Capgemini

TECHNO VISION | Change Making 2021-22

BE LIKE WATER

Public Sector

CONTENTS

FOREWORD

Technology shapes the world – and the public sector is no exception. Just think of how governments around the globe are using technology to shape their responses to some of the critical issues of our time, such as the coronavirus pandemic, rapid climate change, the rollout of new data laws and governance structures, the shifting socio-economic discourse due to Brexit, and continuing geopolitical tensions between countries and across regions.

Technology is a tool to help central and local government organizations overcome the myriad challenges they encounter. With the effective use of technology and data, public sector organizations can help deliver better services to citizens, create smarter and greener places to live, and provide better healthcare and education to the people who call these places home. In this data-enabled environment, technology determines the winners.

However, technology also determines the losers. Just as governments can use technology to improve the societies we live within, so it can also be used to feed and grow inequalities between citizens. All governments around the world have a duty to ensure that the ways they shape the world with technology do not lead to societal exclusion for information-poor individuals who might be left behind.

To ensure that states and organizations use technology in a sustained and inclusive way, a proactive and comprehensive conversation between public sector stakeholders and IT is key. That's where we can help. To enable a more fruitful dialog, we are delighted to introduce the public sector edition of our TechnoVision Change Making report, our annual guide to what's new and what's coming next in the world of technology.

TechnoVision is a unique and proven source of change-making advice that is written by our leading experts. This public sector edition brings together technology-driven, real-life studies from across all forms of government. These stories are written by a diverse team of top practitioners and experts, coming from 12 countries and many of our organizational units.

The motto of TechnoVision 2021 is "Be Like Water", with a focus on key themes such as fluid adaptability, agility, and responsiveness. This focus is apposite given the challenges faced by governments during the past two years. The pandemic required rapid responses across the public sector, from the overnight transition to home working, to the establishment of online-only delivery models, and onto the rise of telehealth and the creation of systems to help manage patient care and vaccinations in healthcare organizations.

The pandemic highlighted clearly how the public sector must deal with change quickly. Organizations had to scale up critical infrastructure and applications in weeks (or even days), leverage key data for decision making, and work across organizational boundaries and formerly impenetrable borders of responsibility. More broadly, we believe the pandemic response is a dry run for the upcoming transformation towards a sustainable, societal development model. This model demands unprecedented change in a short time. More impactful changes will be called for, and at a faster pace than most organizations can currently keep up with. Technology brings the breakthrough tools to help us manage this transition – as we want to avoid cutting back our standards of living to levels that will likely be unacceptable to the citizens our public sector organizations serve.

We believe the scale of change is such that every organization in every sector is now a 'Technology Business', which must be fluid enough to adjust to the new challenges that arise. Unless senior stakeholders are intensively involved in Technology Business decisions and initiatives, achieving digital-led breakthroughs across the public sector is impossible.

We have long followed, commented, and applauded the efforts of the Japanese government, which has set out to systematically use technology to achieve its societal goals. Instead of considering next-generation technology as a problem to deal with and to keep in check – in the manner of some European governments – the Japanese government has sought to harness technology for the greater societal good, through their overarching vision of a "Society 5.0."

Technology holds many answers and enablers, but we must understand how its components work together. It is up to governments to set the standards upon which technology components should be interconnected and communicated, such as helping a city orchestrate the many players involved in making it a smart city. TechnoVision is a framework that is designed to support such dynamics. Throughout its coupled modules, trends, and "containers", this framework enables an ostensibly open, collaborative ecosystem, which aims to give its users control – or, as we would call it these days, sovereignty.

This approach, modeled after the Greek "polis", aims to build an "agora" – a central marketplace to discuss and negotiate the future of its body, balancing the interests of politicians, administrative domain experts, and their CIO/ CDO departments.

Through our TechnoVision report, not only individual stakeholders, but even different countries can find a common language to articulate their technology-driven goals and plans – and that is increasingly important in regions that need to collaborate closely, such as across the European Union.

Let's therefore embark on this vital dialog that is taking place on our technology agora. Let's shape the future of our Society 5.0 while having some fun in the process. I look forward to learning from your feedback and our common discussions, and I hope you will find this framework invaluable as you look to achieve your organization's goals, individually and for our common society.

Marc Reinhardt
Head of Public Sector/Healthcare at Capgemini

INTRODUCTION

As public sector leaders, we face a challenge. As our world becomes increasingly volatile, uncertain, complex, and ambiguous, we tend to despair in the face of the avalanche of technologies and acronyms that should be helping us, but often seem to be breaking our certainties and our established models of service provision.

However, the challenge we face does not have to be intractable. While the potential benefits of technology are sometimes clouded by unhelpful hyperbole, pioneering governments and public sector organizations are already modernizing architectures, embracing cloud services, and exploring emerging technologies, such as the Internet of Things and Artificial Intelligence.

What's more, technology is here to stay; it is bound to shape our environment and the services we provide to citizens. Technology can be our best ally in helping to reduce exclusion and improve societies. Thus, taking a helicopter view over key technology trends provides us with a clear opportunity to see how we can use systems and data to reach our goals.

Our TechnoVision Change Making report issued earlier this year highlights our vision of how to create technology-driven change. It is underpinned by a clear, resonating leitmotiv: Be Like Water – showing how to build the agility, adaptability, responsiveness, and resilience needed to successfully flow with whatever challenge or opportunity may arise. From infrastructure and applications, via data and processes, all the way to user experience and collaboration, it shows the transformational opportunities offered by emerging technology trends in a highly accessible, light-hearted way.

But technology trends – as compelling and inspiring as they may be – mean very little without the right context. To this end, we are proud to introduce the very first TechnoVision Playbook for Public Services. Although it can be read separately, we certainly recommend you digest it in the good company of the original TechnoVision Change Making report.

In the meantime, we hope you enjoy this TechnoVision Playbook for Public Services. It is full of trends, cases, and stories to support many different technology-driven change initiatives – from the level of a local governmental unit, all the way up to society as a whole. It's always about the dialog. Keep on talking!

Pascal Brier
Group Chief Innovation Officer, Capgemini

Gunnar Menzel
Chief Technology & Innovation Officer, Capgemini Europe North & Central

BE LIKE WATER

Be like water making its way through cracks. Do not be assertive, but adjust to the object, and you shall find a way around or through it. If nothing within you stays rigid, outward things will disclose themselves. Empty your mind, be formless. Shapeless, like water. If you put water into a cup, it becomes the cup. You put water into a bottle, it becomes the bottle. You put it in a teapot, it becomes the teapot. Now, water can flow, or it can crash. Be water, my friend".

- Bruce Lee

Cultural icon Bruce Lee – quite possibly the most famous martial arts star of all time – faces his final opponent against the backdrop of the Roman Colosseum in the movie "Way of the Dragon". His rival is played by a very robust Chuck Norris, who is synonymous with power and invincibility. He appears unbeatable, even by Bruce Lee.

At first, Lee relies on a more formal, conventional way of fighting. This approach draws on the way he has trained for years and what has proven to work on many occasions. But it does not work at all against Norris; the stronger, faster and more experienced counterpart. Lee is beaten time and again; dizzy, confused, almost defeated. Norris smiles commandingly, certain of victory. Then, Lee stands up once more. He drastically changes his style, shuffling his feet back and forth, moving side to side, forward and back, bouncing and tiptoeing around his opponent, delivering flicking jabs from unexpected angles. Much like Muhammad Ali, really: Float like a butterfly, sting like a bee. Norris has no answer to this radical shift in approach, and is dealt with decisively in minutes. This fluent mix of using whatever comes in handy to deal with the situation would become a trademark of Lee. He describes it poetically in arguably his best-known quote, shown on the previous page.

We see "be like water" as a key leitmotiv for the public sector, a sector that is at the forefront of how society progresses, with services that are not optional, but truly the backbone of our existence. Technology plays a key role in delivering services, as it is entwined in everything we do and expect. The public sector can't abandon, desert, or accept flaws that might endanger the people it serves. The technology we rely on to deliver services must help organizations to work more efficiently and effectively, every time.

That's why now especially, triggered by the pandemic, governments need to: operate an **IT infrastructure** that is omnipresent, elastic, and autonomous; supporting **applications** that are meshed, headless, and augmented; utilizing **data** that is algorithmic, federated, and shared, orchestrated by a binding, portable and self-connecting process engine(s); that provides **immersive**, low touch and empathetic experiences; allowing and encouraging a distributed and creative **collaboration**.

These six main Technology Business "containers" have to be created, combined, and connected to establish agile, open, proactive, trusted, autonomous, and sustainable IT solutions that meet today's citizen demands, while paving the way for a Society 5.0 environment.

This is the envisioned future of a data- and technology-driven government that leverages its information ecosystem like never before, building on its digital twins of society, nurtured by various insights and analysis sources that merge in real time, enabling informed decisions and a proactive stance. This applies to various actors, such as a city handling traffic management, an army dealing with cyberattacks, a tax authority chasing fraud, or a hospital optimizing its resource planning to cope with a pandemic.
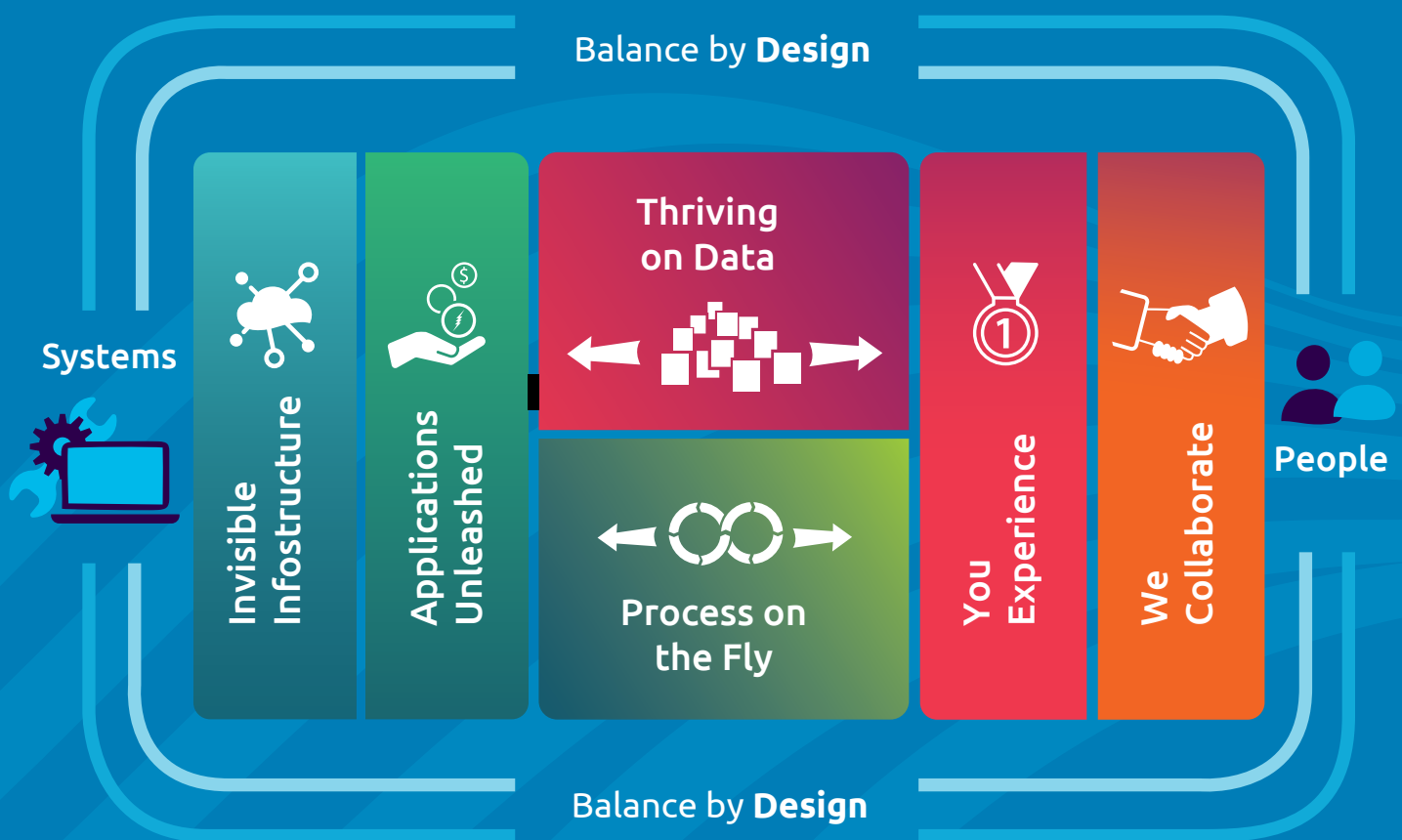
On the quest to use the new potential that enables an organization to make the best use of its data power, the journey to trusted multi-cloud will also be vital – with clear conditions. Public sector cloud transformation stands for a significant growth in data, new value chains and business models, new division of work, cloud-first applications, software-defined everything, and access to innovations. At the same time, the journey to the cloud will need to be a trusted one, embodying robustness and adaptability in that context.

To match these enablers, data and cloud, with meaningful structural change, public organizations will also nurture technology's potential by taking a stance on crucial societal topics: sustainability (see "What's our story?"), the state's way of working (see "A few more things across the public sector"), the future of work and the digital divide are only a few examples of how technology and governance lead to new horizons.

Speaking of horizons, let's get back to Bruce Lee, who teaches a young apprentice in "Enter the Dragon." Lee points to the sky. The apprentice looks at Lee's finger and immediately gets slapped in the head. "It's like a finger pointing away to the moon," explains Lee. "Don't concentrate on the finger, or you will miss all that heavenly glory."

Overview
of TechnoVision

The TechnoVision 2021-22 Technology Business trends:

Balance by **Design**

Systems

Invisible Infostructure

Applications Unleashed

Thriving on Data

Process on the Fly

You Experience

We Collaborate

People

Balance by **Design**

Read TechnoVision Change Making for a complete overview.

TechnoVision categorizes technology drivers into six containers that cover the "what" of Technology Business trends and one container of overarching design principles, the "how" of creating a balanced Technology Business.

Two core containers cover trends in the foundational building areas of infrastructure and applications, aptly named Invisible Infostructure and Applications Unleashed, respectively. Two more form the spine of any innovative IT household, Thriving on Data for leveraging data and Process on the Fly to leverage process automation. The final two containers cover channels to the outside, connected world, You Experience for creating seamless, individualized user experiences and We Collaborate to tap into the power of social connectivity.

There is one final container of overarching design principles (the "how") that should be kept as part of a mindset – and a powerful checklist to apply – throughout the journey towards becoming a fully portable, continuously flowing, and balanced Technology Business: Balance by Design.

The 37 building blocks are all described in the original, 2021 core document through one-page summaries, designed to be crisp and to the point on the one hand, yet appetizing enough for further study through its links and case stories. Each building block contains an elevator pitch to briefly describe the trend. Then comes the "what" (a slightly more elaborate description), the "use" (actual use cases), the "impact" (potential business effect of the trend) and "tech" (links to leading technology solutions and other relevant information).

The seven "Balance by Design" principles are also introduced through an elevator pitch, but then shaped into something much more tangible. Firstly, outlined with a clear definition, the "why" quickly follows, discussing the purpose and benefit of adopting it. Then comes what is needed to put the principle into practice, before the simple measurements required to track the principle in business.

But because not all treasure is silver; the authors have had their fun hiding copious references to rock, pop, movies and other cultural and societal phenomena. The reader is invited to find as many of these "Easter Eggs" as possible. It should not be ruled out however, that millennials and their "OK, boomer" colleagues – blessed as they are with quite different frames of reference – may find completely different hidden gems.

The public services playbook

For this TechnoVision Playbook for Public Services, we recommend you navigate it in the good companionship of the original document. This comes in handy if you want to know more about a specific trend; each page contains a link to the original building block on the web – so that you can easily jump back and forth.

Cases from the public services sector are crucial in this playbook, as they provide the examples and the inspiration needed to move ahead and apply the TechnoVision trends. On each trend page, two cases are featured: one in which Capgemini has been involved and one external, openly published case. Each case is described in the same flow, staying true to our "Be Like Water" theme:

"The Storm" describes the challenge

"The Wave" addresses the way the trend has been applied to deal with the challenge

"The Surf" outlines the business impact that has been created.

The trend pages are preceded by their container pages, in which an overview is given of the entire technology area and its impact on the public services sector.

Our "experts in residence" had no problems whatsoever in finding cases. In fact, they found so many, that cruel, painful choices had to be made to fit the format. Each expert is prominently included on the trend page, hence do not hesitate to reach out to them if you are interested in more cases – they will gladly accommodate you.

Want even more?

If you still possess an unabated appetite for more, the TechnoVision Expert Connect community caters for a variety of detailed posts and articles about your favorite 37 building blocks. Or, if you are lucky enough to run into the colorful TechnoVision cardboard boxes, scan the QR code on each block to take you directly to the relevant materials. You might even get your hands on one of these unique TechnoVision card decks. We also invite you to join any virtual session or look further into applying TechnoVision, to dive deeper with us. Come on in, the water's just fine!

The TechnoVision 2021 Technology Business trends:

Invisible Infostructure

Evolving the IT Infrastructure into the simple, pluggable utility it was always supposed to be.

- The Soft, the Hard and the Virtual
- Crouching Tiger, Hidden Container
- Simply the Edge
- Ops, AI did it Again
- Ceci n'est pas une Infrastructure

Applications Unleashed

Liberating the legacy application landscape and unleashing the next generation of powerful, agile, cloud-based apps.

- Kondo My Portfolio
- Bot is the New App
- When Code Goes Low…
- API Economy
- Apps ❤ AI

Thriving on Data

Leveraging data and algorithms as an asset to increase the "Corporate IQ".

- Crazy Data Train
- Power to the People
- Good Taimes
- Data Apart Together
- How Deep is Your Math

Process on the Fly

Building, managing, and running processes that match the dynamics of the digital outside world.

- Processes 101
- Rock, Robot Rock
- Can't Touch This
- Pleased to Meet You, Process
- Augmented Me

You Experience

Creating seamless user experiences for decisive, magical moments.

- Signature Moments
- Reality Bytes
- Own Private Avatar
- I Feel for You
- No Friction

We Collaborate

Tapping into the power of the connected and collaborative "everything".

- The Team is the Canvas
- Fluid Workforce
- New Chain on the Block
- Use the 5G Force, Luke
- Creative Machine

Balance by Design

Overarching design principles to be followed and checked for a Technology Business to become flowing, adaptive, and responsive.

- Adapt First
- With Open Arms
- Technology ∈∋ Business
- IQ EQ CQ up
- Trust Thrust
- No Hands on Deck
- What's Our Story?

INVISIBLE
INFOSTRUCTURE

The infrastructure part of the IT landscape is a crucial foundation for any organization with business technology ambitions. Although increasingly invisible to the naked eye, it needs to provide fast, secure, agile and cost-effective access to any data or application service. Like water, it should be fluid and flexible to the demands of the enterprise. It simply needs to be delivered anywhere, whether on or off-premise, through the cloud or not. To flow uninterruptedly, it needs to tap into a highly connected, always expanding network of people, organizations and things – clearly illustrating why "infostructure" is not a spelling mistake.

Read TechnoVision Change Making for a complete overview of this technology container.

