for human anatomy, or on cadavers, which are limited in availability. In addition, for a surgeon to assist with surgical instruction, he or she must be physically present, further containing opportunities for surgery training and for assessment of doctor surgical skill and proficiency.

The Solution and Impact

The Ministry of Health of the United Arab Emirates (UAE), working closely with the UAE Telecommunications Regulatory Authority, have designed and developed a 3D virtual reality (VR) based simulation system for training surgical students. The solution uses a combination of software and hardware to immerse users into a virtual environment that provides:

- A detailed virtual representation of human anatomy
- A procedural training simulator that progresses through the steps of a given operation
- Decision tree based feedback and sequence forking for error scenarios
- Dynamic vital signs (heart rate, blood pressure etc.) which respond automatically in real time based on medical conditions during surgery
- Real effects, such as gushing blood

The development of surgical scenario is based on storyboards developed by doctors. The solution uses a 120 degree curved screen and a series of projectors and tracking sensors to render images in 3D (powered interactive glasses are required).

While laparoscopic surgery training has been done with VR, the solution described here is unique in the field of health simulation. Creating a virtual operation required extensive cooperation between a team of doctors and a team of software developers. The joint team had to recreate the complexity and workflow of each modelled operation.

The resulting solution immerses the user in a virtual operating room, and it lets the user conduct the entire surgery as if he or she was operating on a live patient. In addition to training, the tool can be used by senior doctors to assess new doctor performance and readiness. Because the platform is virtual, users need not be in the same place. Consulting or monitoring doctors can participate from remote locations, view the same operation, and appear as avatars within the environment.

Eight hundred to a thousand trainees are projected to benefit from the solution, including junior surgeons, interns and medical students. The number of facilities and partners are estimated at 25 to 30 hospitals and medical schools.

Beyond the training benefits, doctors will be able to use the system as a tool for explaining medical and prospective surgical scenarios to patients. The result is a more efficient, more effective, and more humane delivery process, better

quality of care, and improved patient experience and satisfaction.

Replicable Success Factors

- Close cooperation between medical experts and software and system development team to fully recreate the process of specific surgical operations.
- Flexible technology solution that allows (a) for ongoing software updates that reflect the latest surgical procedures and system feature enhancements (e.g. haptic feedback), and (b) for use across multiple platforms (from multi-projector set up to simple home computer).



Patient Innovation Platform



Portugal

Glossary Term

Collective Intelligence

Summary

Patients with chronic and/or rare illnesses often lack solutions to help them cope with their diseases and face several unmet clinical needs. In the case of rare diseases, rarity discourages companies and researchers alike from targeting diseases for life saving or quality of life improving medical innovation.

Faced with this enduring lack of treatment help, patients and their non-professional caregivers have developed a significant number of solutions to help them cope with their diseases. Without a forum by which to share these innovations, however, the solutions created by patients can help only those who have created them. Patient Innovation was created as a web platform aimed at addressing this twin problem of lack of innovation and lack of diffusion. The platform serves as a network for patients to find others suffering from the same condition, trade information about their experiences, and share and discuss the innovations they have developed themselves, as non-professional caregivers, to treat and manage their

own illnesses. Though based in Portugal, the Patient Innovation platform is available in many countries and languages. The innovations shared by platform participants have helped relieved suffering and lowered medical care costs for countless patients.

Region and Location

Europe, Portugal

Entities

High Patronage of His Excellency the President of the Portuguese Republic; Católica Lisbon; Instituto de Medicina Molecular; Fundação para a Ciência e a Tecnologia; Carnegie Mellon Portugal; Fundação Calouste Gulbenkian; Orange Bird

Problem Background

For patients suffering from chronic and/or rare conditions, healthcare solutions are frequently not available, and it can be hard to find off-the-shelf treatments that work. Healthcare companies tend to

restrict their research to conditions afflicting a large number of people, leaving the unique sufferers with few or no options. Even when solutions exist, they are often difficult to obtain because of limited production.

