
European
GovTech
radar
Civocracy
WAVESTONE

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TABLE OF CONTENTS

Foreword

The new decade has been off to a tumultuous start. Amid countries fighting to contain the spread of a deadly virus and grappling with its repercussions, in 2020, the need for innovative government technology is clearer than ever before. But while recent developments may have highlighted its value, GovTech was already on a rise before COVID-19 unfolded.

In today's Europe, it is evident that citizens both have clear expectations of how their governments should operate and are committed to making their demands heard. Whether it's in relation to government services or decision-making processes, citizens' calls for more efficiency and better accessibility cannot be overheard.

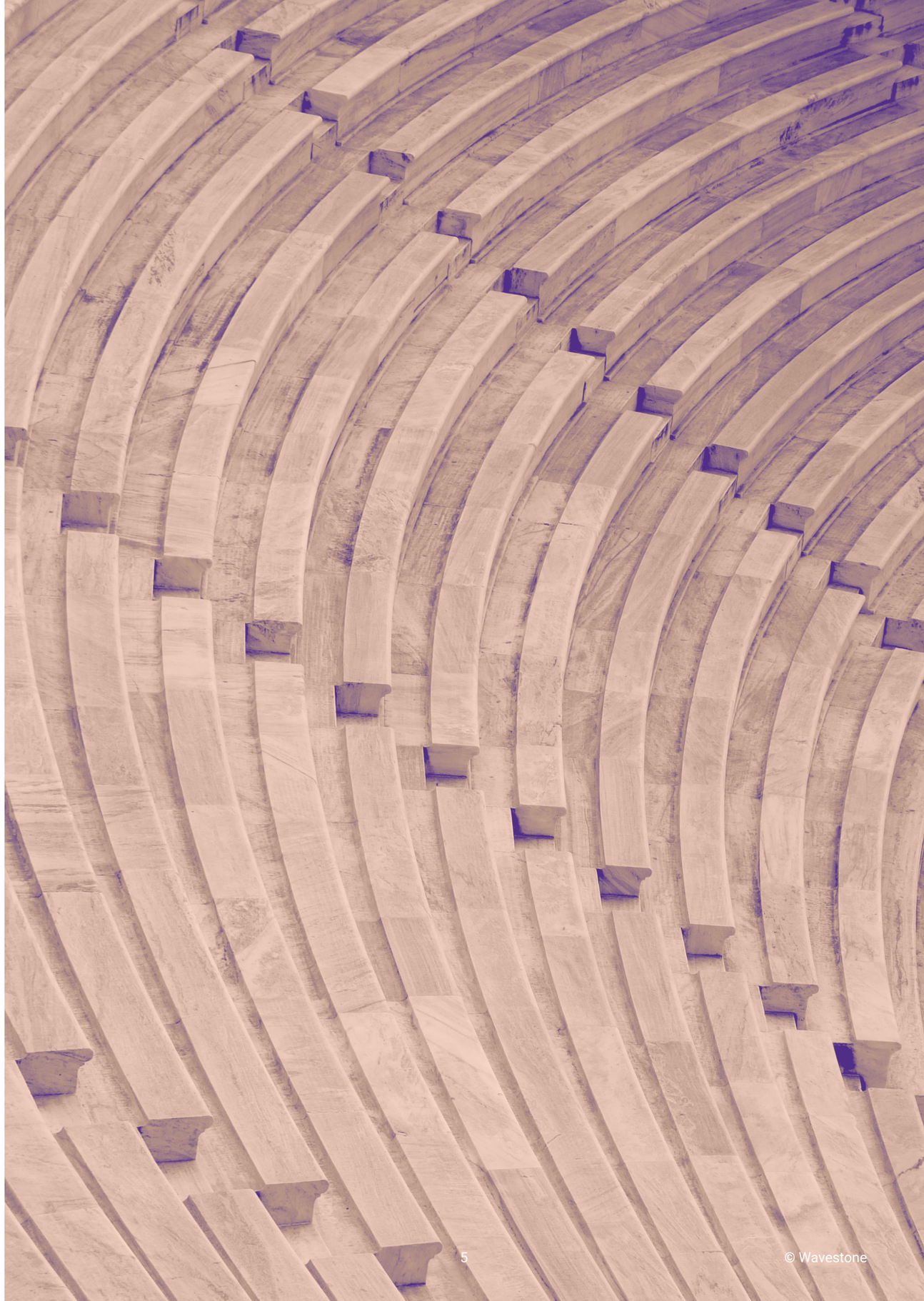
In response to surging citizen demands against the backdrop of ever-expanding modern technology, GovTech emerged as a promising catalyst for the type of change needed at governmental level. GovTech has the power to transform how government and public sector organisations engage with citizens and, as a result, took on an increasingly central role across the globe. And its potential continues to expand, driven by the innovative approaches of a growing number of actors in the field.

For the European public sector, the future lies here. Exactly how this transformation will play out remains to be seen, however. To understand what lies ahead for government operations, we must take a closer look at GovTech's development thus far.

This white paper aims to provide readers with an overview into GovTech's flourishing ecosystem, taking stock of the different actors and trends shaping the field. Based on the input from experts working in the sector, the paper discusses both its current role and the potential it holds for the future.