Invisible Infostructure
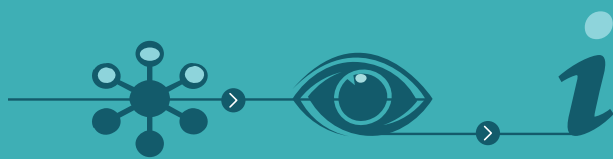
Public sector organizations are not born cloud users in the way startups are. The demand of digital sovereignty weighs heavily on them and local laws restrict what is technically feasible and business-wise sensible. In the last decade, however, the need to eliminate legacy infrastructure costs and to deliver new services to their citizens quicker has driven cloud-first strategies, starting in the UK in 2011, others since then, and recently France in 2021.

These cloud-first strategies are enabling public sector organizations to accelerate their move to cloud, by using software-driven and automated infrastructure delivered as easy to consume services. This enables rapid scaling in line with demand, and a shift away from managing infrastructure to it being "invisible."

Key trends in the public sector:

• **Digital sovereignty** is key for public services organizations, but there is also a need to provide an open and transparent ecosystem where data and services are made available and shared in a trusted environment – while maintaining data confidentiality. GAIA-X is a Europe-wide initiative to create a proposal for the next generation of a European data infrastructure providing a secure, federated, and transparent system that promotes innovation while maintaining and meeting the highest standards of digital sovereignty.

• Public services organizations' migration from legacy IT to **modern cloud-native architectures** is being hampered by distrust in cloud security. "Confidential computing" alleviates data security concerns by encrypting data even when it is being processed. Traditional data security methods only protect data in transit or at rest, whereas confidential computing creates a secure "enclave" within a CPU called a trusted execution environment (TEE). This ensures sensitive data remains protected in memory until the application tells the TEE to decrypt it for processing.

• With the proliferation of devices, decrease in latency, **advent of 5G, and developments in IoT,** many complex tasks and processes can be carried out without the need for immediate cloud processing. Sensitive data can be processed near the edge, eliminating security concerns, with richer data analytics being driven by a cloud layer.

• **Containers** offer public sector organizations true portability of services between cloud providers, thus supporting their multi-cloud aspirations. While container platforms offer processes for building, security scanning, testing, and deploying container images, the likes of Google Anthos allows multi container platforms across multiple cloud platforms to be centrally managed – ensuring consistent user experience. Portability of services enables the sharing of container-based services between departments following an open source strategy.

• The need to significantly accelerate the provision of information in the public administration has become clearer than ever with the pandemic. With the known methods for data integration, speed can often not be achieved. For this reason, the public administration must increasingly rely on **AI-supported data processing.** End-to-end data architectures, supported by AI algorithms and smart data fabrics, are becoming increasingly established.

• Digital sovereignty, the increasing speed of digitization, and the war for talent require the public sector to move towards a **hybrid multi-cloud –** a conglomerate with public and private elements of various "hyper-scalers" and on-premises services. In order to meet the high requirements for IT security, data and secret protection, a special form of governance is needed for the use of these services.

Nannette Biedermann,
Expert in Residence,
Germany

Doug Thomson,
Expert in Residence,
UK

The Soft, the Hard and the Virtual

IT infrastructure is in the midst of a game-changing evolution – one that rides on the shoulders of the cloud revolution to deliver flexible, resilient, scalable, and cost-efficient services on demand with the key principle of "everything-as-code."

Public sector organizations are increasingly challenged to improve citizen interaction, respond quickly to unanticipated challenges, and reduce overall cost to serve. On this journey, virtualization and containerization are key to standardization, hide complexity, and render deployment invisible. These approaches allow for rapid, seamless deployment and update of complex infrastructure on demand, deploying solutions in minutes – where previously timeframes were measured in weeks and months and prone to human error. This combines with the benefits of consumption-based charging, low-cost resilience, and autoscaling design patterns, allowing public organizations to deliver secure infrastructure solutions – at a fraction of the cost and in a fraction of the time.

Whether supporting agile development or legacy modernization, adoption of these approaches has required shifts in culture, in conjunction with the technology. Agile DevOps processes and ways of working have infused these organizations with a drive for continual improvement and optimization.

Mick Halliday
Expert in Residence, UK

Transition a mission-critical platform to Microsoft Azure

HM Revenue and Customs, UK

The Storm: As part of its modernization and cloud-first strategy, HMRC aimed at moving its SAP platform from existing data centers to a scalable public cloud environment to more effectively use its data, lower costs, simplify its IT estate, and support new services.

The Wave: Together with Capgemini, HMRC implemented a vast and complex migration to Microsoft's Azure cloud platform, performing the actual transition in a single weekend to avoid disruption to critical national services. In addition, a workstream was established for improved understanding, covering 650 interfaces.

The Surf: As a result of this migration, HMRC reduced operational costs and improved the speed and resilience of the environment deployment. Thus, faster problem solving and automation, as well as improved response times for users, could be achieved. This results in a future-proof infrastructure platform with lower operating and modification costs.

VMware helps the British Army to build its private cloud

The British Army

The Storm: The British Army required a new hosting system to deliver the application services needed to support daily business operations for up to 50,000 users. Applications include those used for enterprise resource planning, training, staff competency and reviews, combat readiness, HR systems, and scenario planning.

The Wave: The British Army partnered with VMware to deploy an agile, resilient, and scalable estate. VMware's vRealize Suite included a private cloud infrastructure, enabling the deployment of applications within a siloed infrastructure. The shift to a software-defined data center coincided with an ongoing cultural overhaul, embracing a DevOps way of working.

The Surf: VMware's solutions allowed for a quick development of the new software, reducing time for application deployment and avoiding high costs of SI load balancers, core switches, and firewall services. Furthermore, the time gained enabled the army to focus more on operational efficiency, allowing the organization to scale up on demand.

Crouching **Tiger** Hidden **Container**

All the complex infrastructure an application needs to run on, nothing to see but containers. Containers – they simply package an application with the infrastructure, middleware, and platform service components needed into a sealed off, air-tight, standardized box that can be shipped between different actors on a municipal, state, federal, or even European level, making collaboration easier and cheaper.

Pack your application neatly into such boxes, make yourself highly flexible and take a step to digital sovereignty. Different operating systems? Multiple data centers? Local operation or in the cloud? Virtual machines or bare metal? Depending on the current situation, you decide where to run your application and simply move it when the situation changes – quickly, automatically, and without time-consuming installation and configuration.

With containers, you also can address your problems with slowing down applications at peak times. You simply start the containers multiple times and distribute the workload. Essential applications remain available to citizens and employees.
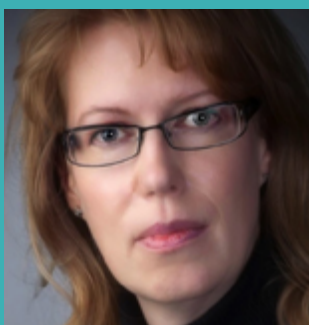
Nannette Biedermann
Expert in Residence, Germany

AWS cloud migration for Home Office

UK Government immigration service

The Storm: The existing hosting platform of the UK immigration service lacked the scalability and stability necessary to support the Home Office's ambitious transformation agenda.

The Wave: Together with Capgemini, the Home Office managed its migration to the AWS cloud platform, with an additional support team in charge of maintaining business as usual. The project involved the move from firewalls to security groups, routers to routing tables, and load balancers to ELBs.

The Surf: The redesigned and simplified infrastructure has improved the stability and resilience of the Home Office's cloud environment, enhanced reliability of deployment, and improved the security of the production service. It has also increased the ability to scale and to optimize infrastructure costs (build times reduced from two days to one hour), operational business, and live services. The project furthermore achieved 35% reduction in weekly incident volume.

DevSecOps on F-16s and battleships with Kubernetes

US Department of Defense

The Storm: In the past, software delivery within the US Department of Defense (DoD) could take anywhere from three to ten years for big weapons systems – incremental delivery was difficult and slowed the implementation of new requirements and technologies.

The Wave: To tackle these issues, the organization created the DoD Enterprise DevSecOps reference design, with a mandate to use CNCF-compliant Kubernetes clusters and other open-source technologies across the DoD.

The Surf: The project enabled the DoD to move from three-to-eight months to a week for implementation, and to obtain the authority to operate a cloud enclave within one week. "Anytime it's going to pass the gates, the software is automatically accredited. You can push software multiple times a day," the organization says, emphasizing that the solution is "going to be a 100-plus years saved off planned program time."

Simply the **Edge**

The recent boom in IoT and cloud solutions has led to the emergence of edge computing. When public services organizations centralize their infrastructure, increase their central processing capabilities and increase the use of IoT solutions, significant amounts of data need to be exchanged. And that can lead to latency and bandwidth challenges, not only for city states, but especially for widely dispersed nations.

Edge computing addresses these challenges through bringing processing capabilities closer to the end-user device. With processing carried out at, or very near to the source of the data, edge processing can be done to either determine the next processing steps or deliver the answer the user is looking for. All public sector contexts, where immediate data processing is required, will henceforth profit from edge computing.

Traffic, especially autonomous driving, health, crime reduction: in all fields where public sector organizations must react to live-changing occurrences and patterns, edge computing can greatly enhance both end-user experience and responsiveness.

Iftikhar Ahmed
Expert in Residence, Germany

Saving lives with the Red Cross in Portugal

The Storm: The Red Cross wanted to enhance life-saving communications technology between emergency technicians and medical specialists in hospitals.

The Wave: Capgemini Engineering worked with the Red Cross and a mobile provider in Portugal to deploy 5G. Using HoloLens glasses and ultra-high definition, 360-degree cameras in ambulances, technicians now transmit critical data and imagery in real time to doctors in hospitals, who then send back instructions and guide emergency procedures through the augmented reality in the glasses.

The Surf: 5G proved its ability to facilitate seamless communications with no disruption or time lag, which has played a key role in supporting the treatment of patients wherever they are. Furthermore, the project resulted in a greater understanding of business connectivity needs and how to meet them.

How edge computing will enable a faster, more resilient government

US Northern Command, Federal Emergency Management Agency & Department of Veterans Affairs

The Storm: Several US agencies sought solutions that are able to absorb periodic surges in computing and data processing needs and the availability of agile data centers that are ready to withstand natural catastrophes.

The Wave: The US agencies turned to edge computing solutions in the context of COVID, to better deal with the requirement of temporary medical deployments in the crisis. For instance, the Federal Emergency Management Agency (FEMA) built a field center to cope with the need of the hour.

The Surf: Edge computing gave the agencies greater operational agility and led to cost savings. Edge computing brought the power of high-level computing directly to mission-critical users, wherever they may be. The edge computing setup and robust data analytics enabled the organizations to be freed of the dependency on cloud or remote data centers.

Ops, **AI Did it Again**

AI is the pillar of automation in many domains including in IT operations – in particular when it comes to improving efficiency and reliability of IT systems, devices, and applications that maintain critical citizen data in the public sector. AIOps helps IT departments to mitigate any risk of data loss, financial loss, improve cost optimization, and encourage transparency. An AIOps system first collects data from multiple sources such as log files, ticket numbers, network traffic, etc. and the machine learning algorithms are then used to collect, correlate, learn, and resolve anomalies in the behavior of IT applications without humans.

Government agencies strive to provide the best experience to their citizens, be it for filing tax returns or paying for a parking ticket. To intelligently automate IT operations with the help of AI and ML in the public sector, IT operations will have to move from the back office and become a strategic function to improve public sector safety and productivity while coping with a more heterogeneous field of applications. Government offices don't have to remove their existing legacy IT to implement AIOps, they can simply integrate AIOps – making use of advanced analytics and ML to automate operations and monitoring.

Anchal Bhalla
Expert in Residence, Middle East

Code analysis using machine learning

Employment agency in Germany

The Storm: Prior to the project, conventional quality control methods thoroughly tested software, but often let errors slip through. Tests covered most of the code, but errors often resided in the sections that were not fully evaluated.

The Wave: Capgemini and the FEA developed a machine learning-based static code analysis tool to find patterns and rules for error-free code in a code base.

The Surf: The benefits include an optimized quality assurance through the identification of code patterns and software errors, the avoidance of hotfixes, and the identification of useful rules that affect functional and non-functional requirements. After just two months of deployment, the system found useful rules for functional and non-functional requirements, for example for the detection of missing codes for closing transactions.

Dubai Smart City 2021

City of Dubai

The Storm: The Smart Dubai Office is responsible for guiding and implementing policies required to achieve the citywide effort to become a smart city, implementing solutions such as paperless transactions and interconnected communities.

The Wave: Dubai has transformed itself into a model smart city, revolutionizing the way government services are delivered by launching over 100 initiatives and more than 1,000 services by two dozen government departments and private sector partners in less than three years.

The Surf: The city's strategy is shared across the city's government and private sector, delivering optimized use of urban resources, integrated seamlessly into daily life, creating the most enriched life and business experience possible. In the three years of deployment, the city has witnessed an increase in happiness of 3%. Services delivered included an ICT enablement of critical infrastructure, a transition towards circular economy, and a zero-visit rule for government administration.

Ceci n'est pas une **Infrastructure**

Continuously build and deploy the next generation of public sector software, without even noticing infrastructure. Sounds like a good idea for commercial organizations. But the ultimately invisible "no" infrastructure is there and ready for use in the public sector as well. Goodbye server room per office building. Hello IT-asset-free government.

Infrastructure as code, radical automation, software containers, microservices and serverless computing are all paving the way towards cost managing and easy-to-use IT infrastructure, without being bothered by complexity. With software being continuously developed and deployed on an infrastructure that automatically adjusts, IT can finally become the powerful utility it was destined to be; always available to civil servants as well as to the general public, just unperceivable. C'est tout.

in

Wiger Levering
Expert in Residence, Netherlands

Kadaster: PLP – infrastructure platform on demand

Kadaster, the Dutch Land Registrar

The Storm: Software development in the DevOps teams requires many new server instances per day. Each new instance consumes time from an infra engineer and the software engineer.

The Wave: PLP was built to automate the process of creating server instance(s) and installing the right software, thus creating a runtime platform. Through a portal the user indicates what type of platform and capacity is needed in terms of processing power, memory, and storage. Initially built to support the on-premises virtualization infrastructure, the current version also supports cloud providers and delivers container orchestration platforms. Future versions might include cost aspects in the choice for the underlying technology.

The Surf: The productivity of the DevOps teams drastically increased. End-customers get additional computing power in moments and servers can be shut down automatically, which decreases cloud provider costs.

Using serverless to power an EU government supply-chain control system

European Commission

The Storm: The European Commission, backed by a new European law, needed to protect citizen health and reduce the availability of illicit tobacco products by guaranteeing a track and trace for finished goods.

The Wave: Dentsu Tracking worked together with AWS on a government supply-chain control system. This traceability platform is powered by serverless technologies making Europe home to the world's largest supply-chain track-and-trace platform.

The Surf: The platform connects millions of facilities and individual economic operators to deliver unique serialization, aggregation, and integration for every single pack of cigarettes. Through serverless infrastructure, the deployment saved weeks on time to market, also reducing costs, while it enabled the EU to scale its operations for tracing over 150 billion products in real time, throughout the process chain from production to retail.

APPLICATIONS
UNLEASHED

The new reality of a Technology Business demands application services to be built and delivered at high speed and in various incarnations; as close to the business as possible, yet responsive to every demand. For sure, these application services no longer resemble the applications we used to know, even the very notion of user interfaces is rapidly melting away. Although agile working through Minimum Viable Products is no longer the 'new normal', but the 'well and truly established', the quality of applications needs to be at enterprise level, as the trust balance of the organization is always at risk.

Read TechnoVision Change Making for a complete overview of this technology container.

Applications Unleashed

During the pandemic – more than ever – government services became online services by default. That movement has created a proliferation of apps and pushed the handling of them to the forefront. Apps are the keys to the citizen experience and are the way to convert the freed data treasures into added value for citizens, companies, and the administration itself. In the past, some administrations created a separate application for every regulation – leading to huge, complex, and expensive application landscapes. But there are cures for this ailment: tools such as eAPM to analyze and rationalize your own application landscape, standard software solutions for some standard processes such as managing grants and subsidies, and cloud-based platforms with a modular approach, microservices or containers – all developed in an agile manner, of course.

True, the old legacy monoliths were designed to be reliable. Although reliability remains an important government objective, it is supplemented by objectives for greater scalability and portability of government applications and more cost-efficient and flexible services to develop and maintain modern applications. The application portfolio of a thriving government agency is lightweight, easy to connect to, and built on the shoulders of typical cloud-native capabilities; predictive and adaptive to ever-changing security requirements and demands. Platforms become shared facilities that deliver various government chains based on maximum reuse and adoption of (open) standards. The same platforms provide scalability so that peak loads are no longer a problem. Value-based collaboration promotes agility, allowing teams to bring innovation with microservices architectures, for example, and really say goodbye to cumbersome and slow old systems. Through agile working and minimum viable products, application quality must be at enterprise level because the trust balance of the government organization is always at risk. To unleash the Technology Business application blueprint, several steps must be considered.

Key trends in the public sector:

• Simplify, rationalize, and decommission existing applications. Once seen as the single source of truth for reliable business operations, these applications have now become heavy, cumbersome, and slow to move. Fast and flexible solutions enable a speedy response to change. Standard industry best-practice cloud applications are a way to kickstart it all. Loosely coupled layers over siloed applications are another (such as

bots, APIs, and RPA). Whichever route you choose, it needs dedication and expertise in analysis and rationalization.

• Add a touch of "smart" through existing or newly developed applications. AI services for areas such as vision, speech, language, cognition, and predictive analytics are routinely available as microservices, permeating every Technology Business stream and the foreign domains of deep learning, neural networks, reinforcement learning, and computational linguistics. And to ensure a steady flow, user-friendly, conversational interfaces can be added – such as voice assistants or bots – to make application services that much easier and more accessible to citizens and public sector organizations.

• Just as the sea is constantly lapping against the shore, tide after tide, new applications are constantly being built and released – DevOps-style. As soon as one ebbs, another is formed. Rapid iterations are developed jointly by business and IT teams, using microservices, APIs, software containers, serverless computing, and radically automated, highly productive tools. Built-in analytics, cognitive AI capabilities, and smart contracts further contribute to both government IQ and organizational trust.

• It is the unleashed application that operates in the most fluid and seamless manner, leveraging and seemingly anticipating the intentions of its users almost before they are expressed. Whatever the forecast, the application landscape must help us weather the storm, adapt quickly and respond to change so that we can move into calmer waters.

Wim Robbemondt,
Expert in Residence,
Netherlands

Lisa Eckersley,
Expert in Residence,
UK

Kondo MY
Portfolio

When water doesn't move it becomes stagnant, growing increasingly hostile and toxic. When static, application portfolios drift away from alignment with the business architecture, and if unaddressed it can lead to a stagnant mix of legacy IT, technical debt and deviation from business objectives.

"Tidying up" your application portfolio is a continual and iterative endeavor which seeks to align business, applications, and technical architectures. At the center of this activity is a product-oriented, high-velocity, application-delivery mindset, leveraging new platforms and modern services to modernize your portfolio on simpler evergreen technology services.

Architecture and new platform technologies hold the key to systematically cleaning up, in the right order, and move forward to the desired state – delivering a simpler and more agile portfolio of applications services, prepped for the future.