Many patients with chronic illnesses manage their own healthcare, or receive care from non-professional caregivers such as family. In the process of providing and receiving this non-professional care, patients and those around them, often develop innovative solutions to the medical problems they face, reducing suffering and making their lives easier. Unfortunately, patient innovators often believe their problems are unique to their own situation, do not realize there may be broader audience for the solutions they've developed, or may not have the means to share what they have done with a broader audience.

Accordingly, they do not usually make any attempt to bring these innovations to the attention of the outside world or to develop their innovation further, for example, into something that might be marketable as a commercial product. This prevents others who might benefit from these innovations from doing so.

The Innovation Solution

Historically, most innovation in consumer use products came from firms or entrepreneurs, often from formal R&D activities. Over the last few decades, this has started to change. Increases in the availability of information through the internet has opened up an opportunity for innovation by consumers themselves. For example, research in the United Kingdom found that 6.1% of consumers (2.9 million individuals) had engaged in consumer product innovation during the prior three years, and consumer-based product development expenditures were more than 1.4 times larger than the R&D expenditures of all firms in the UK combined. One field in which individual innovation is particularly noteworthy is that of healthcare. Patient Innovation is a platform for discussion and a social network aimed at bringing together patients, families, and communities to share solutions to the difficulties brought about by specific health conditions.

At the most basic level, the platform's goal is to better diffuse patient innovations. Research shows that better-informed patients reduce care costs and emergency room visits by 60% and improve health outcomes by 30%. Going far beyond mere information sharing, however, Patient Innovation mainly serves as a platform for innovation sharing across patients.

This can be as simple as advice on managing everyday tasks associated with specific conditions, which can be particularly helpful for those recently diagnosed. It also means that those patients who have developed significant effective treatment solutions now have a way to share their innovations, allowing others to benefit from their ingenuity.

Submitted solutions undergo a screening process that identifies and removes posts that are considered inappropriate; that involve drugs, chemicals or biologics; that consist of invasive devices; or that are visibly and intrinsically dangerous. The platform does not scientifically or in any other way validate the proposed solutions. Most solutions are of a practical nature and may not require scientific validation, though still be important in improving the lives of patients and caregivers.

Innovations created by Patient Innovation users include: Upsee, a mobility device that allows children with motor impairment to stand and walk with the help of an adult; the shower shirt, a post-surgical, water resistant garment designed to protect chest surgery and external defibrillator patients from water while showering; and helium balloon stimulators, simple balloons placed at various heights throughout a home to encourage children with Angelman's syndrome, which affects the acquisition of motor skills, to improve motor skills by striving to reach the balloons.

By coming together as part of a network of users exchanging knowledge, patients help themselves and others, stimulating value creation. The result is more knowledgeable patients and non-professional caregivers, lower care delivery costs, and expanded geographical access to care. With growing participation, the platform has become a unique database of solutions developed by patients, for patients, across a wide range of medical and disease conditions. The database is searchable by diseases, solutions, symptoms, locations and activities.

Patient Innovation users, who may include patients, non-professional caregivers, and other individuals, can provide feedback through comments and informal ratings for each submitted solution. Every solution posted is automatically translated across all supported languages (translation done via machine translation). This way, a patient in Portugal can share a solution with an Australian caregiver without language barriers, maximizing the knowledge spread. Over time, the number of supported languages will increase, broadening the number of users, contributors, and beneficiaries.

Replicable Success Factors

- Community of users with similar challenges, in this case similar rare medical conditions with limited treatment options.
- Easy to use and access platform for user knowhow sharing.



Crowdfunded Civic Projects



United Kingdom

Glossary Term
Collective Intelligence

Summary

To build greater public participation in neighbourhood improvement projects, the Greater London Authority has developed a revolutionary way to plan and fund public capital projects. Working in partnership with the crowdfunding website Spacehive, London's city government created a platform for local organizations to propose ideas for civic projects or new uses for unused space. The Greater London Authority pledges up to £20,000 to support the best proposals. Local organizations raise match funding from the wider community to unlock public funds and realize their projects.

The first round of the programme received 81 proposals, 17 of which were supported, raising 118% match funding from the crowd. In the second round, the Greater London Authority pledged £285,000 to 20 projects, leveraging over £450,000 of additional pledges from more than 2,300 Londoners, a 158% increase in funding. Based on the early success of the program, plans are underway to expand the platform to allow for crowdsourcing and crowdfunding more ambitious and complex projects.