By increasing awareness and visibility of GovTech, this discussion aims to contribute to the sector's growth in the future. Its scope makes the paper relevant to startups, elected officials, civil servantsand citizens alike.

The research process was conducted in collaboration between Wavestone and Civocracy. The findings of the paper are based on extensive desk research of the relevant publications as well as a mapping of the key actors in the field. From this, a database mapping 500 European GovTech startups was built. Lastly, the inputs from experts were crucial to developing and validating the findings. For this, interviews were conducted with Emily McDonnell, Head of Communications at Civocracy, Kiann Stenkjaer Hein and Ramraj Puvinathan from PUBLIC (Denmark), legal expert Simona Frazzani, Sasha Haselmayer CEO and Founder at Citymart, Thomas Poulsen, COO of the Innovation Centre of Denmark, Faruk Tuncer, CEO and founder at Polyteia.



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The growing role of GovTech beyond 2020

European governments are increasingly focused on modernising their processes through digitisation and innovation. Emerging technologies allow public administrations to reshape their internal operations, deliver better and more efficient services and to enhance the way citizens and businesses interact with public sector entities. The emergence of new technologies coupled with the rising demand for innovation within governments resulted in the development and rapid growth of the GovTech industry. The purpose of this chapter is to define precisely what GovTech is, present the main conditions that led to the emergence of this industry, and the foreseeable trends beyond 2020.

1.1 Getting to the core of GovTech

With the increased focus of public administrations on innovation, new and dynamic companies have come to the fore and become increasingly present in the B2G segment, namely in the field of GovTech. According to some estimates, GovTech spending in Europe stood at EUR 22 billion in 2017[1] alone. However, before one begins to grasp the reasons for the rapid growth of this industry, and its importance, one must define what GovTech is.

Given that GovTech is a relatively recent phenomenon, there is not an industry-wide consensus of what constitutes a GovTech startup or company. Table 1 below presents an overview of different definitions gathered from key industry players, governments and international organisations.

1 Accenture (2018) Gov-Tech, Europe's next opportunity.

Table 1 - Existing GovTech definitions

Organisation	Definition	Source
UK Government Digital Service	Sector where private sector startups and technology firms deliver innovative technology-based solutions (often using the latest technologies) to help solve public sector problems.	Technology innovation in government survey (2018)
Craigie Capital	GovTech solutions are innovative services (e.g. Software as a Service, Platform as a Service) which address a pain or need of Government, citizen and business. In this case, Government is often the customer of such a service, in a for-profit model.	GovTech: An Emerging Sector Revolutionising Public Services (September 2016)
CivTech (Scottish Government)	CivTech brings together public sector expertise and private sector creativity to solve real problems, develop new products, and deliver better, faster and easier services for everyone.	CivTech website
Government Technology, USA	Companies focused on, making a difference in, and selling to state and local government agencies.	GovTech 100
GovTech Singapore	From transforming the delivery of Government Digital Services to building Smart Nation Infrastructure, GovTech uses technology to improve the lives of everyone.	Singapore Government Digital Technology Agency
GovTech Summit	A fast-emerging sector, built by innovative startups leveraging both technological advances and recent reforms to government platforms and registers, GovTech aims to build better services for citizens and better tools for public servants.	What is GovTech?
Portuguese GovTech agency	GovTech is a Government initiative that aims to reward and support innovative products and services, created by startups, that contribute to achieving one or more of the 17 Sustainable Development Goals (SDS) of the United Nations, in a national response to the challenges that arise ... in the world.	What is GovTech?
French GovTech Radar	Startups that have a direct impact on the transformation of public initiatives, startups that work with public administrations and startups that contribute to missions of general interest, offering services directly to citizens.	Wavestone

Based on these identified definitions, the key elements of the GovTech sector involve:

- The creation of **new services or products** for the public sector;
- The use of these products or services to, for the most part, solve **pressing governmental challenges;**
- The leverage of **emerging technologies** for providing services of general interest;
- The heavy involvement of startups and/or SMEs.

Given the above elements, the following definition of GovTech will be used throughout this white paper:

GovTech:

Companies (especially SMEs and startups), which use innovative technologies to deliver products to the public sector, which are specifically designed to address its needs.

Whilst there is no industry-wide consensus on the definition of GovTech, the reasons driving its rise are easier to pin down. The early 21st century can be characterised by the rapid development of the technological environment, possible through the onset of technology along with the increasing expectations of society and businesses.

This swift transformation has provided abundant new opportunities for the public sector to innovate and modernise. This, in turn, creates room for private companies to offer digital solutions to governments, which are lacking the required resources or knowledge internally. Therefore, the rapid rise of the GovTech industry globally can be explained by the evolving nature of governments' roles and responsibilities, their desire to harness innovation, and their increasing willingness to work with external companies to deliver those changes.