It is this agility within the application portfolio that will enable public sector organizations to address outdated applications and deliver new ones rapidly, ready for change.

Paul O'Sullivan
Expert in Residence, UK

Transforming a state-owned railway company with ADMnext

Railway organization

The Storm: Challenged by local laws, a railway organization wanted to improve customer service and productivity, while maintaining daily business stability.

The Wave: The organization, supported by Capgemini, implemented a comprehensive DevOps and Application Services portfolio management and innovation transformation. Capgemini's solution ADMnext was delivered, featuring an agile-at-scale approach with a business process focus.

The Surf: The railway organization improved the average application uptime while reducing time to market. The software development life cycle went from an average of nine to three months, with 33 PoCs delivered and first projects live. Incidents related to downtime were reduced to zero, and customer satisfaction was boosted.

IJPortal: Modernization of the eJustice IT system

The Integrate Justice Architecture Board (IJAB), NY City, US

The Storm: The Integrate Justice Architecture Board (IJAB) wanted to modernize its fragmented criminal justice legacy applications. Yet, it comprised of several agencies, all with competing priorities that must be considered when opting for an integrated portal.

The Wave: The IJAB implemented a common infrastructure, migrating its legacy systems into service-oriented architecture (SOA)-enabled Java/JEE applications with a single sign on.

The Surf: Through the modernization of the entire eJustice IT system, stakeholders improved access to criminal justice information, creating uninterrupted and streamlined communication among agencies. This not only enhanced public safety, but also achieved increased savings and efficiencies.

The IJAB case has become best practice for other New York state agencies in their application modernizations.

Bot is the New App

From navigating government services to sharing guidance, digital citizen engagement via a bot-based app is transforming the experience to deliver easy and personalized services to citizens and businesses while freeing public servants from repetitive tasks, which allows them to focus on high-value tasks. Moreover, they give a face to their application portfolio, matching services with interaction skills.

The public sector has been exploring bots to provide fast, efficient, and streamlined services and communications to meet the needs and expectations of citizens. Most public sector organizations start small and scale up, from building quick task-orientated bots to evolving into a new generation, leveraging AI to identify citizen intent, learn new questions, and offer more useful interactions.

As well as building digital infrastructure and deploying bots, it is vital for the public sector to create new processes and develop people capabilities to continuously improve bots, better understand citizen personas, and create governance framework to maximize the benefits of bots while minimizing risks.

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Jing Yuan Zhao
Expert in Residence, Singapore

Chatbot Ave provides COVID-19 support

NHS 24 in Scotland

The Storm: NHS 24 is a Scottish organization providing all '111' services (a free-to-call single non-emergency number medical helpline) for urgent medical advice. When the government implemented new measures in March 2020, many citizens reached out to NHS to ask for COVID-19- related support, challenging the helpline with sudden peaks of demand.

The Wave: Together with Microsoft and a consortium of partners, Capgemini developed the chatbot "Ave" to provide information and real-time advice about the coronavirus, to answer the more trivial questions. When confronted with a complex question, Ave redirects users to a human-owned webchat.

The Surf: With a rapid implementation, Ave helped NHS workers to deal with the unprecedented surge in demand and to provide out-of-hours support. In its first 30 days, the chatbot answered over 40,000 queries, using clinically-approved information.

A text and web chat system for New Orleans 311

City of New Orleans (US)

The Storm: New Orleans 311 (NOLA-311) is the city's primary source to access any local government and non-emergency information and support. In the wake of the pandemic, the service faced a 350% surge in call volume, mostly requests for COVID-19-related information.

The Wave: New Orleans launched an AI-powered 311 chatbot, "Jazz," which is reachable using the city website and via text. It provides round the clock support to citizens with information and service requests. Due to the connection of the 311 center's CRM platform with the bot's ML capabilities, the system's knowledge base and quality improve over time.

The Surf: New Orleans is now the first US city using a fully automated and interactive text and web chat system. Citizens can easily access relevant information, particularly those with no internet access or time to wait on phone calls, and staff can dedicate their time to more complex or sensitive concerns.

When Code Goes Low...

Low-code and no-code platforms make building next-generation application services a high-productivity matter for both IT and "business" specialists. When code goes low, the government agency's business or domain experts get on a high! You may be blessed with brilliant ideas for killer application services, but you'll need to deliver them blazingly fast and with the right quality – we're dealing with citizens here, after all.

Low code gives service managers in the public sector the tools to implement digital services for citizens quickly and independently.

Classic software delivery – based on slow, engineered processes and formal alignment between the parties involved – only gets you so far. It's useful for stable-scope, high-load-bearing core systems, but it is clumsy for citizen-centric apps that need to be built and adapt fast. It is easier than ever to construct applications without huge coding efforts. The secret is in powerful, AI-enabled tools that leverage API catalogs, prebuilt templates, and automation. These tools are so powerful, yet easy to use, that they bring both a quick application rate and tangible results to the public sector table.

Alexej Michaeli
Expert in Residence, Germany

MaPrimeRenov: a grant management platform

ANAH, French Housing Agency (France)

The Storm: In 2019, the French Housing Ministry asked French housing agency ANAH to launch a new grant scheme for housing energy renovation called MaPrimeRenov, to be delivered in only nine months, on January 1, 2020. More than 800,000 grants were to be distributed in 2021, representing more than two billion euros.

The Wave: Leveraging a low-code approach, the National Housing Agency ANAH delivered a grant-management platform serving both agents and users, building on Pega solutions. A very large Capgemini/PEGA team, comprising over 100 people, addressed strategic, governance, operational, and IT issues.

The Surf: With a strong challenge on time, low-code proved to be a successful approach, enabling the organization to deliver the platform on-time, in a highly political context.

A fast and low-code solution for COVID-19 services

Kobe City (Japan)

The Storm: At the onset of the COVID-19 crisis, Kobe was inundated by up to 40,000 crisis-related citizen calls relating to assistance programs and status updates or volunteer opportunities each day.

The Wave: The city of Kobe developed a set of four apps with Microsoft Power Platform, including an automated telephone app that allows citizens to check on their status on applying for relief funds, or a chatbot and dashboards to access pertinent information.

The Surf: This case demonstrates the speed and impact of low-code tools when in the hands of a few individuals. In just one month, citizens were provided with an interface to easily access COVID-19-related information and call volumes dropped by 90%.

API
Economy

API is not just for the economy, as the title of this TechnoVision trend might suggest. The future of the public sector is in managing ecosystems, being secure at the core, but open at the borders of its application landscapes. It wants to collaborate with and integrate other participants of their cities or domain "value chains." To integrate different players' application services or data, APIs are fundamental – supporting the automated and secure exchange of data. They allow you to build more diverse, yet coherent application portfolios, including crowdsourced solutions, and enable "once-only" models, where the agencies get the services and data from where it sits, rather than relying on the citizen to bring it.

Standardization is a crucial part of this game, and while it is never popular with those currently operating outside the standard, it is essential to the functioning of a distributed system tied together by APIs. This is how governments will get on the right track to becoming technology-driven organizations that leverage the full potential of ecosystems of players, application services, and data.

Lisa Eckersley
Expert in Residence, UK

Leveraging API-enabled solutions to modernize student loans services

HM Revenue and Customs, UK

The Storm: The legacy platform for the Student Loans Business Service (SLBS) needed to be modernized to support HMRC's strategic business ambitions, including policy and legislative changes for post-graduate loans.

The Wave: Using Capgemini's REGENERATE migration toolset and methodology, the existing application was automatically migrated to structured Java. This was followed by a deployment onto a modern private cloud environment using CI/CD. The new SBLS system encompassed 20 external APIs, 150,000 objects, over 100 procedure steps, and nearly 40,000 lines of code.

The Surf: HMRC has eliminated its dependency on legacy hardware and software. The introduction of CI/CD tools improved the ability to respond to change and supported the digital transformation agenda and future service enhancements.

API-led transformation of government legacy backend systems

New South Wales (NSW)

The Storm: One dedicated challenge for Service NSW, which delivers access to government services for people and business, is how to continuously improve customer experience while keeping costs down. However, in order to deliver new digital services, Service NSW had to access and integrate data from legacy systems across 40 departments and agencies, while maintaining high security standards.

The Wave: Service NSW adopted Salesforce as the agency's front end and leveraged APIs to expose data from disparate systems across the NSW government in a scalable manner.

The Surf: With the solution, citizens are now experiencing an omnichannel, one-stop-shop access to approximately 800 different services, resulting in a 97% customer satisfaction rating across over two million citizens.

APPS ❤ AI

AI is an important addition to the public sector – but it doesn't have to be a dedicated solution. It can provide many benefits to an organization:

- Intelligently automating administrative processes, administrative processes, such as document processing to reduce waiting times
- Personalizing interactions with citizens, ensuring they are provided with the right information and offered the right services based on their personal circumstances
- Detecting anomalies in citizen needs, compliance and risk
- Augmenting decision making to streamline citizen services.

More generally, many apps love artificial intelligence, and the combination offers great potential for the public sector. Equipping application services with AI is essential for governments and public sector organizations to deliver the simple, helpful, and delightful experiences that citizens expect. Boosting your current applications with a touch of AI will reduce the touchpoints with government through increased automation, allowing citizens to efficiently access the right services at the right time. This will create added value to the citizens or companies – who will love that extra intelligence.

Troy Wuttke
Expert in Residence, Australia

Project Farm 2.0

Change initiatives (Kolkata) for local farmers in India

The Storm: Global demand for food is anticipated to increase by 60% by 2050. Seventy percent of world food production comes from smallholder farmers, primarily from developing countries, where the farmers' livelihood is under pressure.

The Wave: Together with a consortium of partners, Capgemini created project FARM, an intelligent platform to resolve global food shortages by using AI to determine farming patterns to assist farmers with predictive, diagnostic, and advisory functions. FARM 2.0 is custom-made for India.

The Surf: The platform optimizes the value chain by providing key insights for small-scale farmers to improve their decision making and optimize their farm yield. In this regard, automated farming can also be brought to small-scale farmers in developing countries so that they can catch up on the digital divide.

WIFIRE: Fighting fire with AI

Los Angeles Fire Department (LAFD)

The Storm: The Los Angeles Fire Department (LAFD) is responsible for approximately 1,215 square kilometers of territory. Due to climate change, wildfires are more prevalent in the area, larger and more destructive, calling for new instruments to tackle this surge and for the LAFD to be better prepared.

The Wave: The LAFD started using WIFIRE, a real-time interface simulating and projecting the spread of wildfires by connecting i.e., satellite maps of territory with live weather information and infrared images from fire planes. Learning from historical incidents, it can also predict potential fires in the future.

The Surf: With the fire map and the gathered data being relayed within minutes to involved teams – both on the ground and in the air – fire departments can allocate their limited resources more effectively, thereby preventing wildfires from causing major damages to property and from posing a serious threat to human life.

THRIVING
ON DATA

No, data is not the new oil. If only because it has undisputedly become one of the biggest, content free clichés of the industry. In fact, if an enterprise has not already committed to being data-powered by now, it may already be too late. Just like every business has become a Technology Business so should every enterprise now be a data-powered enterprise. Data - combined with the cloud - powers resilience, performance, innovation and transformative breakthroughs.

Read TechnoVision Change Making for a complete overview of this technology container.

Thriving on Data

Just like every business has become a Technology Business, so should every organization now be a data-powered enterprise or government agency. The pandemic has made that case even stronger in the public sector. Meanwhile, citizens are becoming sovereigns over their own, well-secured data, applied in an ethical, fair, and transparent way. Public authorities play a big role in gaining the trust of citizens, but this implies that there is a good relationship in place between citizens and public authorities. Public institutions must ensure this trust is safeguarded and not harmed in any way. Looking at innovative, AI-powered data use cases, the public sector is in a continuous balancing act between innovation and trust, arguably more so than any other sector.

Key trends in the public sector:

- Crazy Data Train **| Data-driven:** The EU aims to become the leader in the data-driven society. The goal is to create a single market for data so that it can flow freely within the EU and across sectors for the benefit of businesses, researchers, and public administrations. GAIA-X and its Data Spaces will be the vessels to get them to this destination.

- How deep is your math? **| Anticipate:** Whether it be a hospital, border control agency, army, or city, all public services treat data as an asset and focus on maturing in the journey from understanding "what happens" towards "what will happen" and "how shall we act" based on advanced analytics.

- Good tAImes **| Fair:** EU regulations explicitly forbid AI systems that cause harm in any way, be it through subliminal techniques or by exploiting vulnerabilities of a specific group of people. **Private:** Established a few years ago, the General Data Protection Regulation (GDPR) provided a strong framework to protect and safeguard the privacy of all citizens. In a data-powered society this is of utmost importance, ensuring trust between parties.

- Data Apart Together **| Share:** By embracing open data, stimulating data sharing, and harmonizing data sets between services the public sector is increasingly in a unique position to provide single digital gateways/data ecosystems to citizens in a digital age with a one-stop shop. By engaging in data ecosystems, organizations have, on average, improved customer satisfaction by 15%, improved productivity and efficiency by 14%, and reduced costs by 11% annually in the last two to three years.

- Power to the People **| Democratize:** We live in a data-driven world, and the potential of citizen participation is immense. Public services, as evidenced by the examples of many cities, shall acknowledge people as the best, smartest asset they can work with – any citizen can be part data scientist!

Martijn v.d. Ridder,
Expert in Residence,
Netherlands

Marit Helland,
Expert in Residence,
Norway

Crazy
Data Train

Millions of citizens, businesses, and organizations interact with public sector services every day. Each interaction provides a valuable source of data, which remains underutilized if it is held in silos within an organization. Recognizing data as a valuable asset unleashes its true worth in the first step towards becoming a data-powered organization. Building trusted data solutions using the latest technologies for data discovery, data security, metadata management, virtualization, and data exchange is the new aim.

Trusted data pipelines and data exchange in public sector services will drive improved digital services, whether in a city, a hospital, or for an army or tax authority. Trusted, shared data is the foundation for the effective use of advanced analytics, machine learning, and AI. It can power economic growth, improve health and welfare, assist in combatting fraud, and it can enable more sustainable use and reuse of data.

Put data at the heart of your organization jump on board this Crazy Data Train and see the value it unleashes!

Nicky Popov
Expert in Residence, UK

Platform for opening, centralizing, exposing, and analyzing data

French Ministry of Armed Forces

The Storm: In the French Ministry of Armed Forces, traditional silo governance models, based on segregation by type of use, needed to be replaced by cross-cutting models that allow for the exchange of data between reference systems, granting visibility over activity.

The Wave: The French Ministry of Armed Forces built the POCEAD (Platform for Opening, Centralizing, Exposing, and Analyzing Data) platform, which centralizes data through strong data governance and mapping.

The Surf: POCEAD provided the technical capacity for valorization and is a methodological building-block for data governance. It has helped to overcome organizational silos and facilitates AI use-case development across departments – with numerous use cases such as HR operation augmentation, equipment operational readiness, and redundancy identification.

Facilitating secure data sharing across Europe

European Commission's Support Center for Data Sharing

The Storm: Data impacts the lives of citizens across the EU. Yet, although a multitude of open data is freely available, it is often of limited quality, unstructured, or inconsistent. The potential for achieving economic and societal benefits by using and reusing data is not fully leveraged.

The Wave: The European Commission funded The Support Centre for Data Sharing (SCDS) to facilitate data sharing among governments and public as well as private organizations.

The Surf: By providing information and guidance on data sharing practices, it ultimately contributes to the EU's aim of creating a singular data market, ensuring Europe's global competitiveness and data sovereignty. Among other successes, is iShare, a trusted framework for data sharing brought to life by 20 logistics organizations, including Dutch Customs, and Hutchinson Ports Rotterdam.

Power to
the People

Knowledge is power! And access to knowledge, in particular direct access to data-derived insights for the "many," not only for the very "few" power users is more important than ever. We have seen citizens gather data themselves if the administration does not provide it, for example on train delays.

The data-powered revolution changes its center of gravity from a dominant core of main data publishers to a decentralized network of data publishers and users, with governments losing the monopoly to "capture the world" in data.

In this new data ecosystem, the role of the citizen is shifting from that of a passive consumer of statistics to a "hands-on" data and insights producer. Agencies need to allow easy access to their data. This is about leveraging the societal power of people directly involved in technology-driven transformation and developing a new "data crowd intelligence." Whether it be for parliamentary debates, patient journeys, or administrative processes, individuals can and need to make the sense of the data that works for them.

People become pivotal to the ecosystem, being in the driving seat of data-powered change. Power to the People right on, spot on!

Cosmina Radu
Expert in Residence, Germany

OnDijon: Connecting man and machine for the Smart City of Dijon

The Dijon metropole (France)

The Storm: With the vision of creating a smart city network spanning its 23 municipalities, the Dijon metropole wanted to tap into the latest digital technology to connect its urban equipment, services, and citizens to improve the attractiveness and quality of life in the city.

The Wave: Together with a consortium led by Capgemini, the Dijon metropole established a central command to centralize data, connecting to their citizens and their queries at all times. A mobile application allowed the user to communicate easily with the center.

The Surf: The data is used to simplify and improve the coordination of service needs, maintenance works, and emergency responses – for instance, citizens can provide the city with crucial information about incidents in real time via the mobile app. This ensures continuous communication with citizens and improves the city's responsiveness and coordination.

The launch of the new platform also led to a 40% cost reduction for their services, while 630 calls concerning citizen requests are processed daily.

Active citizenship and innovative technology driving Bristol's approach to citizen sensing

Bristol City Council (UK)

The Storm: Damp homes are a major problem in Bristol, severely impacting people's health and wellbeing, especially for low-income households.

The Wave: To tackle this problem, the Damp-Busters pilot project was initiated in Bristol. A community-led project that aims to tackle the issue with a mix of sensing technology and open-source resources. The prototype, a frog-shaped sensor, gathers temperature and humidity data to better understand damp conditions.

The Surf: With its holistic approach and by using citizen-generated data, the project empowers city dwellers to become data producers, and become active in solving their city's challenges. The project was developed as part of the European REPLICATE Project, an initiative that brings a new take to active citizenship and the use of technology for social good. The insights of the Bristol Approach have already been applied to other projects across Europe.

Good
tAImes

As the use of data increasingly impacts our daily life, AI solutions must become more transparent, clear as water – while public sector organizations steer away from the darker AI shadows and move towards AI with a purpose.

In the public sector - in which AI navigates beyond solely technological waters - the societal dimension is key for trusted use of this new potential. Good AI needs to meet AI for good, by serving the society and the citizen, while encompassing strong ethical principles of use and purpose.

Building on current markers of this effort, such as the EU's guideline for trustworthy AI and the AI4Good Summit of the UN, societies are witnessing an AI that is steering us towards progress. .

Education, healthcare, justice, environment – data, if used wisely, can affect all these areas for the better and for good.

Pierre-Adrien Hanania
Expert in Residence, France

Tackling early drop-out at schools

Dutch Alfa-College

The Storm: One of the strategic ambitions for Europe 2020 was to achieve at least 40% of all 30 to 34-year-olds having completed higher education. However, student dropout rates have increased worldwide. In Europe alone, 10% of students on average drop out before obtaining their higher academic qualification.

The Wave: In order to support schools, Capgemini developed a predictive model using student data that - by exploiting machine learning techniques - allows early identification of students who may drop out, recognizing patterns of educational difficulties.