Region and Location

Europe, London, United Kingdom

Entities

Great London Authority (GLA); Spacehive; Future Cities Catapult

Problem Background

Governments everywhere are looking for ways to involve citizens more directly in the process of decision-making. While the formal legislative process has established mechanisms for citizens to voice their views, there are few mechanisms for local communities to be directly involved in generating the ideas for public capital projects, or playing a part in delivering them. Projects tend to be funded based on top-down policy, the efforts of well-funded interest groups, or the slow groundswell of public demand.

These processes can be complex, slow, and unrepresentative of what is really needed in a local place. In addition, projects delivered through traditional processes tend to be funded entirely from government funds, limiting their size and scope to what government is willing and able to spend.

The Greater London Authority (GLA), the city's top-level administrative body, wanted to give London's citizens a more direct role in deciding on local regeneration and growth projects. It also wanted to give individuals and organizations outside of government the opportunity to contribute to worthwhile projects. The GLA believed that local residents and organizations were best suited to

understand and address the needs of the neighbourhoods in which they lived and worked. To meet these goals the GLA required a more flexible and modern approach to getting citizen input on civic projects.

The Innovation Solution

Within greater London, there is a fantastic diversity of individuals and local organizations with ideas for community improvement. To help people bring their ideas forward for consideration and possible funding, the GLA partnered with the London-based crowdfunding website Spacehive to create a platform for proposing and crowdfunding civic projects. Through Spacehive, local organizations can put forward ideas for civic projects or new uses for unused space. Crowdfunding allows anyone to pledge money to support proposed projects. To help applicants reach their funding targets, up to £20,000 from the Mayor's High Street Fund is available for each project.

To be eligible to participate, organizations must be a community group, Town Team, resident or trader association, Business Improvement District, Neighbourhood Forum, social enterprise, school, local charity, or local authority. Participating organizations must also:

- Be able to enter into legal contracts, or must partner with an organization that can
- Provide a registered company or charity number
- Demonstrate the capacity and ability to physically deliver the project for which they are advocating

The programme takes an open mind about the type of project to be considered, but projects in Rounds 1 and 2 were expected to:

- Be on, or near, a high street, the centre of neighbourhoods within London
- Mainly be seeking capital funding (rather than operating expenses)
- Demonstrate a fit with four criteria
 1. Attracting visitors
 2. Improving the environment,
 3. Bringing together local groups
 4. Reusing empty spaces

The decision about whether to pledge to a project is based on these four criteria, as well as:

- The applicants' ability to physically deliver the project they describe
- The overall value for money of each project
- The potential for wider benefits of each project

A key aim of the programme is building community support for civic projects. The amount a community is willing to invest in a project is an indicator of its commitment. Accordingly, GLA support comes with the expectation of match funding. A limit was set that public funds could be no more than 75% of total project costs. This meant that applicants need to do more than merely propose projects

They also have to raise funding from 'the crowd' through the Spacehive platform, which allows for a diverse set of funders to fund a diverse set of relatively small ideas.

Of course, match funding alone is not a true representation of local support – as support depends on the wealth of the neighbourhood. By contributing financially to projects, the GLA was able to democratize the crowdfunding process by taking into account non-financial measures of community support, such as volunteer support or Facebook likes.

Government backing for projects significantly increased their credibility, profile, and the ability to raise funding. Before receiving GLA support, projects received an average of £60 worth of pledges per day. Following GLA support, the average was £200 per day – an increase of 233%.

To ensure viability and success, projects only get approved once they meet pre-established funding targets, within a fixed timescale. Project risk management, contract frameworks, and due diligence are all built into the Spacehive platform, and no project advances without full funding and the necessary planning and regulatory permissions. To support local organizations to come forward with ideas and deliver them, Spacehive and the GLA run a capacity-building programme including workshops for interested applicants and bespoke advice on running crowdfunding campaigns.