Governments' push for innovation and digitisation arises from the increasing challenges they face in the 21st century. Among the most salient ones, is the growing need for data protection in the face of new and encroaching cybersecurity threats. At a time in which governments are suffering from a lack of trust from its constituents, the onset of digital age has increased these concerns, in particular as regards to the protection of personal data. The recent adoption of the General Data Protection Regulation (GDPR) by the European Commission reflects this growing demand. Adopted in April 2016 and in force since May 2018, this Regulation guarantees more data privacy for European data subjects by regulating the automated processing of their data. Moreover, in line with the growing focus on protecting citizen's data and protecting one's systems from cyberattacks, European countries have fostered the development and improvement of their cybersecurity systems, in order to protect electronic data and respond to any threat of criminal attacks or the unauthorised use of data. Even if it can be difficult to capture the impact of being unprepared against a cyberattack, due to the lack of reliable data, the economic impact of cybercrime rose fivefold between 2013 and 2017, hitting governments and companies alike, both large and small. At the same time, governments are faced with increasingly difficult policy options concerning platform regulation, with the most recent Facebook and Cambridge Analytica scandals contributing to the concerns that opinions can be swayed by target ads. The forecast growth in cyber insurance premiums, from EUR 3 billion in 2018 to EUR 8.9 billion in 2020, further reflect this trend[2].

In addition to the security challenges, European governments are facing increasing pressure to become more efficient in the way they operate and interact with citizens and businesses.

Citizens and the private sector increasingly expect the same performance from government services as they would from private companies. As a result, governments are increasingly focusing on fostering the development of interoperability and cross-border collaboration. Interoperability is a key factor in making the digital transformation possible. It allows administrative entities to electronically exchange meaningful information in ways that are understood by all parties[3]. A comprehensive implementation of interoperability across Europe would allow for faster and easier communication, the free movement of data and the seamless delivery of digital services across borders.

Governments are increasingly focusing on better and more user-centric delivery of services in crucial sectors such as health, justice, tax, etc. The delivery of public services to citizens and businesses needs to therefore be prioritised by the implementation of adequate IT infrastructure and the redesign of services. This creates a large opportunity for GovTech firms to offer solutions using emerging technologies to public administrations and to improve their efficiency and operation. A potential field where GovTech solutions might find use would be at the level of eProcurement, where there are increasing levels of concern related to transparency and corruption and the national, sub-national and local levels for both public administrations and businesses alike.

Civocracy is one of the emerging voices that sustain the importance for governments to start investing and allocating budget to GovTech initiatives, as mentioned in the following box.

PRACTITIONER - **CIVOCRACY** - Interview pills

Chloé Pahud
CEO and Co-founder

Startup name: **Civocracy**

Year of foundation: **2015**

HQ: **Berlin**

Category: **General Public Services and Administration**

Mission: **Civocracy is a civic tech company that empowers local government to co-create their best cities.**

Contact: **contact@civocracy.org**

"GovTech is considered a nicety rather than a necessity, which means budget is rarely allocated"

"There needs to be upfront spending and programs to absorb technology into government ways of working to encourage its use to become commonplace."

"Legislations have a much more positive effect, as they are legally binding, and demand that governments adopt more modern ways of working. These should be too tight, but should require the digitalization of service and modernization of government working processes."

"For Civocracy, **a large part of our workload is identifying the right person in the right department** who has the budget, knowledge and motivation to harness new technology."

"Startups have as much more agile way of working, and need to develop solutions that work. They have their fingers on the pulse of their users' needs as their products have to be needed to ensure they survive as companies."

"As governments incredibly accountable for their spending, and implementing new technology involves a lot of learning and risks in terms of returns, **governments can be hesitant to commit to purchasing despite being incredibly interested."**

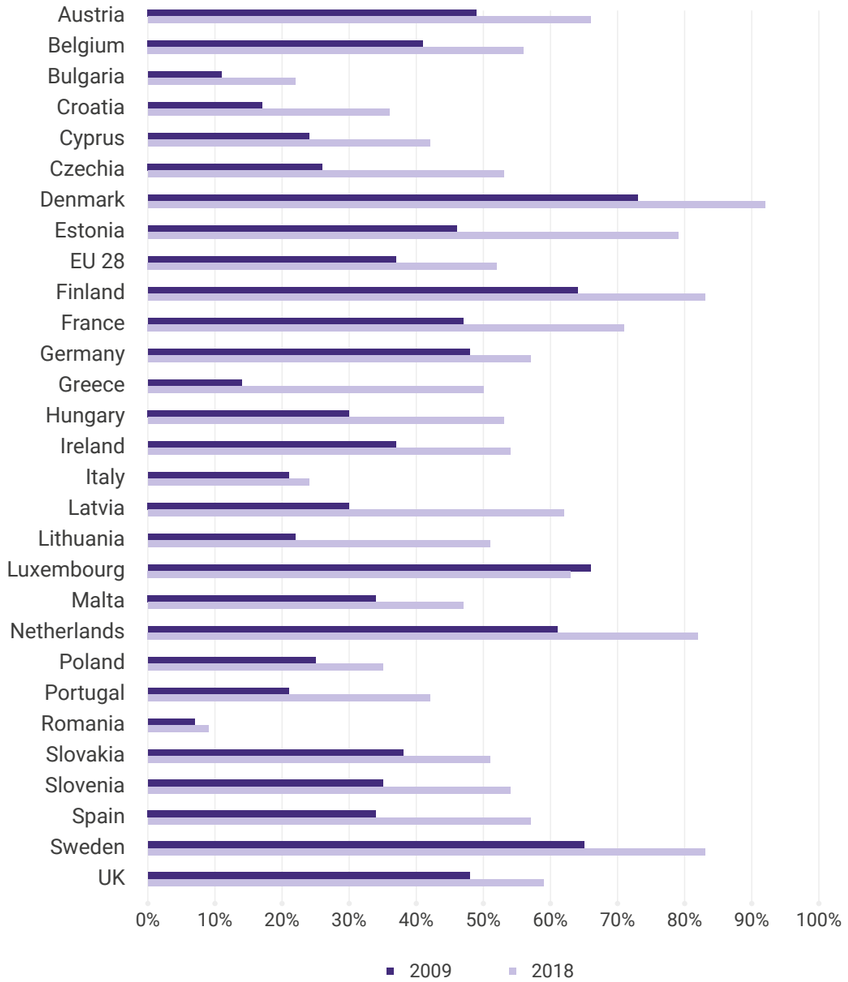
2 European Commission, President's State of the Union 2017.