The Surf: The prediction accuracy was 91% for observations that the model had not been trained on. Thus, the AI-based prediction tool allows for early intervention, helping teachers to provide affected students with more attention without compromising their education.

Weapon decontamination with AI

International Committee of the Red Cross

The Storm: Unexploded landmines constitute a serious obstacle for many humanitarian aid operations, not only regarding staff safety but also in terms of the urgent delivery of food or medicine to conflict areas.

The Wave: Together with Tokyo's Waseda University, the International Committee of the Red Cross (ICRC) developed a proof of concept - followed by several tests - of how AI can be applied to thermal images in order to automatically recognize different types of weapons.

The Surf: The success of humanitarian operations relies largely on the speed and accuracy of detecting landmines and other explosive remnants of war in order to provide safe access to the conflict area. Recognizing patterns improves detection capabilities and reduces false alarm rates. Additionally, the technology helps the organization to plan safe routes for trucks providing food or medical assistance.

Data Apart
Together

The best insights come from bringing together the best and richest data sources. To be able to compete in a global data society, we need access to data that is traditionally apart, split between government, business, and citizens.

When it comes to personal and confidential data in particular, conflict arises between exploiting data to innovate and preserving the rights and will of people and companies. For too long, locking data away was considered the only way to protect it. But government data strategies clearly plan to enable, as much as possible, a free, responsible, and secure flow of data to provide better services and experiences to citizens and businesses.

Once this is ensured, the value potential of using and integrating data from multiple sources is far greater than the sum of its parts.

We are at the beginning of a generational change in practices and technology, similar to what we experienced in the 2000s with big data. Today however, modern data sharing opportunities are not just centered on technology, they encompass business and federated collaboration models, legal frameworks, while seeing citizens as active participants.

Gianfranco Cecconi
Expert in Residence, Netherlands

A health data hub for France

French government

The Storm: Discovering use cases for AI in the health sector is one of France's national strategy priorities, defined in 2018. The foundation of successful AI is data, yet health data is fragmented and not easy to access, given its sensitive nature.

The Wave: The Health Data Hub provides a secure platform with easy access to health data, which enables researchers to develop new innovative usage, complying with legal regulations and citizens' rights.

The Surf: Ultimately, it enhances the quality of treatment and care, paving the way for new initiatives and solutions to cure specific diseases. In 2020, Capgemini supported 25 projects that will that will help to improve patient diagnoses through computer vision, enhancing the way patients are treated through personalized recommendations.

Building a rail freight data hub

Association of German Transport Companies (VDV)

The Storm: The German rail freight transport industry is at risk of losing ground in intermodal competition. Although various individual applications and data streams exist, there is no holistic approach of standardized or coordinated business processes, and the shared use of data pools.

The Wave: The Federal Ministry of Transport and Mobility (BMVI) promotes a project to establish a "Rail Freight Data Hub" (RFDH).

The Surf: A common data platform advances the digitization of the industry, strengthening the competitive position of rail-bound freight transport by accelerating processes, minimizing error rates, and increasing service quality and customer satisfaction. Moreover, the project is expected to have paid for itself in the second year by saving 27 million euros

How Deep is
Your Math

The twenty-first century has witnessed governments worldwide intensively fortifying their technology capabilities to increase speed, efficacy, effectiveness, and optimization in delivering public services at scale. AI and data form the very nucleus of this revolution.

From education to water, law and order to healthcare, climate to econometrics, income equity to force-majeure simulations, today AI is a game changer in uplifting communities globally through predictive and prescriptive data-driven solutions. By digging deep into what data has in store, public services can reimagine their processes, better predicting occurrences and augmenting their decision-making processes with AI-driven suggestions or even digital twins of cities or policy fields.

For instance, within healthcare, from bot-assisted diagnosis, to drug effectiveness and pharmacovigilance, drug and molecule discovery to pandemic management, the technology relies on lightning-fast yet high-precision predictions and recommendations. Two of our showcased solutions here illustrate the clear and tangible benefits AI brings.

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Tanushree Datta
Expert in Residence, India

AI for better discharge decisions

Region Västra Götaland (Sweden)

The Storm: Doctors working in closed psychiatric wards needed to manually prioritize patients for discharge without increasing the risk of readmittance. To determine decision-making prerequisites, doctors needed to consider numerous variables in a short time, such as care history, diagnoses, medication, and patient demographics.

The Wave: Capgemini helped the Västra Götaland Region (VGR) to develop an analytical model built on patient medical data, prescriptions, demographics, and medical best practices to prioritize which patients to discharge first.

The Surf: The solution achieved a 40% precision rate when predicting relapse within 14 days of release, and correctly identified 50% of relapse patients. By applying machine learning, the organization also gained more effective guidance for generating insights into factors of a patient's risk of readmission.

Helping military doctors with predictive cancer diagnoses

The US Defense Innovation Unit (DIU)

The Storm: It is estimated that within the United States, 5% of outpatient diagnoses are conducted in error, translating to an annual misdiagnosis of 12 million patients. False or late diagnosis can result in serious injury or even death.

The Wave: The Defense Innovation Unit (DIU) partnered with Google Cloud to develop an AI-enabled digital pathology solution to help military doctors with predictive cancer diagnoses.

The Surf: AI and machine learning sped up and enhanced the accuracy of cancer diagnosis in the earlier stages, therefore improving not only the diagnostic capability of healthcare practitioners but also contributing to the patient's timely treatment of cancer. Personal data was anonymized in the process to respect compliance rules.
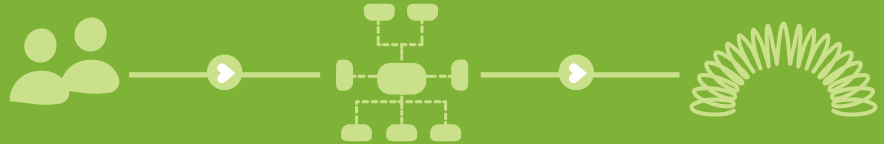
PROCESS
ON THE FLY

As we all know, a high IQ is not always a recipe for crushing success. In the end, it's all about execution. Corporate speed depends on the ability to turn insights into action, to quickly respond to events, to overcome business silos, to seamlessly ride the waves and to rapidly change our ways if circumstances so dictate. This is where process management needs to deliver; to be fluid, agile, reactive and yet proactive, and able to self-adapt to weather every storm.

Read TechnoVision Change Making for a complete overview of this technology container.

Process on the Fly

For many years, public organizations have aspired to fully define, understand, and transform their processes with "heavy" programs. They want to increase the speed of their business execution, increase their agility to respond to changing circumstances, support civil servants' work by automation, and enable self-service for citizens at scale. But it is now time to optimize processes much quicker and "lightly". With the rise of data-driven process management, advancements in intelligent process automation and the introduction of trusted and explainable AI, we can now finally fulfill the promise of a reliable, fluid, and proactive Process on the Fly.

Key trends in the public sector:

- Technologies such as process mining and digital twins of operations are changing how we leverage data to simplify and automate processes while making them more proactive for each query and case individually.

- Intelligent process automation uses the output of such analytical measures and - combined with artificial intelligence (AI) and robotic process automation (RPA) - automates the most repetitive, near-mechanical tasks so civil servants can focus on what is most important for the organization and stakeholders.

- Automation is no longer perceived as a measure to remove humans from the process; the greatest value is generated when intelligently striking a balance between machines and human processing to orchestrate work – even solving the demographic challenges of public servant population in some countries. Our research found that around 69% of public and government organizations already experiment with or implement rule-based automation (ITPA/RPA).

- Public sector processes constantly grow, become more complicated, and need to adapt to changing expectations and legislative realities while considering the GDPR, fairness, and equal treatment for all. Although this is a good thing for citizens, it poses challenges in terms of processes, siloed data, and process experience.

- Public sector processes need to be two-way interactions and one-stop resolutions, enabling proactiveness, ensuring privacy and fair treatment – all while being omnichannel and creating the experience of tailormade services. New, rising intelligent process automation technologies allow us to enable technology-augmented "on the fly" processes.

Marek Sowa,
Expert in Residence,
Poland

Anjali Pendlebury-Green,
Expert in Residence,
UK

Processes
101

The best government interaction is often no interaction at all. Citizens and companies want results such as grants and not lengthy exchanges. Start by identifying what your constituents want and how to best provide that, and not by setting your current processes in stone. If a child is born - and all citizens want government child support subsidies anyway - skip the application and grant it directly.

That said, multiple demands on government agencies force their leaders to focus on the day-to-day issues, preventing them from undertaking long-term improvements such as digital transformation, rethinking what they do and how.

Those who manage it despite the challenges discover technology-driven transformation is easier than it seems. Change can be initiated immediately, using incremental improvements. For example, process mining is a digital tool that connects with system logs to identify and visually display bottlenecks in processes. Solving only a handful of bottlenecks goes a long way to streamline and standardize services, saving time for an overburdened workforce.

The automated process mapping of process mining expedites the digital transformation discovery phase which minimizes the impact on employees, allowing them to devote their time to serving the public.

Doug Petroshius
Expert in Residence, US

Process mining for faster immigration administration

Norwegian Directorate for Immigration

The Storm: The Norwegian Directorate for Immigration's (UDI) processes were seen to be long and stressful for all involved. As such, they pursued the most efficient processing possible for asylum applications.

The Wave: Working with Celonis process mining software, UDI and Capgemini established a data model based on digital traces from UDI's asylum case management system.

The Surf: UDI and Capgemini demonstrated that there was, in fact, a significant opportunity for process mining to deliver substantial improvements to asylum application processes. The top three use cases alone demonstrated potential annual business value for UDI of more than NOK20-million.

Process management to reach efficient tax administration

Finnish Tax Administration

The Storm: Complicated integrations of legacy information systems within the Finnish Tax Administration failed to work consistently. The lack of an overall picture of the processes and information systems made the organization feel powerless.

The Wave: Vero Skatt mapped a consistent big picture of the current and the target state, choosing QPR tools to identify bottlenecks in processes and detect overlapping information systems. The organization developed uniformity in language and communication and created a model of their operations.

The Surf: Process management facilitated process visualization; consumers and enterprises alike can stay ahead of the game and in control, with a focus on human interactions. Customers can communicate with tax authorities anytime, anywhere.

Rock
Robot Rock

Throughout the last decade, the private sector has come to leverage robotic process automation (RPA) extensively, moving from pure work augmentation to customer-centric application integrating platforms.

Due to the increasing expectations of citizens on digitization and the parallel need to do more (new laws and regulations) with less (demographic change), the public sector is now exploring RPA as a short- and mid-term solution to its specific needs. Routine tasks are being automated, costs are being reduced, and processes are being structured in a way that eliminates repetitive manual effort. The robots can even observe the human operators in their daily job and – with the magic of machine learning – at some point, even do it themselves.

If applied appropriately, it can be the augmented workforce governments are aiming at. For the good of the citizen and the public servant, create your own robots and start delivering!

Stefan Burghardt
Expert in Residence, Germany

Robotics function for improving customer service and job satisfaction

HM Revenue and Customs, UK

The Storm: Many agencies use old, outdated IT systems that require employees to use multiple systems to complete a task. This is time-consuming and can lead to high error rates.

The Wave: HMRC used Robotic Process Automation (RPA) to automate time-consuming clerical tasks, and link digital services and back-office systems for end-to-end processing, without significant IT development effort.

The Surf: Using RPA, HMRC reduced processing costs on some services by around 80% and reduced handling times for some calls by up to 40%. Dashboards gave advisers quicker access to the information they needed to answer calls, cutting some call times by up to two minutes.

General Services Administration (GSA) leads the growth of automation projects

US federal agencies

The Storm: Federal agency employees typically spend a lot of time on trivial tasks, leaving limited capacity for more complex and intellectual work such as analysis, technical issues, or customer service delivery.

The Wave: The RPA Community of Practice (CoP) is a government-wide measure administered by the US General Services Administration (GSA) and Technology Transformation Services (TTS) program offices. It enables cooperation and problem solving among federal agencies interested in realizing RPA. Several of those agencies implemented automation to cope with administration bottlenecks.

The Surf: The various initiatives have proven to be very successful in achieving a better citizen experience, minimal error rates, and better management capabilities. In 2021, the GSA has saved approximately 50,000 labor hours through automation, while a CoP report found a 110% increase in deployed automations between 2019 and 2020.

Can't
Touch This

Today, too many routine processes and decisions still go through too many hands of civil servants. Where there is no room to weigh options on a decision and this decision is bound by clear rules to clear outcomes, the value add of the human is limited. Often, it is only an emotional or legal factor to say that the "human has the last word." An automation of "bound" approvals can free up valuable and scarce human resources.

But also, where real evaluations take place, civil servants can be greatly assisted along the way. Intelligent process automation (IPA) optimizes processes and digitizes existing, mostly manual workflows, enabling a smoother and seamless experience for citizens who are expecting faster resolution of their queries. Driven by AI, processes can be further assisted by powerful reasoning systems, and IPA can save taxpayer money through the reduction of fraud risks and enabling policy compliance.

While the ultimate decision-making power and supervision is to remain the prerogative of humans, and every automated decision must be verifiable and explainable, IPA has already generated steps towards more inclusive, transformative, and efficient public services.

Florence Rolland
Expert in Residence, France

End-to-end ID inspection at the border

Western European Security Authority

The Storm: Every day, many complex ID documents need to be reviewed at the border by employees who are not fully informed about newly published security features and policies, leading to security issues. All this needs to happen in real time, with the danger of bottlenecks around every corner.

The Wave: Automatic control using computer vision, deep learning, and OCR technology are used to achieve a high level of validation security – cross-checking all known falsification of IDs recently used. The document is identified by scanning the document and chip.

The Surf: Using ID proofing knowledge in AI, Capgemini's template-based document verification validates documents 10 seconds faster than existing solutions. It also provides fast alerts for common falsifications – useful for anomaly detection.

IPA mitigates risk for COVID support initiatives

HM Revenue and Customs, UK

The Storm: Her Majesty's Revenue and Customs (HMRC) launched a series of support initiatives (job retention, sick pay...) during the pandemic and needed solutions to help mitigate against fraud and risk.

The Wave: HMRC used Pega's Intelligent Automation and Robotics solutions to automate manual aspects of its claim validation process for the government's COVID-19 initiatives. The implemented system stopped payments when risk was identified while ensuring faster disbursement to others.

The Surf: A quick deployment of the solution in only 8 days ensured public officials received requisite support in time. The schemes have since supported millions of claims.

Pleased to Meet
You, Process

Agency or department siloes are preventing progress and innovation. Overcome them by adding flexible process layers on top of them, rather than break solid, established structures.

Robotic process automation (RPA) is a non-invasive technology, acting like a virtual employee that is used to automate highly repetitive processes, the rule-based (and often boring) actions of employees. However, with existing non-RPA-based process steps still prevalent in many public service organizations, new RPA-based applications must coexist with legacy applications and manual processes. This is where we meet our process.

New RPA technologies avoid the need to replace process specific applications that you've customized and come to depend upon. Bridging the divide through data aggregation and cross-silo process flows not only breaks down the barriers to enterprise-level unification, but also to the outside world.

Facing the ocean of services delivered by a public administration, bridging all processes in a seamless automation wave is the desired omnichannel experience citizens expect from their governments.

in

Mignon Rijnja
Expert in Residence, Netherlands

RPA supports a prefecture's administrative work

Ibaraki Prefectural Office (Japan)

The Storm: Ibaraki Prefecture, responsible for 2.8 million citizens, struggled to maintain the sophistication and diversification required to support prefectural citizens.

The Wave: Ibaraki Prefecture and Capgemini implemented UiPath to automate the input of data and information into the existing system while improving the associated processes. 7,000 staff members participated in project sessions.

The Surf: By introducing RPA technology into 20 targeted distinct administration, education, and police operations, the time involved in these processes was reduced by 35,000 hours per year and improved the employee and citizen experience. The mix between RPA and OCR made it possible to "reduce the payment processing time of more than 10,000 handwritten applications from 12 minutes down to two minutes per case."

Transforming a legacy planning system

New South Wales Department of Planning, Industry, and Environment

The Storm: The Department of Planning, Industry and Environment (DPIE) provides a range of services related to planning, zoning, building and conservation. It was using 15 systems, many custom apps and some paper-based processes that were costly and required a high level of effort and resources to remain fully operational.

The Wave: The application process has been digitized and integrated into one single digital platform with Pega – a seamless alternative to the siloed structure of manual processes that the organization was challenged by, with processes that could only be conducted in person and during business hours.

The Surf: Over 2,000 development applications have been submitted through the ePlanning Online DA service since December 2018. Using the new system reduced application determination times by more than 50%.

Augmented ME

Our lives are augmented by it. Our work is accelerated by it. And our world runs on it: data and AI.

Whether you're driving, handling documents, ordering a new phone, or just walking in a forest – all of these are enhanced by our ever-developing technology. Adding AI to business operations speeds up decision making and creates a symbiotic relationship that brings humans and AI closer together – from simple information analysis to digital companions, from preventing crime to forecasting deforestation and other disasters.

For both the private and public sectors, the mix between AI, learning intelligence and the capability to continuously automate over time holds great promise. Yet it also puts emphasis on a crucial topic: how to rebalance the relationship between humans and machines. Whether to shift trivial tasks towards faster, automated processes, or to create insight-driven suggestions for decision-makers, innovation questions us technologically and societally.

As AI technology advances and challenges us, we finally learn what it truly means to be human.

Marijn Markus
Expert in Residence, Netherlands

Leverage AI to hunt spruce bark beetles in forests

Swedish Forestry Agency

The Storm: The onslaught of spruce bark beetles is threatening forests around the world every year. According to the Swedish Forest Agency, three to four million cubic meters of forests in Sweden were destroyed in 2018, damages summing to the amount of 100-million euros. It is very difficult to identify and quickly manage affected trees using manual processes.

The Wave: The Swedish Forestry agency leveraged Geo Satellite Intelligence through a mix of artificial intelligence (AI) and satellite imagery, to produce detailed maps that visualize the progression of the spruce bark beetles in the forest.

The Surf: The technology mix accelerates the detection and monitoring of infested areas. Capgemini Sogeti found 80% of the outbreaks using GSI and satellite analysis – versus less than 30% before. One forest owner alone could save approximately 15 million euros yearly in forest value using Capgemini's solution, with a ROI of three days

Augmenting custom workforce with predictive analytics

South Korean Customs Services

The Storm: Identifying illegal counterfeit products can be tedious and complex, given the real-time requirements and the numerous cases needed to base decisions on. For the South Korean Customs Services, this became almost impossible when imported goods doubled over time, with the custom force remaining the same.

The Wave: The Customs Service relied on AI and analytics to augment its workforce in their tasks – mostly focusing on routine and classification tasks. The agency adopted data-driven decision AI to identify illegal imports more intelligently, augmenting 400 inspectors in their daily work.

The Surf: Since the implementation of the project, the detection rate for illegal goods improved by more than 20%. While more cases are being detected, the workforce also benefits from the technology to delegate trivial tasks and avoid bottlenecks that would have enabled criminality to remain hidden.

YOU
EXPERIENCE

User experience is at the heart of intimacy between an enterprise and its audience, whether they are customers, employees, or partners. And it is quickly moving different places, as preferences, players and positions change on a minute-by-minute basis. This is exacerbated by the accelerated move to online, 'no-touch' channels. Not an easy environment to build a solid understanding of _what is driving the user_ it seems, let alone to develop a deep, mutual, emphatic relationship.