The GLA dedicated £600,000 in direct funding from its High Street Fund for the first two rounds of the programme. In the first round, the GLA received 81 proposals, representing a pipeline of locally led projects worth around £2.5 million that could be delivered very quickly. The GLA funded 17 of these projects based on the High Street Fund criteria. These projects represent £315,000 of GLA investment, bringing in

£370,000 of match funding, equalling 118% local match. In the second round the GLA pledged £285,000 to 20 projects, leveraging over £450,000 of additional pledges from more than 2,300 Londoners (2,100 individuals, 120 businesses, and 6 councils), a 158% increase in funding.

A sample of projects funded include:

- The re-use of an empty shop unit as a local community centre, hosting a programme of events and workshops that have allowed more than 350 local people to co-produce the Queen's Park Neighbourhood Plan, a locally-led strategic vision to inform the local government's future thinking about the area.
- Preparatory work for a new community urban park in Peckham using a disused railway viaduct, which will link neighbourhoods on either side with shops, services, and public transport.
- Bringing an empty shop in Catford back into use as a community grocery store, selling affordable, locally grown vegetables as well as providing workshops, training, and advice on healthy eating.
- Transforming a disused alley in Whitechapel into a free public library with a book exchange, seating, and planters.
- A new not-for-profit restaurant in Tottenham offering young people an affordable, healthier alternative to fast food, at the same time as creating job opportunities for local people.

The GLA have committed an additional £700,000 to a further two rounds of the initial pilot programme. This is being run as an iterative design process with each round learning from the last, and testing of new ideas, which allows the programme to evolve quickly to meet the needs of users. Other than the GLA and Spacehive, supporters of the programme have included organizations such as Vicarage Field Shopping centre – Barking, Arts Council England, Sustrans, Southwark Council, and Tesco.

In the future, the GLA plan to extend the programme to create a central civic crowdfunding hub for London, bringing together all community-led civic projects in one place to leverage investment from citizens, public bodies, and the private sector. Calls for projects will be made on specific themes (e.g. Zero Carbon or Smart Cities) or to align with key government funding priorities.

The hub will also allow projects to be presented in phases with various elements 'unlocked' and secured once certain funding targets have been met. In addition, crowdfunding campaigns could be run for both a 'standard' and 'enhanced' project. This, of course, would change the current 'all or nothing' model for funding, but could make funding go further where there is extra support.

The GLA and Spacehive also plan to develop their package of support to encourage groups with limited skills or resources to propose ideas and engage in delivery, building local capacity and ensuring diversity and fairness in public funding

Replicable Success Factors

- Local community members with good ideas for smaller-scale public capital projects.
- Presence of large number of potential crowdfunders, either individuals or organizations.
- Available crowdfunding platform to bring together good ideas and many small contributors.



Public Data Visualization



Brazil

Summary

Though government open data programs have grown rapidly, they are typically hard to access, difficult to use, and often ignored by those who could benefit from analysis of government data. To overcome this challenge, and working in collaboration with the MIT Media Lab and Datawheel, the Brazilian State of Minas Gerais developed an open data platform called DataViva which was designed from the ground up to be easy to use. The platform provides over 3 terabytes of Brazilian data, and over 500 gigabytes of data on exports, imports, employment, and education for the entire formal sector of the Brazilian economy. Data can be examined and downloaded using a highly intuitive visualization tool that can create over 700 million interactive visualizations, making the tool easy to use for government officials, businesses, and citizens.

Region and Location

South America, Brazil

Glossary Term

Data-led Effectiveness

Entities

Minas Gerais Government; A Fundação de Amparo à Pesquisa do Estado de Minas Gerais; MIT Media Lab; Datawheel LLC

Problem Background

Many governments have collected a massive amount of data and made them public through “open data” portals. Despite a growing number of government-led open data initiatives, much of the data released by public agencies are not easily available to the public. They remain buried in poorly designed public databases or hidden in hard to find reports.

For example, an immense amount of data is embedded in tax, social security, and annual registration records. These data can tell us, in theory, how many people work in every occupation, in every industry, and in every location within a region. But to be useful these data need to be easy to access and understand.