3 Revised European Interoperability Framework.

1.2 GovTech from the national perspective

Over the past decade, European governments have been increasingly focusing on reinventing and innovating the way in which they deliver public services online. As a result, **between 2009 and 2018, the proportion of individuals who use the internet to interact with public authorities in Europe has risen by 15%**, from 37% in 2009 to 52% in 2018. Denmark has been leading the way with 92% of its population interacting with public administrations online in 2018[4].

Figure 1 - Individuals using the internet for interacting with public authorities



4 Eurostat : Individuals using the internet for interaction with public authorities, obtaining information from public authorities web sites

Along the lines of what advocated by the UK's Digital Service Team, we recognise the following

5 different sources of public sector innovations

that can drive the transformation of public service delivery in Europe:

1

Service innovation

Develop a **new service concept** or gradually improve an existing service. Service innovation is soughed in most sectors and startups like Citymapper (UK) or Ada Health (DE) illustrate this transformation of public service delivery. Citymapper, a smart mapping platform for cities, uses real-time citizen data to optimise public transport routes and journey's planning. Ada Health, which is an AI-powered mobile health application, allows users to report their symptoms and receive automated diagnoses and medical reports.

2

Process innovation

Rethink the **entire end-to-end processes** to bring significant efficiency and productivity improvements. For example, Doctolib (FR) is an online platform which allows patients to book nearby medical appointments, simplifying the booking process for both patients and doctors. While, Synergist.io (DE) uses artificial intelligence to automate the creation, signing and negotiation of contracts with public sector authorities.

3

Technological Innovation

Explore **emerging and disruptive technologies** or combine **existing technologies in new way**s to develop novel solutions and services. For instance, Unblur (ES) is an intelligent assistant for first response emergency services, integrating the dynamic information (drones, cameras, GPS) with static information (databases, maps) to optimise situational intelligence. Another example is EclecticIQ (NE), a cybersecurity company that allows enterprise security programs and governments to collate and analyse cyber threat intelligence.

4

Regulatory innovation

Support new business models and disruptive technologies through **regulation and enforcement frameworks** while protecting the public and stimulating the economy. Some successful instances of GovTech in this domain are Zivver (NE) and Civiciti (ES). Zivver is a plug-in for emails, chat, and file transfers that make them secure and GDPR-compliant and is used by hospitals to securely exchange patient records and data. Civiciti provides users with an end-to-end data encryption channel to protect the privacy of citizen identities. For example, it designed and implemented a secure platform enabling the inclusion of citizen's proposals in the participatory budgeting in the City Council of Logroño.