Read TechnoVision Change Making for a complete overview of this technology container.

You
Experience
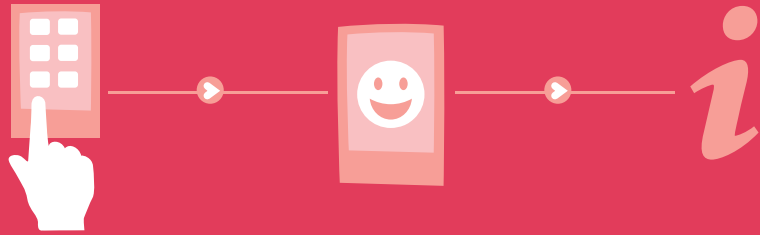
The <u>user experience</u> connects an organization to its audience; whether they are citizens, customers, employees, or partners. It is a fickle thing, moved by emotions, circumstances, or preferences, exacerbated by the accelerated move to online, "no-touch" channels. Building a solid understanding of <u>what is driving the user</u> is no easy task, but unless you understand these drivers, you will not build up acceptance and thus usage of online government services.

The good news? Real-time data, smart algorithms, intelligent automation, the internet of things and immersive technologies enable hyper-personalized, compelling "you" user experiences as industry examples show. If governments keep the right balance between "knowing enough" to provide good service but "not so much" that citizens get spooked, then even administrations can create signature moments at which users feel their intentions are fully understood, especially in life events like a birth, where the citizen's focus is somewhere other than interacting with government.

Key trends in the public sector:

- **At your side throughout time –** some people become annoyed when they have to introduce themselves again and again to a person who tends to forget them despite the successive introductions. They want a friend who knows them well, remembers the last discussion, and transposes the conversation to a new context – whether it is the birth of a new child, a chronic disease, paying taxes or applying for a pension. If this is a free choice, the data protection officers cannot object to this friendship.

- **Your authentic adventurous friend –** they always know the newest stuff, know no rest and are always ready to immerse themselves in new and exciting fields. Augmented and virtual reality is this friend whose contagious energy shines, offering you the best of yourself.

- **Your representative –** True friendship occurs when you're confident you can let your friend speak on your behalf. This maturity, while having its limits, is progressively spreading at various moments of a citizen's life. Taxes, child allowance, pension – thanks buddy!

- **Your empathic listener –** When it hasn't been your day, your week, your month or even your year, technology is there for you, following your state of mind and knowing when to reach out - or not! Intelligent technologies redefine experiences, "hyper-personalizing" the interaction with government and getting the signals you send. If you don't have the control and the interaction feels invasive, the friendship is soon over!

- **Your partner through thick and thin –** they can listen, cook, understand your jokes, even replicate some of your signature skills – and seamlessly commit throughout the day to make you happy... Wait a minute... Is (s)he the one?

Anne van Leeuwen,
Expert in Residence,
Netherlands

Paul Johnston,
Expert in Residence,
UK

Signature Moments

Using user centricity, design, technology, and unique content, governments can create signature moments, just as leading international consumer brands have done for years. To create an immersive and emotional moment connecting to your citizens is a lofty goal. But facing that challenge - and the expectation that civic connection and interaction with the state and the government feels like a breeze - is rewarding.

Becoming a parent at the hospital, discovering new horizons as tourists in a city, founding a company, claiming rights as an insured person; these moments are individual and emotional. Each of them offers the potential to create lasting impressions. If the interaction is not easy and intuitive, but the government also adds a touch of extra service, even administrations can dazzle. If you anticipate what the citizen may need next and propose or even provide it, you will receive positive feedback, boosting your civil servants' morale.

Like brand loyalty, citizens will value their political leaders, and will share the seamless satisfying experience, the signature moment, with their community.

Florian Bemm
Expert in Residence, Germany

#MyHelsinki – Helping people find the best of Helsinki

City of Helsinki (Finland)

The Storm: Although Helsinki has much to offer tourists, the city lacks international prominence compared to neighboring countries. In fact, for visitors of a foreign country, it can be difficult to find the best and hidden spots besides well-known attractions.

The Wave: The city of Helsinki partnered with Idean to envision an app to help people experience the best of the city. One of the key features of the MyHelsinki App is MyHelsinki Lists, offering a visual map of favorite places to be created and shaped by anyone.

The Surf: The success of the local guide has led to a 19% increase in tourism in six months. #MyHelsinki was also tagged over 150-thousand times in social media and the website experienced a 1,935% growth in site visits. A mini program, helping to plan the full journey of a visitor's holiday, was created especially for non-English speakers.

Towards citizen-centric life events in Denmark

Agency for Digitization (Denmark)

The Storm: Major life events such as birth, marriage, or death require multiple interactions with various government services that are usually delivered from specific units. Given the lack of cross-departmental integration of services, interactions can be time-consuming and stressful. The potential of interoperability and a once-only principle goes untapped.

The Wave: The Danish Agency for Digitization developed coherent digital user journeys for ten significant events providing citizens with a customized overview of their to-do-tasks in the given situation.

The Surf: Enhancing the citizen experience, government services were customized to citizens' needs and data only needs to be submitted once in the digital self-service portal, borger.dk. Digital guides are also rolled out for ten user journeys to support businesses on the portal, virk.dk. The user journeys also allow the government to deal with sickness in a sole-trader business.

Reality
Bytes

Today, more than ever, we need to feel close with each other, even if we can't be physically in the same place. The pandemic as well as climate change goals have increased the value of hybrid environments. Simulating critical scenarios with virtual reality, or transforming reality through new channels with augmented reality, creates the same space some public organizations can lean on to innovate and reimagine – eventually bringing to life a new reality with augmented skills and implemented outcomes.

Already today, in tourism, healthcare, security and defense, our public institutions are using mixed reality environments, where the virtual meets the real environments, be it for training or remote assistance purposes. Many more uses can be imagined however. To name just two: as cities build their digital twins, changes to the city can be simulated and "felt," and augmented reality could boost the learning experience of many school classes. Wherever you reach limits in real life, see first if you can overcome them in AR or VR – it may kickstart you on your way towards actual realization.

Gael Prudhomme
Expert in Residence, France

Innovative AR capabilities in the Air Force

The Royal Netherlands Air Force

The Storm: The Royal Netherlands Air Force (RNLAF) wanted to explore the use of new technologies particularly for aircraft maintenance. Given the large number of devices, it was impossible to delegate senior technicians' work to junior technicians for every maintenance job.

The Wave: Capgemini developed an innovative process based on augmented reality, which enabled the Royal Netherlands Air Force technicians to seamlessly create maintenance job templates, in order to perform smooth maintenance of equipment using HoloLens technology.

The Surf: The new system enabled high-quality maintenance and repair while reducing logistics costs. For the Air Force, it enhanced the ability to focus on supporting more peace missions with the same budget. Additionally, the AR feature is enabled to delegate work to more junior technicians. Given its success, the system was also used for other navy and army departments.

VR enhancing happiness of senior-living residents

Health PEI (Canada)

The Storm: The move into a senior living infrastructure can lead elderly people, particularly those with cognitive decline or mobility restrictions, to think their freedom is limited. In fact, more than 50% of senior living residents experience depression or social isolation in the facility.

The Wave: Health PEI uses Rendever's virtual reality (VR) platform for customized reminiscence therapy, enabling residents to relive memories. The tool makes them virtually travel the world and create new friendships.

The Surf: Since the foundation four years ago, the Rendever VR platform has been used in over 250 senior living communities across the US, Canada, and Australia delivering over 850-thousand experiences. The communities have shown a 40% increase in resident happiness by fighting loneliness and boredom. While the headset deploys the same frame experience, each resident controls the direction and focus it can take, making it an individual and immersive experience.

Own
Private Avatar

Digital assistants can act on behalf of citizens, patients, employees, or organizational entities. Avatars – our digital intermediaries – represent us and our individual needs with services and systems. Built on AI/ML and cloud models, intertwined with graphics, CGI, 3D and VR design tools, avatars can make our lives easier and more effective, provided they truly act as our digital twin.

The key is to maintain control of our avatar and reveal only as much of it as needed and consented. From a service provider's perspective, it will help to understand, engage, and interact with these avatars – to create signature moments for citizens. It can not only make our experiences better, but also help us maintain our sovereignty by standing up for our rights on our behalf; for example, consenting automatically to data uses we always approve, or pointing out any access to our data that is unusual. Use your tech buddy to keep control of your sovereignty to safely open up new tech possibilities.

in

Anne van Leeuwen
Expert in Residence, Netherlands

Ange Gardien: the first application of Digicare

Region of Nouvelle-Aquitaine (France)

The Storm: Patient pathways over time are a difficult challenge for health practitioners to cope with. While a more consistent following of the patient storyline is needed, the interaction with different profiles at different stages also needs to be ensured – especially for chronic disease that weigh heavily in the cost of health; only affecting 17% of people, but representing two thirds of the costs.

The Wave: Ange Gardien is the first application case of Digicare, the next-generation digital care pathway app for patient support on specific pathologies and treatments, backed by monitoring, educational, and recommendation features.

The Surf: The patient-centric solution accompanies patients throughout all stages of the treatment and care pathway, supporting all involved through the interface. Thanks to Ange Gardien, more than 1,000 patients benefited from an early diagnosis. Furthermore, the collected data is leveraged for medical research to help optimize the fight against chronic diseases.

Alexa-like access to public services

Government of Estonia

The Storm: With all Estonian public services set to be available online, the government wanted to explore ways to improve citizen interaction and experience with government services, making make it less complex and rigid.

The Wave: The Estonian government worked on a project #KrattAI to enable citizens to interact with government departments and access services via virtual digital assistants of their choice. Following a citizen's voice request, the ensuing task is completed by an automated process relying on the interaction of AI applications from different departments.

The Surf: Citizens will be able to use their preferred interfaces to take care of government services, be it applying for a new passport or asking Siri to fill out taxes as well as to be reminded of upcoming expirations. In this respect, digital public services will be easier to use and accessible for everyone from any device, providing for an enhanced user experience level. One additional benefit is that no further interface is needed, as the solution leverages platforms that citizens use already.

I Feel for You

AI can automate and accelerate many processes. We all know that. But sometimes, we tend to generalize and associate bots or AI only with customer-oriented processes such as sales or support. The truth is that these technologies can help us in a tailor-made way, with specific attention not only on operational efficiency, but also human specific contexts and reactions. With emotional AI, feelings and situations merge with the process and the search for a suitable output.

Who doesn't struggle with bureaucratic processes when dealing with governmental services? It can be a real pain, and get you stuck, right? AuroraAI helps in proactively acknowledging difficulties and solving them – together with the citizen. But intelligence also can become aware of adjusting interactions to the most vulnerable in our society, such as Botti, a chatbot offering children a safe space to talk in highly difficult situations.

We'll keep our fingers crossed for you AI, so we can observe many more such initiatives in the future. Initiatives that will make our lives easier, safer, or simply happier.

in

Aleksandra Domagala
Expert in Residence, Poland

Botti – Chatbot for Children

Capgemini-supported proof of concept

The Storm: Most child abuse victims are between six and thirteen years old. At this age, children often lack the capacity and courage to find and contact appropriate institutions on their own. A sense of shame also often means that they are too inhibited to speak to someone able to help.

The Wave: Botti is a prototype built within the context of the German WirVsVirus hackathon in 2020, allowing children to communicate anonymously and independently, regardless of geography or time. The chatbot asks progressive questions, adapting to the child's readiness to share information, and builds on how they feel.

The Surf: Given the lower inhibition threshold, children are encouraged to seek help at an earlier stage. Credited for its easy scalability and the mix between new technologies and a chatbot interface, the PoC won a prize at the #Wirfürschule hackathon.

Towards a human-centric society with AuroraAI

Finnish Ministry of Finance

The Storm: The Finnish supply of government services is largely silo-like and driven by the needs of public authorities. Due to this, authorities may fail to deliver them in a timely manner to citizens or companies in different life or business-related circumstances and events.

The Wave: AuroraAI is a Finnish customer service model using AI to assist citizens accessing government services based on their needs, centered around selected life-events and business activities. AuroraAI will be fully available in 2022 and builds on a so-called snapshot of people's needs and the state of their well-being as citizens.

The Surf: The program promotes a human-centric, proactive society. For citizens, it offers personalized services and strengthens their ability to solve issues in difficult situations. Moreover, the program will enhance process efficiency and produce savings by improving the cost-efficiency of services.

No
Friction

Using smart technologies, public sector services can become personal, seamless, and autonomous to the extent that when desired they can blend into the background.

Utilizing the plethora of data available to organizations, individual preferences, location services, and IoT, their services become aware of your personal environment and can deliver highly contextualized user experiences, if you wish and ask for it.

Trust that "the authority" uses your data ethically is critical to large scale user adoption. Transparency about the sources of data, automation techniques and AI's use are key to user consent and then building and maintaining their trust.

These data-powered frictionless user experiences are wholly dependent on the fluid exchange of data – between the authority, the user, and the ecosystem they sit in. To deliver an optimized service, equal levels of smart data analytics are required within "the authority." The interplay between the frictionless user experience, the service provider's analytics, and continuous product delivery – all with a strong ethical backbone – is what will differentiate good user experiences from those with No Friction!

in

Dr. Michael Osborne
Expert in Residence, UK

STEP: Predicting Bed Availability with AI

Regional health agency in France

The Storm: The uncertainty of bed capacity challenges hospitals and health authorities, both on a medical and logistic level. Striking the right balance between scheduled and (urgent) unscheduled care during medical bottlenecks is key to saving lives.

The Wave: The Agence Régionale de Santé (ARS) Île-de-France partnered with Capgemini Invent to apply AI to monitor and anticipate bed capacity across the region – also featuring a prediction feature to proactively steer the health ship through the storm.

The Surf: The project's analytics capacities made it possible to make projections based on predictions of epidemiological models in order to maintain a minimum of available beds. Such scenarios for incoming flows help to avoid emergency overcrowding and allocate scarce resources more efficiently to manage patients' stays and support. The approach also drives better decision making and foresees the impact of new confinement strategies.

## UbiGo: Launch of MaaS travel service in Stockholm

City of Stockholm

The Storm: Mobility and sustainability are major global challenges. Given the continued trend of urbanization and increased demand for transportation, cities must find solutions for related issues of emissions, noise and congestion.

The Wave: The city of Stockholm launched a New Mobility-as-a-Service (MaaS) project introducing UbiGo, an app that combines transport options from distinct providers.

The Surf: Reducing the need for a private car has immediate effects on the environment contributing to a move towards sustainable mobility. For its commitment to sustainability, UbiGo also receives funding from the EU Horizon 2020 CIVITAS ECCENTRIC program. Furthermore, it has a positive impact on the traveler's experience. After a successful pilot in Gothenburg and rollout in Stockholm, the first ever deployment of MaaS, the share of users that were very satisfied with their overall transport experience increased from 17 to 50%.
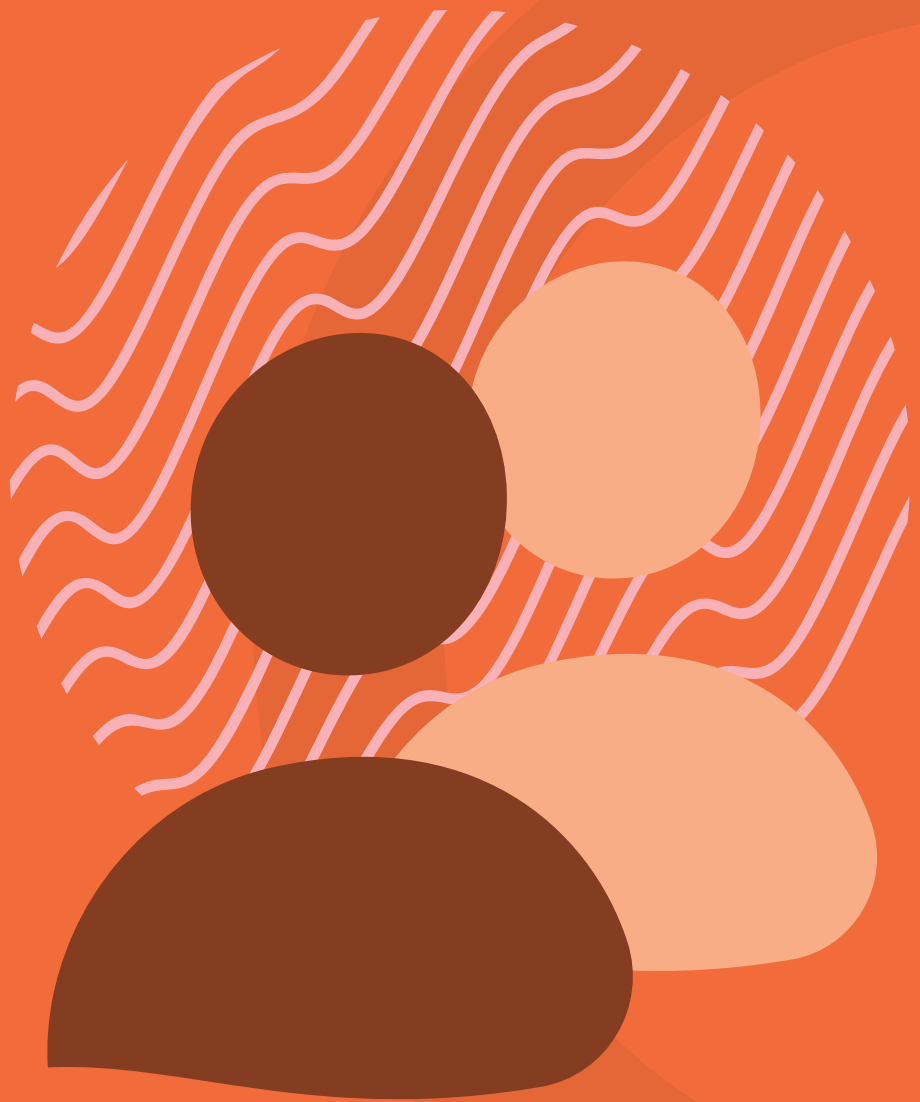
WE
COLLABORATE

The need for humans, organizations and nowadays, 'things', to engage in a formless, portable and resilient way is imperative, unstoppable even. The legacy collaboration systems of yesteryear have entered their well-earned final resting place at the bottom of the corporate ocean, and in their place a new vision of collaboration has emerged; flowing through old barriers and floating between 'compete' and 'collaborate'. With all becoming intimately networked with superior, simpler and ever-more ubiquitous technology and an abundance of social platforms, it's time to tap into the phenomenal power of the collaborative Technology Business, even as connections and entire ecosystems are seemingly changing overnight.

Read TechnoVision Change Making for a complete overview of this technology container.

We
Collaborate

The changes COVID-19 has brought are life-changing, revolutionary, and will be amplified in the sustainability transformation. The need for humans, organizations, and nowadays "things" to engage is imperative, unstoppable even. The challenges we face consistently could not be solved by any organization alone, and the pandemic brought with it a previously unseen level of collaboration between partners that historically insisted on "their way" only. They had to float between "compete" and "collaborate" mentalities, re-engineer and re-think processes to be more adaptive, experiment with modern technologies to partner, and respond to changes almost overnight. Agencies and even countries collaborated with each other to achieve fast and superior results, driven by joint "missions" that kept all involved focused on specific outcomes.