The State of Minas Gerais in Brazil wanted to create an open data portal to improve government transparency, fight corruption, and stimulate economic development. Minas Gerais did not want just another open data portal that was hard to use and got little use from its intended audience. The challenge was to make data collected from a wide range of sources and stored in very different formats available in such a way that it was easy to access, visualize, and analyse.

The Innovation Solution

To make its new open data portal as user friendly as possible, the Minas Gerais State Agency for Research Development cooperated with the MIT Media Lab and Datawheel to incorporate easy-to-use data visualization into the tool. DataViva, as the portal is known, provides data on exports, imports, employment, and education for the entire formal sector of the Brazilian economy. Included in the tool are databases covering imports and exports from the Foreign Trade Department, occupation and workforce data for 427 sectors from the Ministry of Labour and Employment, census data, and the graduation and post-graduation census from the Ministry of Education.

DataViva makes the data available in a variety of formats:

- Through eleven different visualization types resulting in over 700 million possible interactive visualizations.
- As rankings for the federal, state, regional, and municipal levels across several years.
- Through cleaned and organized data tables available to download or use within an application programme interface (API).
- Through “Profiles” focused on specific topics that draw data into narratives to help users understand Brazil’s locations, occupations, industries, products, trade partners, universities, and educational coursework.

In addition to reformatting original source data to make its interrogation easier, the development team focused on aesthetics and intuition. They created an interface that was as visually appealing as possible. DataViva also includes pre-populated lists of visualizations based on the most popular data sets, such as the richest municipalities or best-paid occupations.

In total DataViva can be used to visualize over three terabytes of Brazilian data. Some of its core applications are description focused, showing data aggregated at various levels in a simple and comparative way, such as Treemapping. Others are prescriptive, using calculations that allow analytic visualizations of processed data. All of the applications are generated using an open source JavaScript library. The platform is available in both English and Portuguese, accessible through any desktop or mobile device, and optimized for fast viewing.

Key to DataViva’s usability is its interactivity. The platform guides users to freely discover locations, industries, and occupations in Brazil or answer questions of interest, such as, “What is the average salary paid to computer scientists working in the software development industry in Belo Horizonte, the state capital of Minas?” or “What has been the evolution of exports in the last decade for each of the 5,567 municipalities in Brazil?”

The governor of a state, for example, may access DataViva in preparation for a visit to a municipality, understanding at a glance the municipality’s income distribution, most common occupations, university areas of study, and major industries. Alternatively, the tool could be used by investors searching for business opportunities, entrepreneurs pursuing new ventures, or students and workers looking for better career prospects.

Users are free to view and download the data to manipulate themselves. Since launch, DataViva has seen over 1.5 million page views, with over 200,000 unique users. Of these users, about 113,000 have been from Brazil (36.6%), 63,500 have been from the U.S. (20.4%), with the remaining largely from France, the U.K., Canada, India, Mexico, Spain, Russia, and Australia. The ultimate goal of DataViva is to provide a common ground for open discussion of economic policy issues, moving away from the information-deprived idea of central planning and into a future where collaborative planning can become the norm.

Replicable Success Factors

- Availability of a large diverse government data archive.
- Platform design that focuses on ease of data access, integration, and visualization.



Europe Media Monitor



European
Union

Glossary Term

Data-led Effectiveness

Summary

Governments have a growing need for accurate, targeted, and timely information. While the internet provides an enormous volume of information, filtering the ever-growing pool of data on the internet for useful insight has become almost impossible given the scope and average quality of available information. In order to provide the European Commission with the information it needed, both in terms of insights for internal interaction and decision-making and for early warning of potential large-scale emergencies, the Commission's Joint Research Centre developed the Europe Media Monitor, a text gathering and analysis engine that provides advanced monitoring and analysis of both traditional and social media.

The platform gathers and assesses approximately 250,000 new news articles per day, along with countless social media data points, and analyses this vast body of information for specific content, emerging trends, and early warnings of public emergencies such as new disease epidemics. Originally developed for use by the European Commission, the platform is now used by government officials and organizations around the world, and a web version of the platform made available to the public receives as many as two million hits per day.