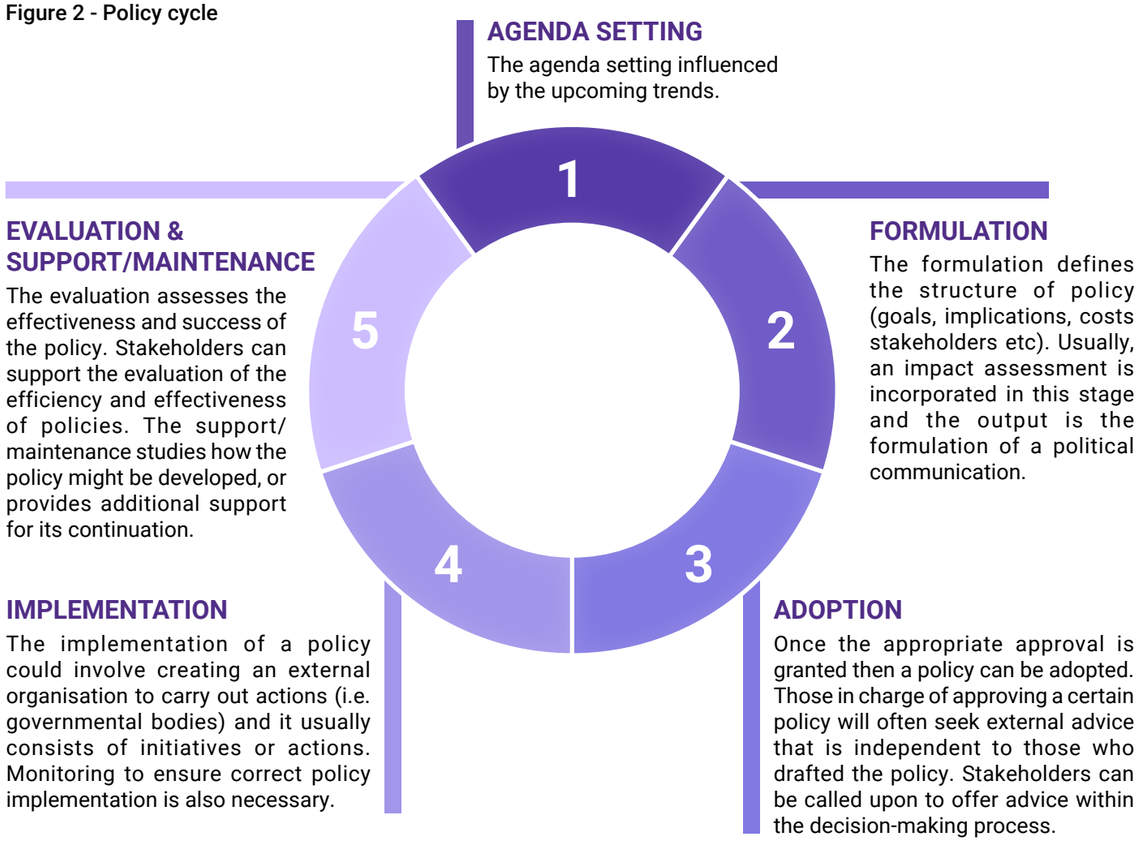
5

Policy innovation

Identify constituents' needs, and reduce the development, testing and **implementation times for new policies**. In this field, perfect examples of GovTech are Civocracy (DE) and Fluicity (FR). Civocracy is a citizens' engagement platform that helps governments connect with constituents through direct consultations, project co-creation, direct communication, idea crowdsourcing and data analytics. Fluicity is a citizens' engagement application allowing users to propose ideas, vote for others' ideas, report local problems and take part in direct consultations.

In order to set the strategic focus of their innovation and digitisation, national governments have adopted political communications (strategies, action plans and/or roadmaps) to digitise their public services and promote the interoperability and overall functioning of public administrations. The adoption of new political communications is a cyclical process in response to the evolving societal needs and technological trends, and, usually, it results in the adoption of legal instruments to lay the foundation for innovation. This cycle is a key enabler for the digital transformation of public administrations, it can be influenced by emerging technologies and it can foster their adoption and proliferation, as figure 1 shows.

Figure 2 - Policy cycle



According to the eGovernment factsheets 10th Anniversary Report, this policy cycle has some common elements across the different European countries, which define a shared pattern towards innovation. While the priorities set in the national political communications vary slightly, the data shows that all countries have adopted legal instruments to lay the groundwork for modernisation. **The key focus of areas for these legislations adopted in the past are the provision of digital public services, access to base registries, deployment of eGovernment infrastructure, open data and cybersecurity**[5].

The report also shows that the implementation of **specific initiatives and actions is another enabler for this shift towards public policy innovation. In particular, the deployment of specific eGovernment infrastructure (eID, eSignature, eInvoicing, eProcurement, and eDelivery) appears to have been of upmost importance to European public administration because it underpins the development and delivery of digital public services and the digitisation of public administrations more broadly.**

Each year, the EU eGovernment Benchmark presents a state-of play overview of eGovernment development in Europe. This assessment helps to evaluate countries' performance and identify areas for future growth and development. More details about this years' results are provided in the following box.

5 Wavestone for the European Commission (2r018), eGovernment factsheets 10-year Anniversary report. Available at: (last accessed on 19/07/2019).

eGovernment Benchmark Report 2018

The eGovernment Benchmark Report presents the results of the assessment of eGovernment services made according to the eGovernment Benchmark Framework in 34 countries (EU Member States, UK, Iceland, Norway, Montenegro, Republic of Serbia, Switzerland and Turkey). The assessment covers the **priority areas of the eGovernment Action Plan.** Each priority is measured by one or more indicators, included in the so-called top-level benchmarks (User-centric Government, Transparent Government, Cross-border Mobility and Key Enablers).

A total of **eight key life events** make up the eGovernment Benchmark (measured bi-annually in groups of four). The life events measured in 2017 were Regular business operations, Moving, Owning and driving a car and Starting a small claims procedure. The life events measured in 2018 are Business startup, Losing and finding a job, Family life and Studying.

The latest eGovernment Benchmark report shows constant improvement in the **user-centricity** and **mobile-friendliness** of digital public services. At the same time, further progress is needed in the domain of transparency, cross-border mobility and key enablers. More importantly, the newly introduced cyber-security indicator reveals that there is still significant room for improvement across the EU. According to the Benchmark, less than 10% of the 3 500 analysed European public websites passed the basic tests performed.

Looking at the individual country performance, **eleven countries deliver high-quality digital services** across the evaluated public sector domains: Malta, Austria, Sweden, Finland, the Netherlands, Estonia, Lithuania, Latvia, Portugal, Denmark and Norway. On the opposite end, eight countries have an overall eGovernment maturity score under 50%. Namely, Bulgaria, Croatia, Greece, Hungary, Romania, Serbia, Montenegro and Switzerland.

The eGovernment Benchmark report also measures the levels of eGovernment **penetration** and **digitisation** in Europe. Penetration captures the adoption of eGovernment services online and digitisation assesses the digitisation levels of the back and front office of public administrations. It is interesting to note that one sees a wider disparity between European countries when it comes to penetration, while countries more or less present the same levels when it comes to digitisation. Europe's digitisation level is 63%. When it comes to penetration, the European average is 53%, with Sweden being the best performer. More specifically, there are countries scoring above 75% (Sweden, Finland, Estonia, Denmark, Netherland and United Kingdom) and countries scoring below 30% (Italy, Greece and Czech Republic).