Key trends in the public sector:

1. **People, the life-force:** People power our technology. The shift to "hybrid" working has played a key role with 73% of public sector (PS) organizations saying they have seen a rise in productivity due to remote working models, with productivity gains varying between 18–33% and expected cost savings around 36%. Availability of global tele-workers and gig workers has also expanded a wider talent pool of multi-disciplinary skills. A majority (88%) of PS organizations use some form of fluid workforce, proving that employees' needs have changed, shifted the way we lead, reframed employee touchpoints, and strengthened the cultural fabric and role of the physical workspace.

2. **A quantum leap:** Technology is not only aiding intra-organizational collaboration, but also breaking down cross-government barriers and creating close public-private collaboration to enable data sharing and innovative services for the citizen. We know 5G is enabling public sector transformation from areas such as smart city initiatives to public education, connected healthcare, defense, and transport. The announcement of the first Quantum OS from Cambridge startup Riverlane, has shown that quantum computing can now be harnessed in a chip. Processing complex calculations at unparalleled speeds gives a needed quantum advantage for "virtual labs" to simulate digital versions of new futures from chemical compounds to creating better batteries to achieve our net zero targets.

3. **In Public Sector We Trust:** Public services are well suited to collaborate with data across ecosystems because of the need to ensure trust, transparency, accountability, and security of data. Distributed ledger technologies are well positioned to enable this success with the US military using blockchain (SIMBA Chain) to secure its military communication, messaging, and applications. The sector is turning to blockchain as a means to better serve citizens, and improve public administrative functions while ensuring transparency, preventing fraud, and establishing trust.

4. **Data doppelganger:** Several public sector innovation and R&D labs are partnering to synthesize data at scale rather than simply consolidating federated data. The ability to synthesize any dataset enables cross-data sharing services across both public and private sectors in a safe and secure way. The application of AI to generate synthetic data across Swedish and UK governments proves that open data experiments are possible at speed, without the security risk presented by real data.

Priscilla Li,
Expert in Residence,
UK

Nancy Manchanda,
Expert in Residence,
India

The Team
is the Canvas

As social human beings, we adapt our interactions and collaborations quickly to our circumstances. Creating together is an essential part of who we are and what we do, day in day out, and no crisis can stop that.

That applies even more to the public sector; although current governmental bodies often frown upon such "new work" models. Public services are for everyone, with inclusion and completeness of services as very important drivers. Public services are evolving into a composition of interactions between the citizen, business, and IT, who meet under the auspices of a collaborative spirit and mutual education. In a virtual or hybrid society, citizens, IT, and business use a virtual canvas, carefully selected to reach our goals, and work together. Highly integrated for a flow of ideas turning into tangible value, and encouraging creativity, connection, and inclusiveness, even when we are worlds apart.

Judith Kennes
Expert in Residence, Netherlands

DEON for a governmental workshop

Western European Central Government

The Storm: The central government task force wanted to host a workshop in which all ministries would participate and brainstorm. The format should be collaborative, with a key criterion being working on a shared platform in real time.

The Wave: Capgemini applied the collaborative platform of DEON, a visual collaboration platform, integrating all file formats in one canvas and allowing for a real-time editing of the space for over 30 participants from all ministerial departments.

The Surf: The application of visual collaboration tools enabled participants from different ministries to work on documents simultaneously in real time, storing their data safely on premises. The digitization of the process made follow-up actions easy and instinctive.

India launches 3D product design software for students

Ministry of Education (India)

The Storm: 3D printing has become an integral part of 21st century innovation, so it's important to think about new types of collaborative opportunities where designers can work together to share ideas and specifications, and review each other's designs.

The Wave: CollabCAD is a collaborative, network and desktop CAD software system that provides a total solution for 3D product part design, 2D drawing and CAD data import and export.

The Surf: Interactions are greatly improved and the time frame for decisions is reduced. Collaboration facilitates rapid product visualization and dramatically reduces time. CollabCAD will help students from over 140 schools across the country, along with schools in the Middle East who can access it.

Fluid
Workforce

A fluid workforce is not something most people would expect from the public sector, which is known for clear, hierarchical and long-term organization. But the need to get things done faster and the nature of the challenges have also shaken the fixed organizational setups of government agencies, and have let a number of fluid elements in!

The demographic challenge forces the public sector to look at intellectual capital as an asset that requires diversification, risk appetite, and ambitions. The "next normal" has added new dimensions to the complexity of choices to be made. While the backbone of civil servants by definition is less fluid, it should at least flow more freely between departments.

The need of government agencies to renew their workforce – tapping into the capabilities required to provide innovative services - is new and still feels strange but is a necessary step. Previously the only flexibility was sought - and not always found - through mega outsourcing deals. New ways of mission-oriented private sector collaboration are developing and are complemented by citizen crowdsourcing, innovation labs outside the agency organization and collaboration models with "GovTech" parties.

Cinzia Giulietti
Expert in Residence, Italy

HMRC rapidly develops digital service to support employers

HM Revenue and Customs, UK

The Storm: Due to COVID-19, HMRC had to work quickly to implement a solution that would allow employers across the country to furlough employees instead of separating themselves from them.

The Wave: Working together with agile and DevOps approaches, a digital service to support the Coronavirus Job Retention Scheme (CJRS) had to be developed in a very short timeframe. The solution provided a new digital service based on a microservice architecture on the digital platform, hosted in the cloud. The system collected information from employers and routed it to a risk and compliance process.

The Surf: While such an operation usually takes one year, the digital service was produced within four weeks. By the end of 2020, CJRS had assisted over 1.2 million employers and 9.9 million jobs, paid out claims worth over 46.4-billion GBP and processed over 4.5 million claims from employers.

Shared service of hospitals

Canton of Vaud (Switzerland)

The Storm: To enable a resilient digitalization in hospitals, FHV Informatique chose a new IT tool to facilitate access to information, promoting collaboration between the responsible institutions with decentralized structures through the development of a new digital workplace.

The Wave: FHVI identified potential areas for improvement and evaluated them against 140 criteria. The Jalios solution applied a rich feature set, the ergonomics of its "out-of-the-box" implementation, scalability, and the comfortable publication and management of multi-site content and resources.

The Surf: As a result, 8,895 employees have simplified access to valuable information. While each institution gained autonomy in terms of managing its content and resources, sharing and collaboration on cross-cutting projects were stimulated.

New Chain
on the Block

Blockchain has a revolutionary potential for governments, especially those that are federal and not centralized. Its promise of making decentralization work more effective is inspiring local government leaderships around the world.

After the hype, we are now taking steps from technical insights, proofs of concept and prototyping towards the delivery of business benefits with real solutions. While blockchain technology in general is still emerging, some – with more every day – solutions have already proven themselves and gained maturity, closing gaps and making things digitally possible. Despite the hype, blockchain is only one technology option and needs realistic views on what can be done and what not. So, experience and qualification are needed.

Countries, including Germany and the US lead with national blockchain strategies and action plans, bringing forth trustful digital identities, secure digital proofs, multi-party cross-agency collaboration, stable digital currencies, ways to manage energy consumption, and much more. It's time to surf into a new digital future of the public sector – ride the blockchain wave!

Jakob Boos
Expert in Residence, Germany

Whiteflag – Using blockchain to save lives

The Dutch Ministry of Defense

The Storm: Saving lives in disaster and conflict zones around the globe requires any potential lack of communication and information to be prevented. To achieve this, a trusting environment should be created for all parties involved in a conflict.

The Wave: Whiteflag is a decentralized protocol that enables a trusted messaging network for disaster and conflict zones by providing both fighting and neutral parties a reliable way to digitally communicate predefined signs and signals using blockchain technology: the blockchain secures the messages, protecting these from manipulation and recording the history of events as proof.

The Surf: Whiteflag increases visibility in conflicts and enhances the reliability of the information, which helps to avoid conflicts, while standard channels fail to meet all requirements of privacy and neutrality. The created transparency is beneficial in case of litigation.

Emissions trading registry with distributed ledger technology

The German Federal Environmental Agency

The Storm: To combat global warming, an emission trading system is needed. The deployment of distributed ledger technology (DLT) is still in its early stages, hence, scalability, performance, and security, and energy consumption are required for the trading platform.

The Wave: Based on the attributes of emissions trading, a draft for a DLT-based emissions trading register was developed, based on which requirements such as usability, performance, interoperability, and sustainability were evaluated.

The Surf: As a specific type of DLT, blockchain technology can increase the decentralization and transparency of climate action. DLT is therefore useful for the implementation of the Paris Climate Agreement since this technology makes the implementation of the decentralized approach to climate change effective.

Use the 5G Force, Luke

Today, more than ever, our society depends on fast, efficient, and data-fueled emergency response. If equipped with cutting-edge tools and technology, emergency medical services can operate swiftly and improve outcomes in life-critical situations.

The advances promised by 5G could enhance assistance by enabling faster data transfer and addressing challenges associated with dated systems: immediately accessible medical records, real-time sharing of information ahead of arrival. This could improve triage and ensure that those correct treatments are available at transfer.

Alongside the advances of faster data transfer, the possibility of using smart, data-driven algorithms in healthcare is increasing. 5G will make it much easier to use AI software to analyze real-time patient data. Analyzing medical images is a daunting task due to high volumes of data. AI can extract more information from images with reliability and accuracy and identify features that are not easily detectable to the human eye. With health services under unprecedented pressure, 5G and AI allow health workers to do their job even more effectively.

And 5G will not stop here; it will provide value to every aspect of public life.

Antoine Mercier
Expert in Residence, France

Shaping the 5G network strategy for public safety

Network operator for public safety

The Storm: The mobile network operator wanted to optimize its paging and dispatching network for all emergency and security services.

The Wave: To deploy the migration of users from its current network to a new hardened 4G/5G network in conformity with European initiatives and 3GPP/PPDR standards, the organization and Capgemini developed the strategy to leverage wholesale, MVNO, core and service network evolutions, IoT, and multi-access edge computing.

The Surf: The project strives to create a detailed business and financial plan for the next five years, with a detailed technical LTE/5G network architecture using RAN sharing configuration. The new target operational model will assess staffing needs and a concrete investment plan.

UK's first remote ultrasound over a public 5G network

NHS Birmingham (United Kingdom)

The Storm: Ultrasound examination is the second most common diagnostic test provided by the NHS. The technology is expected to speed up diagnosis in cases where time matters.

The Wave: The South Central Ambulance NHS Foundation Trust implemented a 5G-connected diagnostic ambulance. The technology facilitates the remote assessment and diagnosis of patients by instructing the paramedic to look in a certain direction or transferring control signals over the 5G live network to a "haptic" glove worn by the medical assistant.

The Surf: The remote diagnosis represents an opportunity to determine a suitable care pathway without necessarily having to see a physician in the hospital. It also decreases the number of potential outpatients, as well as ambulance and A&E department visits.

Creative
Machine

For most of us, artificial intelligence (AI) is still mainly associated with hard mathematical optimizations and less with the artistic act of creation. However, lately, this aspect is getting more and more traction.

We have come a long way from style transfer and caption generation. AI can now generate images from text descriptions, full articles from text prompts, paint pictures, compose music, and even develop source code, allowing us to support or even automate a whole new set of tasks.

First application examples of generative adversarial network (GAN) methods in the public sector are starting to appear, with healthcare at the forefront of these efforts.

All this new potential should come – by default – with a strong ethics-inside chip, to build trust and avoid its demonization. Once this is secured, imagine all the potential of an AI system that merges data creation with intelligence creation, paving the way towards tailormade insights – for job matching, education, or city experiences. Wait for it: AI is getting inspired!

Daniel Kühlwein
Expert in Residence, Germany

Using GAN to synthetize patient data and mitigate compliance risk

Försäkringskassan (Sweden)

The Storm: The organization could not use its data due to privacy and compliance risks. Therefore, a GDPR-compliant solution was needed to handle patient data. Yet, data scarcity was a problem in terms of applying AI.

The Wave: Using Sogeti's ADA solution, a combination of deep learning methods, a sample of the real data is fed into the model and the output of the model is a generated synthetic dataset that is very similar to the original data in terms of statistical similarity and distribution.

The Surf: The organization is now able to generate enough production data for testing and accelerate QA. Medical data is generated, which can then be used to leverage insights on patient situations, while GDPR compliance is secured with sensitive patient data being synthesized.

GAN-based detection of M. Tuberculosis pathogens

Various researchers

The Storm: The early detection of diseases, such as Mycobacterium (M.) Tuberculosis, increases the chances for successful treatment. AI and computer vision can significantly help to speed up the diagnosis and reduce response time. However, with little labeled image data available, the manual labeling of images required for the creation of training data for AI models was time-consuming.

The Wave: In combination with advanced computer vision, Generative Adversarial Network (GAN) analysis was used to gather labeled training data for recognizing objects with minimal effort in a short time. The focus was on responsive alerting to address threats through the use of low resources and offline mobile computing applications. The performance score of these models ranges for M. Tuberculosis from 0.84 – 0.93.

The Surf: With the use of GAN, open-source data can be made more adaptive and robust, saving thousands of man-hours that can be used for fine-grained diagnostics.

BALANCE
BY DESIGN

TechnoVision's aim is to help you build and develop your Technology Business. To provide the rich technology construction materials to do just this, the first six TechnoVision containers provide a logical display into the art and science of the possible. But how do we do it? What are the guidelines that need to be observed? What are the principles every Technology Business should know and respect? Balance by Design offers principles to consider, simply, methodically. While the trends make up a full technology menu, the principles make up the recipe to leverage the trends.

Read TechnoVision Change Making for a complete overview of this technology-business container.

Balance by Design
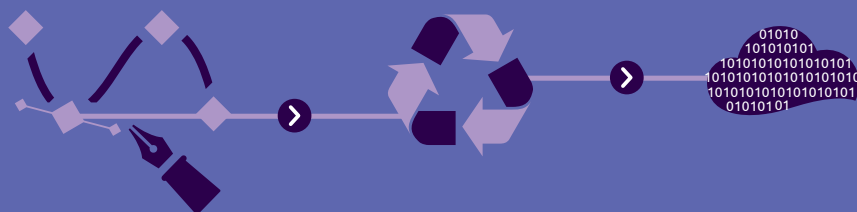
TechnoVision's aim for the public sector is to help governments harness technology capabilities and innovations for the benefit of society, and delivering more valuable and effective public services to their citizens. To provide you with the rich technology capabilities tapestry to draw from, the first six TechnoVision containers brought to life the major technology building blocks. But how do we stitch it all together? How can we observe the guidelines and principles that every Technology Business leader should respect? Here, in Balance by Design, we will consider these questions and potential answers. What are the guidelines that need to be observed? What are the principles every Technology Business leader should know and respect? To help you approach these questions, this seventh container – Balance by Design – offers principles to consider, simply, methodically. While the trends make up a full technology ingredient list, these principles make up the recipe that leverage the trends to design a balanced capability that systematically orchestrates the technology underpinnings to deliver better service to citizens.

Key principles for the public sector:

- The Balance by Design principles for successful technology adoption are slightly different for the public sector because of the difference in what "success" means in a public sector organization. For a private business, success is typically defined in terms of gaining market share, increasing profits, lowering costs, and improving customer satisfaction and retention. In the public sector however, the emphasis is on driving greater societal good, improving inclusive coverage of service, simpler citizen experience, and ultimately, driving the success of public policy.

- Another important aspect is a greater emphasis on trust. Building the trust of citizens in organizations and the state in general provides stability where things are unstable. Trust gives the foundation for flexibility and agility, strengthens the production of knowledge in society and therefore paves the way for successful innovations and keeps the balance between change and stability. Balance through the adaption of customer and citizen values and users' cultural perspectives is the key to disrupt current methods,

technologies, and approaches. As its name "Balance by Design" indicates, there is a great need to strike a balance between time of disruption and discontinuity on the one hand and stability and continuity on the other – and governments and their administrations are one special key to assist us in keeping our cultural values, yet finding a new footing.

- Some guiding principles deserve special attention amid this balancing act. **Adapt first** motivates us to think about inclusion right from the start. Being prepared **with open arms** is necessary for a sustainable and inclusive environment, where various stakeholder parties feel invited to work in concert. **IQ EQ CQ UP** reminds us of key considerations around intelligence, creativity, and human-centricity. The **thrust of trust** must be found, with trust under attack as data is pivotal to the technology-driven society. So, **technology and business** becoming one really needs to be a fact, rather than a new trend. Finally, **no hands on deck** suggests a careful approach to AI and automation, with administrations making far-reaching decisions on societal questions and humans involved.

Jens Fromm,
Expert in Residence,
Germany

Sandeep Kumar,
Expert in Residence,
UK

Adapt
First

The public sector never easily embraced change, but now it must. The speed of change continues to increase; demographic changes, climate actions, and the recent pandemic were just a few symptoms of this continuous change we are observing. In such a world, the public sector must be resilient for the sake of its society, which means first and foremost, adaptable. Building agility is therefore one of the most important demands for making one's own organization fit for the future. This also applies to those agencies that still feel that they are not directly affected, as the sustainability transformation will catch up with everyone.

The entire Technology Business landscape must be designed for speed, even more in the public sector, with an ode to iteration and resilience. Processes must be questioned again and again, and continuously adapted. Shorter and more flexible planning cycles are needed to be able to react to changes at short notice. Existing obstacles must be removed or circumvented. It's all part of becoming "like water."

Thomas Heimann
Expert in Residence, GErmany

Bringing iteration and agility with SAFe & DevOps to the French Army

French Defense Procurement Agency (DGA)

The Storm: The French Army is engaged in securing and upgrading its military intranet, managing the effective exploitation and processing of its data.

The Wave: Alongside a consortium of partners, the French Defense Procurement Agency launched ARTEMIS, a partnership agreement to provide a big data platform. In this context, Capgemini supported the agency with the SAFe® model implementation to infuse agile principles throughout the project's delivery.

The Surf: Via the implementation of a scaled agile framework, collaborative work was strengthened with related architectural projects to enhance coherence with the global strategy. The silo effect could be reduced, and organizational or technical difficulties were identified.

Preparing teachers for the transformation towards hybrid learning

Ministry of Education, Culture, Research & Technology in Indonesia

The Storm: It's not just the pandemic that has highlighted the need for digital classrooms and remote teaching. Generally, a transformation towards hybrid education is taking place. Yet, as teachers are the main driver, digital literacy plays a key role.

The Wave: Together with Microsoft, the Indonesian Ministry of Education, Culture, Research, and Technology organizes "The 21st Century Digital Skills Training," a free program for teachers throughout the country to improve their digital skills.

The Surf: The program facilitates the teaching experience not only for teachers but also for students, promoting inclusivity and flexibility. It empowers teachers in expanding their IT expertise to be well prepared for the future of learning. The goal is to empower over 24-million Indonesians through the skills programs by the end of 2021.

With
Open Arms

The public sector is one of the few ecosystems in which monolithic systems still live. While these closed and immutable systems may do the job that they were designed to do, they struggle to keep up with change, which takes too long, is expensive to build, and even more expensive to maintain.