Region and Location

Europe, European Union

Entities

European Commission; European Commission Joint Research Council

Problem Background

As executive body for the twenty-eight member state European Union (EU), the European Commission presides over what is in many ways the most complex and diverse governmental constituency on Earth. The Union includes over half a billion residents speaking twenty-four languages.

To effectively administer such an expansive community, access to timely and accurate information is absolutely necessary. Information available from the internet represents an important input to government decision making. Unfortunately, the volume of information generated by the internet is far too large for any individual or organization to meaningfully process and use. The historical government problem of finding enough information on an issue has now shifted to one of finding applicable data and information from the enormous body of facts and opinion being created every second.

The advent of social media and the real-time data they generate only adds to this challenge. At the same time, growing economic, technological, and political complexities around the world mean that governments are faced with an increasing need for more high quality information, especially predictive and early-warning

information that can improve their responses to emergencies. Good information is both more important than ever and more difficult to distil from the background noise of useless data.

The Innovation Solution

Faced with the need to filter useful insight from a growing stream of information from online media sources, the European Commission's Joint Research Centre (JRC) developed the Europe Media Monitor (EMM). JRC applied core competences in computer science and computational linguistics to develop EMM, an open source intelligence and analysis system

The system automatically harvests and analyses multi-lingual information from internet-based sources, including both news and social media. At its simplest, EMM and the applications built around it provide decision makers with insight into global affairs.

However, the tool also provides timely evidence-based alerts to support humanitarian interventions, health crisis management, and early warning in a number of security and crisis scenarios.

The platform gathers an average of 250,000 new news articles a day from over 7,000 internet news websites corresponding to 15,000 RSS feeds and HTML pages from around the world in over 60 languages. The user interface is updated every 10 minutes, the platform groups all news articles that focus on the same subject, and prioritizes the most important stories unfolding in the news, as events

evolve and coverage changes. EMM uses a database of over 700,000 proper nouns – people, companies, locations, etc. –, which are extracted from reports and used to classify news.

The proper noun database is a component of the advanced text analytic techniques EMM applies to every article to automatically determine what is happening to whom and where. Every article is classified according to:

- A hierarchy of over a thousand topic categories (what)
- People and organizations (who) identified within each article
- Geo-location (where)
- Tonality – whether sentiment is positive or negative

The EMM analytic software allows it to determine the context of the news to group related items. For instance, it can successfully distinguish news reports related to Paris, France from those related to Paris, Texas from those related to Gaston Paris, the French writer and scholar.

In addition to EMM's two news-related websites, News Brief (breaking news) and News Explorer (news analysis across languages and over time), the platform also includes the MediSys tool. MediSys analyses medical-related news coverage, generating early-warning signals by spotting sudden increases in media reports regarding any public health-related risk. MediSys processes approximately 50,000 media reports per day in real time. MediSys does more than merely count documents with risk-associated keywords to identify emerging health risks. It uses the advanced information extraction technology to ensure that

the identified spikes in coverage are associated with specific public health concerns, such as outbreaks, rather than unrelated medical coverage of the same topic.

Complementing the two EMM web sites, the platform features two additional interfaces for user interaction with the collected information. These tools are not publicly accessible and are part of the corporate EMM System. MyNews is a user interface that allows extensive grouping and filtering of existing information channels (e.g. categories) in order to produce a fully customized user 'view' of the underlying data. For selected users this tool also allows the production of standard newsletters by means of simple selection of items found in the user interface.

NewsDesk is the super-user interface of the system intended for the creation of a number of information products (newsletters) that can be published in a variety of formats. NewsDesk is a concurrent multi-user system that allows a team of people to work on the same editorial task. NewsDesk also provides access to the category editor and a number of other tools for media impact analysis.

A number of mobile applications have been developed for both the Android and Apple platforms. The EMM App, available on iTunes and Google play, showcases the platform's public services. For corporate customers there are a number of dedicated apps that allow mobile access to products from the NewsDesk system. Two examples of these corporate apps are the Daily Press Review (DPR), a complete overview of the main stories from the EU member states published

at 08:00 every morning, and the Daily News Summaries (DNS), providing summaries from member states of articles from a number of sources on the same topic.