As summarised in the box below, during an interview with PUBLIC from Denmark we highlighted that there are **two main directions to foster the change**: "In terms of cultural initiatives, the first step would be to **educate GovTechs** in better understanding the needs of governments and the way in which their procurement processes work. At the same time, public administrations should develop the culture of **interacting with GovTech**. The other direction that should be more explored in terms of initiatives is the one related to the financial domain. Indeed, GovTechs are generally startups and their need for financial resources is well-known. For this reason, the governments should create national funds, allocating procurement budget to interact more with GovTech startups and to invest more in research."

The above-mentioned sources of public services innovation can trigger different forms of improvements; the **OECD Observatory of Public Sector Innovation (OPSI) in its 2019 Global Innovation Trends report[6] clarified this concept by identifying three core types of public sector innovation: (i) Invisible to visible; (ii) Opening doors; and (iii) Machine-readable world.**

The first innovation type, invisible to visible, aims to create a more citizen-centric approach when designing policies and public services. In the last decade, governments have made transparency and openness a focus, but the insights, perspectives and opinions of citizens and residents remain largely invisible. Hence, governments are taking innovative steps to make these invisible factors visible.

Citizen science, the collection and analysis of data relating to the natural world by members of the general public, has matured, activating individuals as agents for change, therefore governments are approaching the use of behavioural insight and gamifications to unlock perspectives and reinforce positive change. In particular, governments are realising the importance of immersive technologies[7] to bring about new ideas and inputs.

The complexity in governments has usually served to limit participation and minimise public value for underserved and at-risk populations. Nowadays, **governments are opening doors in the attempt to increase access by harnessing the untapped elements of new technologies, open data, and the emergence of new business models.** The main objective is to empower all citizens to access the public value of governments, while embracing major shifts occurring in society.

The last innovation type is related to machine readability[8]. **Governments are realising the potential of using machine-readable data to fuel their decision-making processes.** The use of this kind of technology can directly influence the way policies and legislations are created by feeding data into algorithms that serve as the basis for an ever-growing number of decisions and services.

6 https://trends.oecd-opsi.org/

7 Immersive technology is one that emulates a physical world or creates a new reality through the means of digital world, thereby creating a sense of immersion.

8 "Information or data presented in a structure format that can be processed by a computer without (or with minimal) human intervention and without loss of semantic meaning. Digital formats are not automatically machine readable (e.g. text documents in PDF or DOC formats are not machine readable)". – OECD 2016.

MEMBER STATE - **PUBLIC (Denmark)** - Interview pills

Kiann Stenkjaer Hein
Managing Director

Ramraj Puvinathan
Research Associate

Company name: **Public**

Year of foundation: **2016**

HQ: **london**

Category: **General Public Services and Administration**

Mission: **Public bring together experience from the public sector, technology and finance to help startups solve public problems.**

Contact: **hello@public.io**

"In general terms, the **initiatives promoted at national level** should work in **three directions: culture, funding and procurement."**

"The two **most important key drivers for successful collaborations** between governments and startups are the **awareness and the willingness o**f governments to interact with startups."

"The reason why governments should choose to engage with a smaller player relies on the a**dvantage in having more innovative IT solutions that better fit with their needs."**

"In the same way in which FinTechs have started disrupting the financial industry, **GovTech startups have the potential to disrupt the public sector and transform the way in which governments offer public services."**

"In an ideal world, there should be a **combined effort at local and national level.** The **Government should promote a national strategy** that foresees an increasing interaction with GovTechs, while **regional or local public administrations should open the dialogue with the specific startups."**

1.3 Role of the European Union in fostering public sector

It is not just the governments themselves that set the course for innovation. The European Institutions plays an equally important role in fostering and setting the way forward for innovation across our public administrations.

1.3.1 The EU role since 2015 innovation

In 2015, the European Commission has adopted the Digital Single Market strategy (DSM), which includes three key pillars:

- **Access:** better access for consumers and businesses to digital goods and services across Europe;
- **Environment:** creating the right conditions and a level playing field for digital networks and innovative services to flourish;
- **Economy & Society:** maximising the growth potential of the digital economy.

The latter pillar places a strong emphasis on digitising European industry and society. It is under this pillar that the key communication related to the evolution of digital government in Europe, the **eGovernment Action-Plan[9], was potentially adopted. It lays down key principles, including transparency and user centricity, that public administrations should follow when designing and implementing digital public services.** Most recently in 2017, the European Union's public administrations have committed to implementing the eGovernment principles by signing the Tallinn Declaration on eGovernment.

9 COM/2016/0179 final, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU eGovernment Action Plan 2016-2020 Accelerating the digital transformation of government

In addition to digital government, the DSM initiative placed a large emphasis on fostering Europe's SME and startup ecosystem. Having said that, the DSM priorities have been implemented using several initiatives and funding instruments, that were launched since 2015:

Horizon 2020

is a EU Research and Innovation programme that makes nearly EUR 80 billion of funding available over a seven year period (2014 to 2020).