In a rapidly changing, complex, connected world, even the leading technology organizations in the world do not do it all alone; they form partnerships and shape ecosystems. If they cannot make it on their own - despite their huge technical and financial resources - then the public sector must embrace openness where it has not already done so. Luckily, the Open Government has done just that over the last two decades – creating opportunities for agile and open ecosystems that thrive on state-of-the-art technologies and open platforms as powerful vehicles to communicate and empower citizens.

At all levels of government, technology shows itself as committed to helping the public sector advance sustainable development worldwide and improve its strength and posture, digitally and socially.

Jessie Hernandez
Expert in Residence, US

Building an open data platform for European cities

European Commission (EU)

The Storm: Brought to life by the European Commission, the Intelligent Cities Challenge (ICC) strives to bring together 136 cities in their respective processes to shape their smart territories with the help of technology. The focus on shared priorities such as sustainability, social inclusion, and intelligent planning is thought to open the floor to collaboration.

The Wave: The ICC set up its challenge as an ode to openness, with regular networking opportunities, an ICC City Lab, and access to training or common online toolboxes. Furthermore, an open data platform linking city labs was created while cities have access to a Tech4Good marketplace, a showcase of technical solution offered catalog-style.

The Surf: Through the ICC's set up, cities stay up to date with fresh policy inspiration and sources of funding. They address global challenges globally and benefit from a federated constellation of similar projects.

Life SG – An app built with open culture

GovTech Singapore

The Storm: In 2018, Singapore launched the Moments of Life app to help new parents to quickly go through the registration processes for their newborn children – this example formed the ambition for one app to cover all digital services dealing with key occurrences in a citizen's life.

The Wave: LifeSG was created to accompany citizens throughout their lives – accessible, simple, and covering 40 government services. The use of open data was a key focus to enhance the various processes involved.

The Surf: By embracing an open platform, LifeSG resulted in time and cost reductions for maintenance. With all services within one app, the citizen experience was greatly improved, with the birth registration to baby bonus application process lasting just 15 minutes, instead of 60.

Technology ⋺ Business

Every public sector organization needs to be a "Technology Business"; the COVID-19 pandemic has clearly shown that. By increasing the use of technology, public sector organizations were able to maintain their services or even deliver more valuable and effective services to their citizens.

Today, a state-of-the-art public sector organization does not separate policymaking, implementing, operating, and related technologies. The previously meticulously established and maintained siloes set up between the business of a public sector organization and the relevant IT organization have been removed.

In a Technology Business, public sector teams work jointly on citizen-centric products – rather than on projects – with a potentially indefinite lifecycle, guided by shared budgets and objectives. The skillsets of the team members may differ, but they will certainly overlap more over time, as a successful unity tends to do. The next stage of this integration must be to consider how policies will be implemented digitally from the beginning of the legislative process.

Michael Stoelinga
Expert in Residence, Netherland

Live healthcare digital platform bringing together regional professionals around data

Aquitaine region (France)

The Storm: Public healthcare wanted to develop an adaptable and multidisciplinary approach to treat patients with chronic diseases. The Ministry for Health launched a pilot program in 2015, called "Territoires de Soins Numérique" (Local Digital Health), to better manage chronic diseases.

The Wave: Capgemini helped regions to build a platform called Digicare, aiming for patient support programs on specific pathologies and treatments.

Phase 1: Federated medical actions using digital channels

Phase 2: Collected data from the teaching hospitals to field healthcare professionals

Phase 3: Provided personalized expertise from AI-based data collected in the field.

The Surf: The project led to engaging 120,000 patients, 5,000 engaged healthcare professionals, and achieved a decrease of 20% in emergency room visits for patients enrolled in the program.

Digitized technical procedure for effective fisheries control

German Federal Office for Agriculture and Food (BLE)

The Storm: The lack of integration of landings, sea inspections, and visual reports from federal and state control units, as well as distributed data volumes, media disruption, and a lack of end-to-end checks made extensive automated plausibility checks within the framework of the mandatory EU Fisheries Control Regulation difficult.

The Wave: The new Fisheries Information System (FIT), a central data platform for seamless fisheries monitoring, enables the collection of data and makes it directly available to all relevant control units so that the data can be processed with more sophisticated plausibility checks.

The Surf: New technical standards, the early involvement of users in the implementation process to shape the design, and the transparent communication of the advantages of the platform eliminated previous data silos. Agile, interdisciplinary cooperation between the software provider Scopeland and the BLE experts displayed an effective fusion of technology and business.

IQ EQ
CQ up

As the volume, complexity, and velocity of data continue to increase, AI's capacity to build an organization's IQ and EQ through enhanced data capture, as well as its ability to mimic human action and decision making, will become increasingly valued in solving global challenges.

For example, an important indicator of EQ is the ability to accurately interpret others' emotions. Better than many humans, AI's carefully trained neural networks can help to accurately process human emotions through language and facial recognition and turn them into data. The enrichment of data and derived insights ensuing from the embedding of EQ into AI, is aiding the public sector in governing its people in a data-driven, yet ethical, manner.

What's more, allowing AI to handle the bulk of arduous tasks grants the workforce increased bandwidth to focus both on the details that require human interaction, as well as the creative brainstorming of new solutions (its creativity quotient), hence IQ EQ CQ up.

Melissa Hatton
Expert in Residence, US

Social media analytics in the context of the Ivorian election

Ivory Coast

The Storm: Viral dissemination of fake news on social networks is the most dangerous spread of disinformation as it can erode trust in government and have major political effects, such as riots at the US Capitol following the 2021 presidential election and during the 2010 elections in Bloom, Ivory Coast.

The Wave: The key to combating disinformation is to identify and dismantle it before it goes viral. Bloom's solution did just this by applying two innovation pillars using AI: semantic and social inference. Firstly, semantic inference helped to understand relationships between words to identify and characterize communities. Secondly, social inference identified the relationships between parties and analyzes communities.

The Surf: Using semantic and social inference, social data was turned into smart data to successfully identify fake news in advance of it going viral during the 2020 Ivorian election campaign. This solution is scalable to mitigate viral disinformation and the emergence of riots worldwide.

UK government using emotion detecting AI for digital content

UK government

The Storm: With approximately 60% of the globe active online, there is no simple "one size fits all" approach to online content. The human experience and response to social media and the news is very fragmented, resulting in citizen dissatisfaction and even distrust when universal content and policies are pushed to the public.

The Wave: The UK government decided to apply the solution of FlyingBinary, which uses AI to understand and recognize 20 human emotions with resonance to five human responses to online content. Building on billions of data points, the solution classified emotions, such as anger or shock, and detected patterns of each emotional response to online content.

The Surf: The AI solution continues to help organizations understand the online audience before content is published and is being deployed as part of a G-Cloud 10 service built for the UK government. While being GPDR (EU law on data protection and privacy) compliant, the solution further helps to create policy changes that address citizens' current feelings on certain subjects.

Trust
Thrust

If the pre-pandemic conventional wisdom for trust was "slow to earn, quick to lose", the current play or post-pandemic wisdom needs to be different. Use the best technology armory at your disposal to build or rebuild trust much faster. We should ask ourselves: how long can we tolerate a lack of trust – in ourselves, in our organization, in our systems of government? Public sector organizations have no choice but to put the quest for trust at the core of their operations.

First, they need to ensure reliability and security, at a time when cybercrime has never been this high. Armies, cities or hospitals need a resilient infrastructure in order to host sensible data and leverage innovative technologies.

Secondly, trust is built through transparency, with an ethical use of technology, especially when with paradigm-shifting technologies such as AI, where decision-making processes and skillsets are impacted. Show what you do and justify why you did if needed!

Thirdly, give your citizens control of their destiny, and the use of their data, with a cockpit in which they can decide what to share.

Finally, trust comes from understanding, translating technology to business and business to technology. So boost up and reskill along technology dynamics. Citizens and government employees that understand technologies, will trust them more.

Charlotte Wojcik
Expert in Residence, France

A cybersecurity experience center to train against cyberattacks

Capgemini solution, involving Europol partnership

The Storm: Digital transformation exposes organizations to digital risks, testing their resilience capabilities. As such, this requires the right technologies and capabilities to detect significant cybersecurity incidents and respond to them.

The Wave: Capgemini's Cybersecurity Experience Center offers on-site and remote cybersecurity incident simulations in various settings. With the establishment of a "Cyber Range," the Center provides a multi-range and multi-user simulating physical infrastructure in a virtual environment, providing a SOC, an OT/Scada control room and a boardroom for the executive level.

The Surf: The tailormade training scenarios prepare C-level executives and security professionals to tackle cyberattacks before they have a real impact on the organization's core business, therefore incoming threats can be mitigated.

Protecting the city that never sleeps from cyber threats

New York City Cyber Command (NYC3)

The Storm: The New York City Cyber Command (NYC3) was established in 2017 to protect the city from cyber threats. New York City is responsible for more than one-million systems that deliver critical services, yet cyberattacks are a growing concern.

The Wave: In order to support its cloud operations, the NYC3 adopted Google's Site Reliability Engineering (SRE) model, providing a data pipline with risk alerts, visualization, and analytics to the Cyber Command Staff.

The Surf: The platform ensures that the government agency delivers cybersecurity data and services to more than 100 city agencies immediately and without interruption. NYC3 is the first Google Cloud customer in the public sector creating its own formal SRE team, keeping security systems available 24/7 for the city that never sleeps.

No Hands
on Deck

Self-adapt: from automation to autonomy in control, public sector organizations currently face enormous challenges and those organizations that have embraced intelligent automation are delivering efficient, adaptable, and responsive ("water-like") services.

While making sure that humans are involved to monitor and discover unexpected frictions – always staying in the deciding seat – a well-balanced automation mix augmented by AI intelligence is a treasure for constantly improving the end-to-end service offered to the citizen.

For all trivial processes, self-driven processes will change the public servant's life for the better, while citizens will be thrilled to discover the pleasures of a seamless once-only-principle and interoperability. In paper-heavy, interactive processes, the human is still the one who gives the direction. But there is nothing bad about going with the flow, drifting along where simple requests can be decided based on clear criteria. All in a heartbeat.

in

Pritam Poojari
Expert in Residence, UK

AcUIty unemployment insurance solution

Unemployment insurance agencies (US)

The Storm: Workforce agencies need solutions that enable them to provide timely and accurate payments, prevent fraud, and allow access to the system from any device, anytime, anywhere.

The Wave: AcUIty is a modern unemployment insurance (UI) solution designed to support state-level UI benefits and manage and address complex financial, eligibility, and claims-management requirements. The solution is differentiated by automated intelligent business-process workflow and a configurable architecture.

The Surf: Automated processing of claims, online edits, workflow, and case management bring business efficiencies and opportunities for ROI. Automated routing of tasks reduces cycle time and well-defined business processes ensure faster deployment and better integration with federal systems and fraud prevention. One workforce, AcUIty, realized a 1.5-million USD reduction in annual operating costs, while increasing free time for the staff by 20%.

Fast and seamless passenger flow at Changi Airport

Changi Airport (Singapore)

The Storm: Already recognized as at the forefront of tech savviness, Changi Airport set the ambition to improve the passenger experience while keeping security standards high. Terrorism and criminal activity were imminent threats to maintain as focus.

The Wave: The FAST (Fast and Seamless Travel) solution for a secure and seamless passenger flow involves a biometric capture of passengers to facilitate automated bag drop, automated immigration and boarding gates, and a passenger process facilitation platform that links the various airport and airlines' systems.

The Surf: The project helped Changi Airport to increase passenger satisfaction as the benefits included faster processing and combining separate touchpoints into one solution. Automated systems reduced language barriers and the need to provide multiple documents at multiple checkpoints so travelers could arrive closer to flight time.

What's our Story

Governments are accountable for their actions, in parliaments and the public opinion, especially before elections. It is therefore crucial that they explain what they do and why. Only when citizens understand, can they accept and support your policy. But in the same logic, as organizations designing technology, we have a responsibility to create more inclusive and sustainable futures. And while we build our tech-fueled products and services inclusive by design and free of discrimination, being inclusive in our workforces, cultures, and practices, is now more important than ever too.

At the crossroads between societal purposes, political stakes, and cultural specificity, technology is key. Our greatest minds deliver technology that is disruptive and omnipresent, building bridges and creating breakthroughs towards progress. So how do we make these tools as effective as the memory and voice of those who guaranteed progress? How do we move from a monolog to a dialog? And how do we weave in the organization's purpose into a never-ending story that keeps changing and flowing? Answering these questions will be key to meaningful organizational success. Start and maintain a dialog with your people!

Shobha Meera
Expert in Residence, India

Enabling a better treatment of our forests with data

European Space Agency

The Storm: The quest towards sustainability needs collaboration and completeness of insights, which is often a challenge for individual organizations to tackle. Furthermore, access to accurate data is a crucial element in tackling environmental challenges, such as earth observation.

The Wave: Capgemini supports the ESA in building its MAAP platform, a multi-mission algorithm and analysis platform with the aim to measure forest biomass from space. The interoperable platform between ESA and NASA leverages open source and open data, providing datasets to Earth observation missions that are monitoring forests.

The Surf: By creating synergies between organizations, the platform fosters collaboration between ESA and scientific actors, leading to more comprehensive and meaningful actions. The fast access to accurate data will make it possible to refine more accurate forest mapping around the world, helping make crucial decisions about how we need to change the way we manage forests.

#WirVsVirus – 28-thousand person hackathon to tackle the virus

Federal government of Germany and various initiatives

The Storm: The COVID-19 pandemic is a global crisis that hit all areas of social and economic life, including health, education, and employment, and is continuing to spread around the world. The challenge is to address this crisis and stop the global spread.

The Wave: In March 2021, around 28-thousand people took part in the German We vs. Virus hackathon. The purpose of this event was to find smart, digital solutions in the global fight against COVID-19 within 48 hours.

The Surf: The hackathon was seen as a starting point for collaborations to solve long-term challenges facing society, since the ideas from civil society unfold the greatest possible benefits for citizens. The program enabled rapid testing and user-centered development. Out of 1,500 proposals for fighting the pandemic, 20 applications were chosen for funding, including an online platform for using 3D printers, as well as websites to coordinate logistics and find job offers for citizens who cannot report to work.

Applying the **TechnoVision Playbook** for Public Services

There are many ways to apply TechnoVision, such as brainstorming entirely new ideas, systematically crosschecking an architecture, designing or inventing an innovation potential, using it as a playful dialog tool between all involved in Technology Business change, or just trusting good old serendipity to find an unexpected angle when tackling a tough challenge.

TechnoVision is a tool to tell a Technology Business story; a story that shapes an opportunity, answers a question, gives direction, resolves an issue, or simply delights an audience. It is always a story to be told between people, from both the business and IT sides of an organization. Choosing the right trends – studying them, interpreting them, discussing them – is already part of the storytelling.

To assist in developing this story, each of the seven containers and the 37 trends have been turned into colorful, real-life cardboard boxes (you can print them yourselves; the design is openly available here), each box contains a short elevator pitch of a trend and with a QR code for more detailed content. These boxes can be picked up, carried away to be studied, and discussed with others. Together, they can tell a technology-enabled customer story, a day in the life of a citizen, a breakthrough in a process, or a new public service.

We also created a TechnoVision card deck, and you may find that your favorite TechnoVision expert happens to have it with her. You can simply pick a card. Any card. No matter which of the 37 TechnoVision trends you get, you're guaranteed to have a new perspective on the challenge or opportunity at hand. It's the magic of being playful with technology.

As a rule of thumb, we prefer to apply TechnoVision in a lively workshop setting. Usually taking place in one of our innovation and transformation environments such as one of our Applied Innovation Exchange (AIE), or our Accelerated Solution Environment (ASE). However, as the COVID-19 pandemic shaped the world, so it has shaped our approach to applying TechnoVision, requiring us to think differently, and

all the while working from home and in our main TechnoVision 2021 Edition we detailed eight ways to apply TechnoVision:

- TechnoVision Theater (with boxes)-Page 73
- Business Model Canvassing (with boxes)-Page 74
- Repositioning-Page 75
- Digital Picture-Page 76
- Storytelling-Page 77
- Grab a Box (with boxes)-Page 78
- Applying TechnoVision Virtually-Page 79
- TweetMyArchitecture.-Page 80

In addition, and specifically tailored towards the public sector, we have added three top use cases for applying TechnoVision:

- **Use case 1:** Guiding compass through your technology-driven transformation
- **Use case 2:** Business and technology connector – create your Agora
- **Use case 3:** Enabler and driver for your internal training program

Frank Schlosser,
Expert in Residence, Germany

Aghogho Akponah,
Expert in Residence, UK

Use Case 1: Guiding Compass through your technology-driven transformation

Who is it for?
Business and technology leaders, who have basic knowledge about technological trends, and want to leverage these trends to apply them to their technology-driven transformation (or if they prefer: "Digital Transformation") activities.

Preparation
Before starting the workshop build up the TechnoVision 'wall' with boxes, positioning the container areas and trend boxes in the right sequence. This is useful to explain the TechnoVision framework. Document the workshop activities with photos, so make sure to have a person assigned to this task.

Create a template for a technology-driven transformation Journey, which becomes the key artifact along the workshop. The template should be printed on a plot large enough to gather both the "As-Is" state and the "To-Be" state of each container and trend and has room for prioritizing activities to reach the target state.

Introducing the workshop
Start the workshop with an introduction on the TechnoVision framework. In addition, make sure to share information on the latest digital trends in Public Sector with a focus on your agency, country and/or region. Let attendees study the context by themselves and, where necessary, provide additional information on the trends. In addition, introduce the objective of the workshop: formulate your high-level action plan for your technology-driven transformation journey.

The format
Let attendees decide which trend boxes is their favorite or in which they have the most knowledge in. Ideally, place the trend boxes in different areas across the room. In virtual environments an easy vote will be sufficient. Participants who chose the same box will form a group. Make sure that the groups are balanced regarding the number of members. The workshop consists of three iterations:
- Assessment of the current state of your organization/agency within the trend box
- Description of your technology-driven transformation vision
- Derive prioritized activities to reach your transformation vision

All three iterations should be time-boxed to 45 minutes. After that, there will be a 5-10 minutes report-out on the iteration of each group.

Iteration 1 – Assessment of the current state of your organization

Use the first 10 minutes to create a common understanding on the trend box. As soon as everyone is on the same page, jot down questions that allow you to evaluate the current state of your organization, using post-its. As an example, think about the following:
- What activities are we currently performing to leverage this technology?
- Do we have plans to extend the features of our products with this technology?
- Why don´t we use this technology to create new opportunities?
- Are there legacy systems within the organisation that could impact adoption of the technology?
- Are there existing cost challenges that could mean the technology is not a fit for budget?
- Do we foresee employee/citizens adoption to this technology being an issue?

The second step shouldn't take more than 10 minutes either. Take another five minutes to put the Post-It´s on a wall and read out loud your question so everybody understands it. In case of duplicates or similar questions, group them together. Use 15 minutes to answer the questions individually. After that, use the remaining 10 minutes to discuss the answers and group them together.

Iteration 2 – Description of your agency´s technology-driven transformation vision

We want to design our technology business vision in the field of the trend box we choose. What should our organization have accomplished two years from now? How do the achievements benefit citizens, employees, companies, other agencies/ authorities?