Early warning capability is provided by quantitative analysis of event categories and location and is independent of user language, and is enhanced through the monitoring of social media. Interestingly, JRC's analysis of a number of past alerts the system has generated shows that media-based alerts preceded social media based warning. In these cases, the spikes in social medial traffic have been driven by citizen reaction to coverage that first appeared in the media.

Though the tool was initially developed for internal use by the European Commission for early warning, real-time response assistance for large-scale public threats, and general briefing purposes, the EMM has become a crucial instrument in the daily work of almost all Commission services. It is used by organizations inside and outside the EU, including:

- European Centre for Disease Prevention and Control
- European Food Safety Authority
- European Chemical Agency
- Centers for Disease Control and Prevention in the United States, Canada, China
- Multiple UN agencies
- African Union Continental Early Warning System

Some of the functionality of the EMM has also been made available as a public web-based tool, which receives between one and two million hits per day.

Replicable Success Factor

- Application of advanced information gathering and text analytics techniques to derive topic-specific insight from public data.

Summary and the Way Forward

Innovation in government is not just about technology, or even primarily about technology. It's about new ways to impact the everyday lives of citizens - improving health, educating children, safeguarding the environment, beautifying surroundings, reducing wasted time and resources, ensuring trust and confidence in government itself.

Incremental advances in these areas happen every day all around the globe, but when we look closely at the most innovative advances, those at the very edge of government innovation, we find a unique set of common ingredients. These ingredients, taken together, point the way forward

for others who aspire to change things for the better for their own countries, communities, provinces, ministries, or agencies, anywhere in the world.

An Urgent Need

like all great innovation, innovation in government starts with an urgent need. Invention that does not address a driving need is not innovation. The solutions featured in this edge of government showcase set out to solve clearly defined, important, and urgent public problems, ones that are ubiquitous across the world, from the spread of disease, to contamination of the air, to government inefficiency.

An Added Value

Innovative governments work on establishing and developing the value add their work creates for the community, including expanding opportunity, improving services, and enhancing quality of life. By being more responsive to community requirements and expectations, innovative governments build trust among community members and enhance government transparency.

A Novel Solution

work on the frontier of government innovation requires new ideas and new ways of looking at problems, ones that are often counterintuitive or make use of exiting knowhow for radically new purposes. Edge of government solutions tend

also to rely on "citizen up" rather than "government down" approaches, are often free of the constraints of place, and involve participation from a vast range of diverse peoples rather than a small group of narrowly defined specialists.

A Champion

all successful innovation requires a champion, someone willing to marshal the will and the resources and the partnerships required to see each solution into practice.

Champions are indispensable to successful innovation, but they cannot succeed by themselves. They require support from a diverse team of contributors, both in and out of government, and must ensure their efforts are aligned with the broader goals of the governments in which they work for who whom they serve.

A Willingness to Experiment

many organizations and governments are willing to try new things, as long as there is no risk. That's not experimentation. True experimentation implies a willingness to take risks and a willingness to fail. Indeed, it implies an expectation of failure at least some of the time, because failure is fundamentally positive because it provides for learning and points the way forward towards the next innovative idea.

Innovators must have a "protected space" for experimentation and not be in fear of failure as they go about the business of finding the next edge of government innovation.

Leading edge innovation in government is within reach of virtually any public entity. Though some of the case studies of government innovation featured at the 2016 World Government Summit do represent large ambitious projects,

innovation does not require access to vast resources. Most essential for success in public innovation is commitment to move forward. The opportunities for innovation are virtually limitless - they are waiting to be discovered.

About The Authors

The Mohammed Bin Rashid Centre for Government Innovation

The Mohammed Bin Rashid Centre for Government Innovation was established to stimulate and enrich the culture of innovation within the government sector through the development of an integrated innovation framework

The goal is for innovation to become one of the key pillars of the UAE government in line with the vision of H.H. Sheikh Mohammed Bin Rashid Al Maktoum, UAE Vice President, Prime Minister and Ruler of Dubai, which aims to develop government operations and enhance the UAE's competitiveness, making the UAE one of the most innovative governments around the world.