Startup Europe

is part of a broad effort by the Commission to boost the startup ecosystem in Europe. It offers a wide network of support to startups and helps them find potential investors. Furthermore, there are several networks and platforms that aim to foster the startup ecosystem across EU: Startup Europe Partnership (SEP); Accelerator assembly; Unicorns forum; Investors forum; Startup Europe Nations Network; EUCluster Partnership Platform.

Connecting Europe Facility (CEF)

is an EU funding instrument, which three main themes: Energy, Telecom and Transport. CEF Telecom, in particular, focuses on investments into network developments across the EU to make them smart, sustainable and fully interconnected in order to boost the Union's competitiveness. At the present moment, CEF's Digital Sector envelope has EUR 1.14 billion allocated to it. The main focus of the envelope is on connectivity and the deployment of Digital Service Infrastructures (DSIs) to deliver networked cross-border services for citizens, businesses and public administrations. These projects contributed improvements in the competitiveness, promotion of the interconnection and interoperability of national, regional and local networks, and support to the development of a Digital Single Market.

Competitiveness for Small and Medium Enterprises (COSME)

is a programme launched by the European Union for the 2014-2020 period. It is built around two main themes; promoting entrepreneurship and strengthening the SMEs ecosystem; and is composed of four main fields of investments. First, accessibility to financing is bettered by accompanying SMEs during their development phase. Second, support European companies and the financing of the Enterprise Europe Network (EEN) to help companies with practical services to facilitate their entry on the market. Third, facilitate the financial situation of companies by reducing administrative costs and implement a "Think small first" regulation. Finally, implement two programs aiming at developing the corporate spirit of young people: "Entrepreneurial 2020" and "Erasmus for young entrepreneurs". To finance these 4 main fields, COSME was attributed a EUR 2.4 billion funding.

The European Structural and Investment Funds (ESIF)

can support actions related to the development of ICT products and services[10] and those related to strengthen the institutional capacity and efficiency of public administrations[11]. Within the new Multiannual Financial Framework (MFF) the fund's priorities will be revamped to give more emphasis to areas such as digitalisation and eGovernance.

10 Enhancing access to and use and quality of information and communication technologies (ICT)', Thematic Objective 2 of ESIF.

11 Enhancing institutional capacity of public authorities and stakeholders and efficient public administration', Thematic Objective 11 of ESIF.

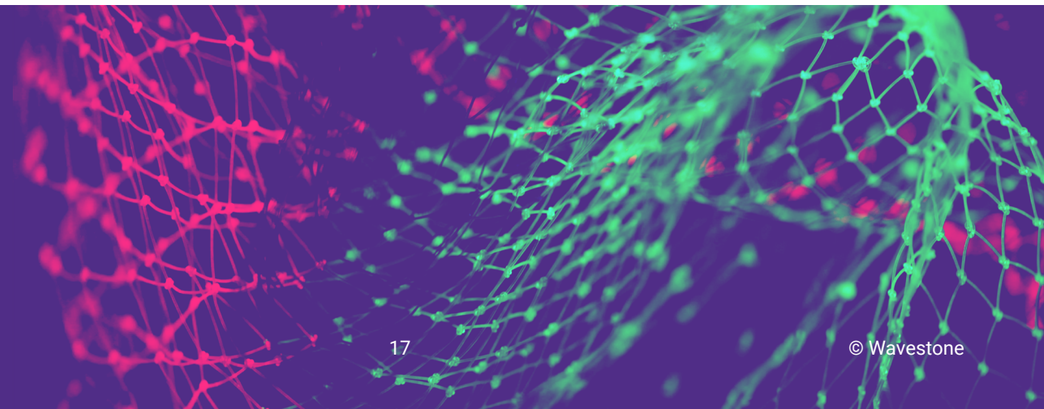
The European Commission Structural Reform Support Service (SRSS)

is a service of the European Commission which aims at supporting Member States with the preparation, design and implementation of growth-enhancing reforms, as well as focusing on providing tailor-made support on the ground, and finally steering and coordinating technical support provided by the Commission. To that effect, the "Governance and Public Administration" team of SRSS provides support to Member States in the areas of governance and public administration. The objective is to implement structural reforms to optimise the efficiency of the public administration in many fields of application such as "Efficiency of the organisation of the State and service delivery by the State" or "Designing and implementation of an e-Governance system" for instance.

The Invest EU programme

built on the model of the Juncker Plan, aims at enhancing investment, innovation and job creation in Europe and is expected to trigger investments of at least EUR 650 billion between 2021 and 2027. The programme will: mobilise public and private investment using an EU budget guarantee (the InvestEU Fund); provide technical advice on investment projects needing financing (the InvestEU Advisory Hub); provide an easily accessible database that matches projects with potential investors worldwide, thus simplifying and streamlining EU investment support (the InvestEU Portal). The InvestEU Fund will support four main policy areas: sustainable infrastructure; research, innovation and digitisation; small and medium businesses; and social investment and skills. Finally, the programme will be part of the Commission's economic policy mix of investment,