We answer these questions by formulating a newspaper article that will be published two years from now. The article is a press release on our accomplishments within the field of the chosen trend box. It should contain a description of the accomplishment, its benefits and feature some quotes of various stakeholders, such as employees, citizens, magazines, etc.

All needs to fit on one page. So, keep it short and precise. Take 45 minutes to write the article and five minutes to present it to the audience.

Iteration 3 – *Derive prioritized activities to reach your transformation vision*

For Iteration 3 we use to methods to derive activities that help the organization/ authority to reach their transformation vision. To come up with activities/ solutions we us "Crazy 8".

Each participant takes a sheet of paper, folds it three times in the middle and unfolds it again to have eight equal rectangles on it. In addition, pens are needed to draw solutions. The goal of "Crazy 8" is to come up with eight activities/solutions that need to be done to reach the defined transformation vision. Therefore, we have eight minutes to individually draw eight solutions on the eight rectangles. Everyone should draw eight solutions/ activities. There won't be any additional time.

After the time has elapsed, transfer your eight solutions/ activities to Post-Its. Each member of the group now has approximately five minutes to present their activities and put them on the wall next to the Post-Its from Iteration 2. In case of duplicates, put them together in groups.

As soon as you finished "Crazy 8" the final activity will begin. Read through all the activities on the post-it's, clarify questions and make sure that everybody has the same understanding. Now, we use "Weighted-Shortest-Job-First (WSJF)" to prioritize the activities. This is done by evaluating the value of an activity over its size (e.g. complexity, duration

to complete, …). In order to evaluate the value and size of each activity/ solution we can use planning poker. Now, we calculate WSJF. Divide the value by the size. The bigger the result the higher is the priority. Repeat that for every activity/ solution. Order the Post-Its on the wall by the WSJF value.

Report Back
As a group take your findings with you and place them on the roadmap. Take ten minutes to prepare a short presentation to the audience. If time allows it, try to find synergies across the groups. Are there activities that can be grouped together? Can people from different domains work together to accelerate the transformation? Discuss the activities with the entire group.

Use the technology-driven transformation journey as a starting point. Try to distribute activities and repeat the workshop every year to measure progress and update the journey. The entire workshop can also be performed virtually, by means of a video conferencing – including breakout rooms – and an online collaboration tool.

Use Case 2: Business and Technology Connector – create your Agora

The Agora – the place where business and technology meet. It shows how business and technology people prepare themselves for fruitful exchanges on the Agora, how the results are captured and how these results lead to actions.

Today´s Business Technology requires relationships in which business and technology people must meet, understand each other, act in concert. Recognizing this, we propose to introduce an Agora, being informed by the Greek Agora. This is where citizens gathered, discussed, disputed, concluded, transacted. The new Agora is where business and technology people gather, discuss, dispute, conclude, transact. They define what needs to be done and distribute the work to the surrounding workplaces.

The modern Agora's workplaces manufacture processes, craft systems, build products and services. Our Agora is the Technology Business Agora. It is designed to make the meeting of business and technology minds happen. For this purpose, business and technology people must come to the Agora equipped with powerful tools, the tools of their trades.

Who is it for?
Business and technology leaders

Introduction & Preparation
Discussing "freely" on the Agora would not produce smart results. For a productive, targeted exchange, the participants need to prepare the tools of their respective trades.

The business people enter the Agora equipped with their business drivers. Not only do they know what they want to achieve, they also know how they want to achieve it.

The technology people enter the Agora equipped with technology trends. Not only do they know how technology works today, they also know how technology is evolving. The 7 containers and 37 trends build a clear landscape of technology and trace its expected evolution. To facilitate the Agora exchanges, the trends that are part of each relevant container are described in terms that make sense for everybody. To make things easier use our QR coded boxes or our handy TechnoVision card deck to aid the conversation.

The format
Now equipped, business and technology people will be ready to meet on the Agora. Each dialogue, between one business driver "representative" and one technology trend "representative" will generate specific Business Technology insights. The sum of these dialogues will be a full picture of business and technology. For successful dialogues on the Agora, identifying and describing an organization's business drivers is as challenging and important as identifying and describing the technology developments.

The Dialogue
When the representative of a business driver meets the representative of a technology trend, what do they discuss? Clearly not the weather. Clearly not generalities. The business side announces its needs: "If I truly want to fix our service issue, I need to equip our people in the field with mobile technology, some form of tablet computer. But we have a big security issue; we need to give them all the details on our products including the software that supports them! Without good security, no way can we do it."

The technology side advertises the capabilities of their trend: "With the recent developments in Invisible Infostructure, we can offer a security solution that will be wrapped around each of your downloads in the field. Here is how it works…"

And so, the dialogue continues, up to its conclusion. Business: "I do need your solution for my driver. When can we include it in our project?" Technology: "It will be our first implementation of this pretty new technology. Better to start with a pilot. Let's create a joint team and install this pilot in the next couple of months. Based on the learnings, we can expand it to your whole driver." And so, they agree on the right actions.

During this dialogue, two things happen:
• The Agora is where people understand each other. Drivers are defined concretely – there is no doubt as to what is needed. Technology, thanks to the crisp definitions and unambiguous language of the trends and containers, becomes meaningful.
• Business and technology are no longer separate fields. The business solution is technology-based, the technology finds its meaning in the business need.

The Full Picture
On the Agora, each business driver representative speaks with each technology trend representative. From their dialogues will emerge a complete picture of the relationships between drivers and trends.

Let's first summarize each conversation: Either the trend is a "must" for the business driver, or it is not. And the trend can be put to work now if the technology and the capability to use it are available, or only later.

Let's then build a matrix with the business drivers as rows and the trends as columns. The cells summarize the dialogues as indicated above. "M" will indicate the must correlation, and color dots will show the timing: green for right now, yellow within six months (for example), red for later.

The Journey
A full implementation of the Technology Business thinking will take time. The longer the journey, the earlier one should start – but how? The first step is to declare Technology Business to be the way the organization will look at the combination of business and technology.

The second step is to create the conditions favoring the dialogue, or rather the dialogues, between business and technology. Having an Agora is a must, building the institution will send a powerful signal. All the more so as the Agora, once built, once used, can and should be put to work multiple times: repeating the dialogue, but also changing the Agora topic – taking a functional view, on marketing and sales for example, or focusing on a broad, complex enterprise ambition like "Creating a new public sector experience."

The third step is to deal with the business drivers as the tools to manage the evolution of the business. By designing them together, business and technology people will not only identify dependencies on technology earlier, but also make the design of the driver project stronger thanks to technology opportunities.

If joint work has started at the design phase of the drivers, it will naturally continue in their implementation. "Joint ventures" – or agile teams – between business and technology will be seen as the best way to progress.

Reporting back: Building your own Agora
The Agora is a simple concept. Maybe deceptively simple: Building it, using it, taking full advantage of the matrices requires knowhow. Beyond the general concepts, five areas of experience are critical.

• The technology trends need to be understood in depth. Often, the critical element to the business is not the container in general, not even one of its trends, but only one component of that trend. Furthermore, the representatives of technology on the Agora must see the path between today – the state-of-the-art in the enterprise – and tomorrow – where technology will lead us in a couple of years.

• Business drivers are not a matter of course. For some executives, it is a natural way of thinking. For others, it requires inquiry and translation – a process that brings benefits in itself. Not only is the work on the drivers the occasion to clarify and streamline what the executives want to do, it is also a first opportunity to enrich the thinking: with memory banks of existing drivers, and with ideas and

references from other public services organizations, but also other sectors of industry.

• The Agora dialogues need facilitation. Business and technology representatives benefit from the support of a third party with previous experience, from questions putting a new light on their undertaking, and sometimes from a friendly arbitration.

• The TechnoVision matrix, produced on the Agora, is a picture in need of an interpretation. Experience helps draw the right conclusions. Comparisons with other matrices produces major additional insights.

• Insights will be of interest, but relevant only when translated into the right actions. This might well be the most critical step on the Agora, or after it. Some are obvious – for example the redeployment of resources across the technology trends. Others get to the heart of the organization: Doesn't the sum of the business drivers represent the future of the enterprise?

Use Case 3: Enabler and Driver for your Internal Training Program

Idea 1: Community of Practices

Who is it for?
Technology and Business Owners with interest in one or more TechnoVision trends and the specific intent they deliver as well as are known for their innovative mindset within the organization.

Preparation
The people come together in an informal meeting to discuss which community they want to create to fit in one or more trends. They should think of people within their units who share a common concern, a set of problems or an interest in a TechnoVision topic they want to gather people in a community to work on this. New communities should be advertised in a meeting during which key areas of work are presented to teams across the technology and business areas and active participation in that community is motivated. The Leads come up with elevator pitches for their community.

Introducing the workshop
The kickoff meeting is hold for new Communities during which the Leads introduce to key goals, benefits, and contents of the new community to their teams. The Elevator Pitch should help each to find a community which would interest them, by giving them the focus of the community and the concerns, problems or interests they want to work together and how it should improve the work within the agency/department. After the elevator pitch there is a brief Q&A slot, depending on group size, e.g., 10-15 minutes.

Within one week every employee can decide which communities he would like to join or giving ideas for new communities they would like to create. The community leads meet at the end of the voting period to decide which communities they want to move on with. As a best practice, it showed that there should be at least 5 people in each community, and not more than 1-2 new communities per year.

The format
Each community lead starts with setting up the official kickoff meeting to discuss the settings of the community. There can be different formats, e.g.:
- Problem solving workshops,
- Discussion boards,
- Impulse lecture,
- and others.

Very importantly, it must be clear right from the beginning how the community work may and will benefit the development of the agency/department. The community's work is fully self-organized.

Reporting back
The results of a community meeting should be made available on a platform to all teams. The Community leads meet regularly to align and discuss the progress of the communities. Key results and achievements should be shown to relevant stakeholders across the agency via intranet, digital newsletters, leadership meetings, etc.

Idea 2: Find the Training

Who is it for?
Technology and Business Owners who want to expand their business technology knowledge. Human Resource Department, as well as one or two connoisseurs of TechnoVision.

Preparation
Before starting the workshop build up the TechnoVision 'wall' with boxes, positioning the boxes in the right sequence. This is useful to explain the TechnoVision framework.

Documenting all the results is a must, so make sure to have a person assigned to this task.

Create a template for personas to empower the attendees during the workshop.

Introducing the Workshop
Start the workshop with an introduction on the TechnoVision framework. Rely on them to study the context by themselves and provide additional information where necessary to enable thorough understanding of the trends.

The Format
Let attendees vote for the trends they find the most interesting in getting more knowledge or providing them the most insight. Each attendee has a maximum of 3 votes. Rank the trends based on the number of votes, respectively. Trends with no votes are sorted out.

Build groups of 3-5 people. The attendees can decide for a trend by standing next to it. If there are more than 5 people for a trend, they can be asked to create a new group for the same trend or chose another trend.

During the group sessions the connoisseurs of TechnoVision go around to facilitate discussion and answer questions on TechnoVision.

The groups first work on creating 2-3 personas for people attending training programs. The goal is that the following questions for all created personas can be answered afterwards:
- What training would they need for the trend?
- What do they need to attend the training?
- Why would they want to attend that training or what would they get out of the training?

Reporting Back
- The groups come together and present their personas to the plenum.
- The personas are collected and shown on a board to the plenum.
- The results are grouped together and potential future steps for the internal trainings are given.

Keep in touch!
We welcome hearing about other best practices and are most happy to share any additional format you have pioneered yourself around applying TechnoVision.
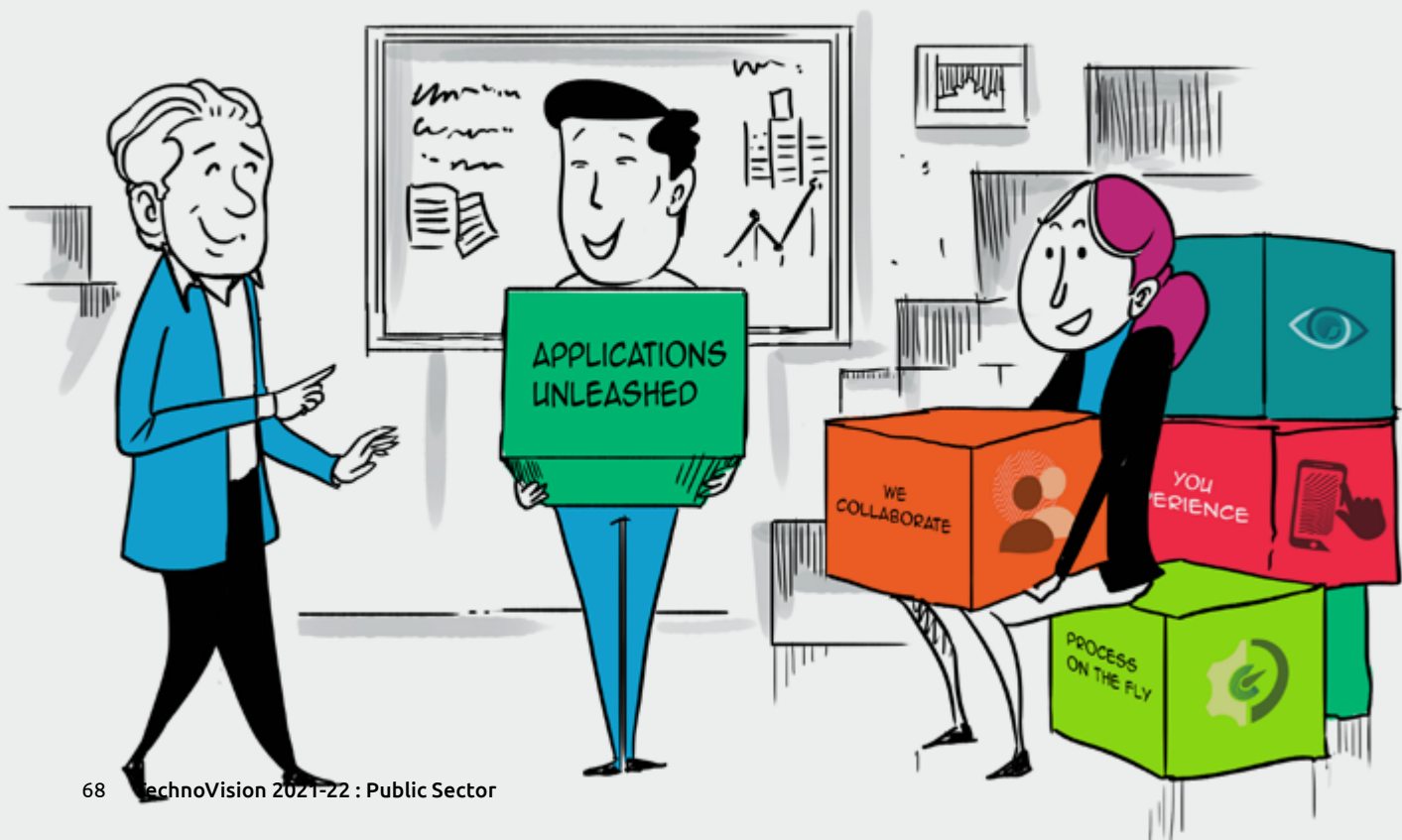
A few more things across the public sector

37 waves across seven seas have shown:
Technology and business merge together in many ways, shaking up the public sector with all kinds of data, process and other technology currents.

The special waters of the public sector
Let's take a moment to talk about the specificities of the public sector, as we are indeed in a different waters here. While this sector embraces innovation and technology as much as anywhere else, some standards from "other industries" don't apply as such, or are not even desirable. For instance, as we saw, the aim may be on thriving on data and offering a frictionless user experience to all involved, but surely direction and pace need to be carefully managed, in order to avoid the maelstroms of biased, low-quality data and an administrative overreach that violates the citizens' privacy. The fact that there is no market to be defended or competition to be feared allows for more caution but should not invite stagnation – swift change is still needed as our report has shown again and again. Organizational goals are more likely geared towards completeness and sustainability, rather than towards monetization and competitiveness. This is maybe one additional level of agility that the public sector embodies in different waters, where the balance between human and machine – and between capabilities and purposes – comes with different shades of blue.

Troubled waters
By being less daring than wild water rapids, and by having whole societies on board as stakeholders instead of just selected target segments, the public sector is as vulnerable as it is valuable to society's progress and wealth. This should be considered at all times, as it applies to challenges both from outside and inside. Cyberattacks and online disinformation are a threat to the flow of the public waters, impacting both individual citizens and society as a whole. These threats require the highest levels of resilience and governance, with a solid and sovereign data infrastructure at the very foundation. Threats can come from the inside as well : unethical technology, whether through using biased data and algorithms, non-compliance to privacy rulings, or use cases in undesirable areas, will bring either confusion or worse, will bring technology-driven innovation and change to a screeching halt.

Resilience for the better
While these scenarios of troubled waters might shed a pessimistic light on the public sector, it is rather the contrary: with its responsibility and critical mandate comes a powerful ability to steer change and to set standards! Equipped with built-in resilience and with a specific flair for the geopolitical dimension, the way towards a true "technology-driven sovereignty" is open, setting new ambitions for how society uses the potential of technology and embraces its realities. International "data waters" can then rely on a new technology governance such as in GAIA-X, better protecting citizen rights against attackers, and in defining what should be shared and common technology foundations. This strong resilience against outside threats opens the ability to always explore new areas, for the benefit of all and society.

Next-generation society
It brings us all the way back to the tantalizing prospect of a "Society 5.0": a next-generation, smart society, perfectly enabled by innovative technology. On the journey there, the constant balance between innovation and caution, e.g. between hyper-personalization and data protection, turns out to be a core strength. Online accessibility makes us create new ways to reach out to literally everybody, nobody excluded. Sustainability guides us on how to reimagine our ways for the better and the substantial, reconciling the values of optimization and conservation.

Mission economy
And governments don't need to and shouldn't do it alone! In some cases, society may help in a crowdsourced manner, as we have seen with "WirvsVirus." The industry is also by its side to help, and by setting the rules of collaboration governments can even influence industry's course as a whole, through standards, legislation, or sheer purchasing power. Once all sides have agreed on the mission to achieve, they can divide up the work, drawing on all sides' strengths and combining the best of their worlds – that is what we meant with the "open arms" and the "we collaborate" paradigms. To play their parts in this mission, not only will industry have to adopt new standards and paradigms; the public sector must also fundamentally reinvent itself, becoming more "entrepreneurial" and proactive. So besides the external challenges of the health and climate crises and technological innovations, the public sector must take on a cultural and organizational transformation – a truly Herculean task!

Sitting on the dock of technology-driven government, the public sector offers us a societal mandate: there is an ocean of opportunities when it comes to the application of technology for a better and more sustainable, more inclusive world. Hopefully, TechnoVision helps you to set the right course on these waters, with, or without all hands on deck. Bon voyage!

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TechnoVision Change Making 2021 builds on our long-standing heritage of expert guidance—it's the 13th edition of our annual technology guide.

Technology can play a pivotal role in helping businesses deal with a flurry of unpredictable events, challenges and opportunities. To take advantage of the many benefits that technology can bring, organizations must be like water—that's the key theme of TechnoVision 2021, our annual guide to technology trends in business. Read the report to discover how by being like water, executives can deal with complexity and help their companies to thrive.

TechnoVision is a practical guide to creating a technology- business. To run your own TechnoVision ideation or trends workshops, download our playful, open source boxes.

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