The Centre aims to make innovation an everyday practice by experimenting with new approaches, enabling people with the right capabilities, networks and resources, thereby enriching the culture of innovation.



More information at: www.mbrcgi.gov.ae

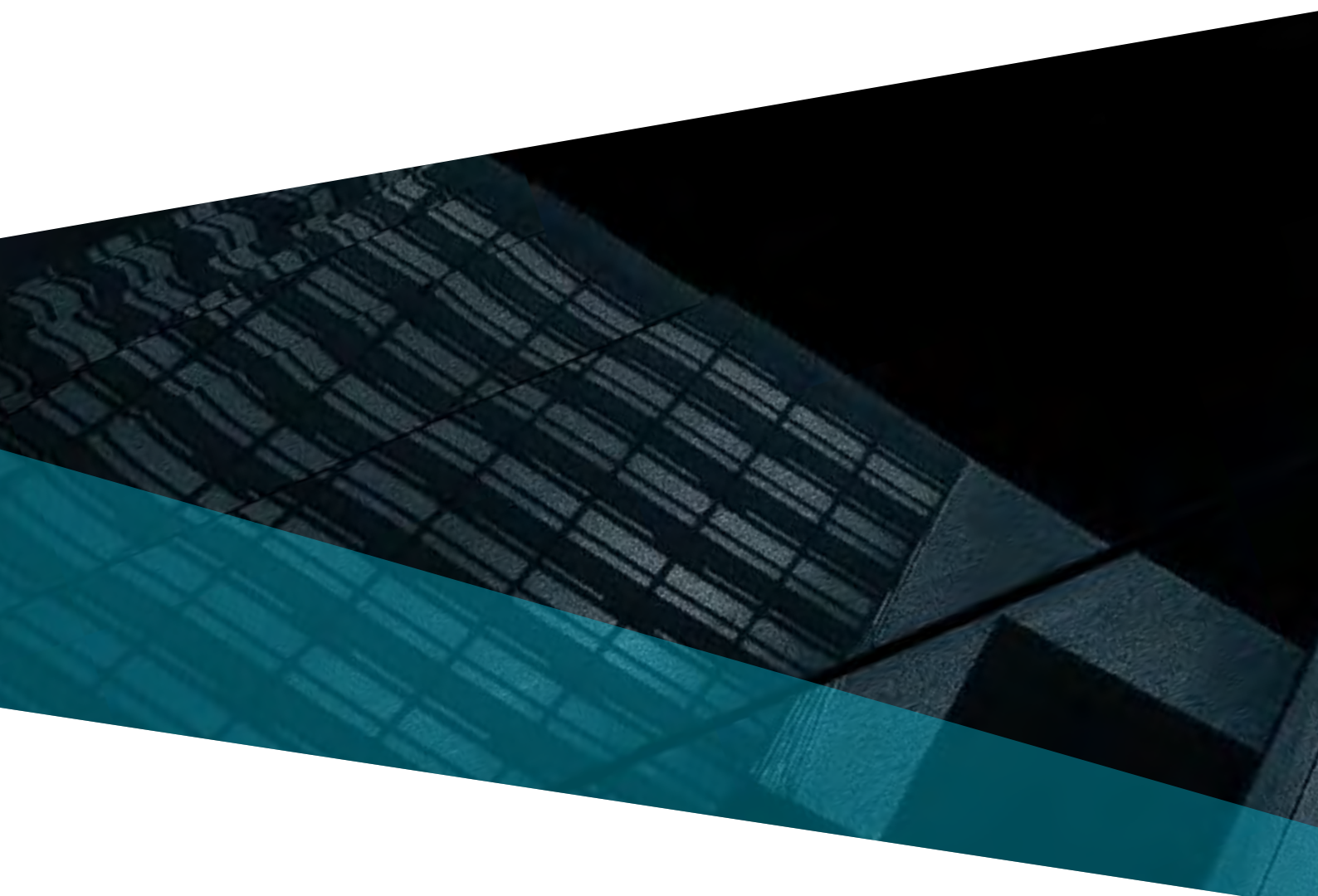
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