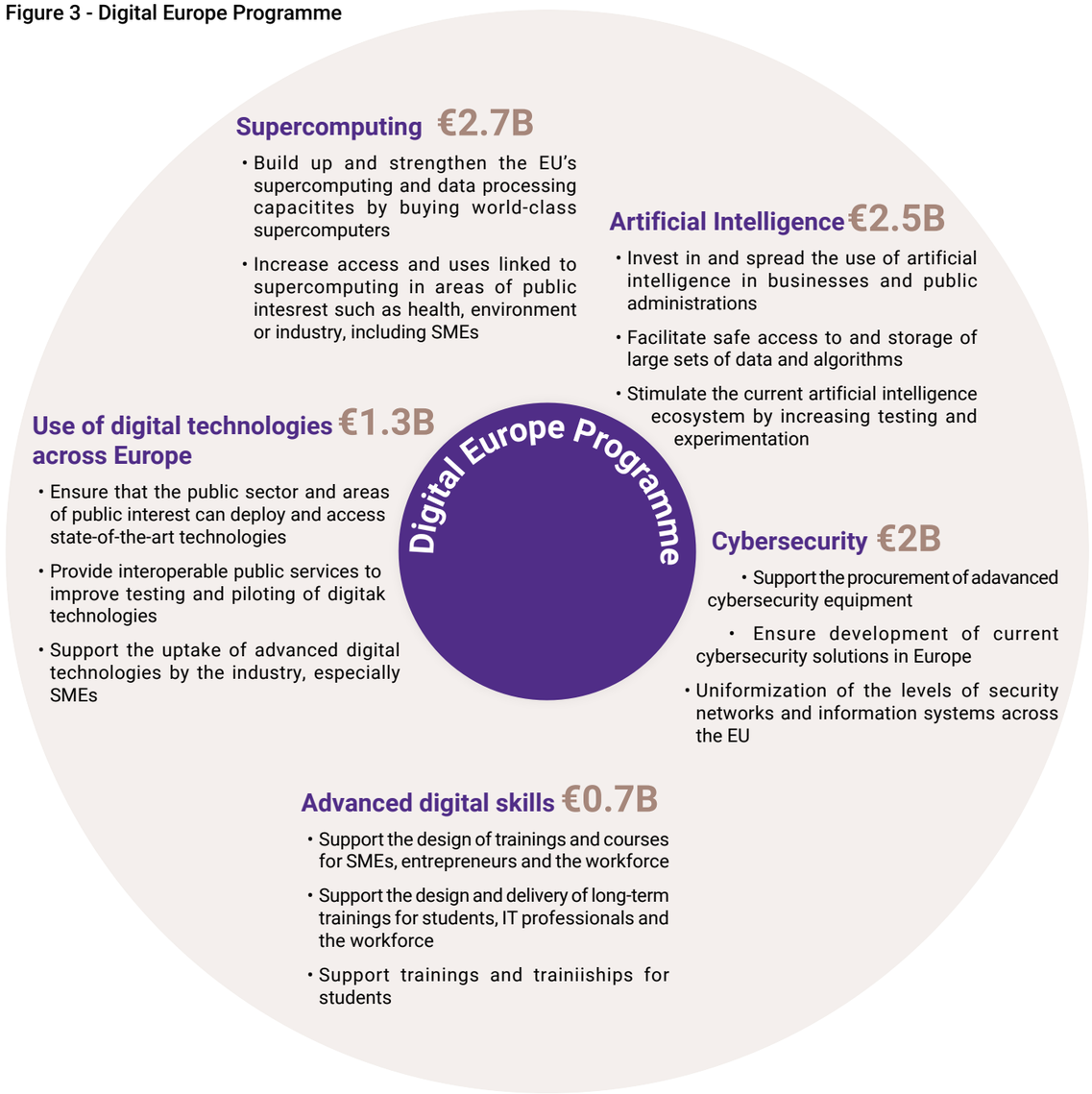
The European Commission also has a strong focus on the digitisation of Europe's industry. In 2016, it launched an initiative titled **Digitising European Industry. The key priority of this initiative was the creation of a European network of Digital Innovation Hubs.** This initiative assures that every company, whatever the size, and whether its high-tech or not, can enjoy digital opportunities by acting as a "one-stop shop" that facilitates access to technology-testing, financial advice, market intelligence, and networking opportunities. In fact, with EUR 500 million allocated from the Horizon 2020 budget, the purpose of the Commission is to accelerate and support the development of DIHs within each region where companies are based and thus help them access competences to digitise their organisation, products and services. Various EU funding instruments and initiatives are aiming to foster different competences within DIH: ICT Innovation for manufacturing, Smart Anything Everywhere for IoT development, Open Data Incubator Europe for open data initiatives, Robott-NET and ECHORD++ for robotics, ACTPHAST 4.0, EPRISE for photonics, Supercomputing Exercise for SMEs for supercomputing, among others. Hence, the DIH network aims to support digitisation among SMEs and startups by ensuring that they have access to the right competences and resources. This in turn, helps to foster the rapidly growing GovTech ecosystem in the EU.



1.3.2 The way forward with the Digital Europe Programme

Furthermore, with the end of the H2020 multiannual financial framework approaching and the beginning of Horizon Europe, which is a EUR 100 billion research and innovation programme, the European Commission has launched the **Digital Europe Programme, which will run from 2021 – 2027. The programme aims to shape the digitisation of Europe's societies and economies with a priority to unlock future growth and competitiveness.** With a budget of EUR 9.2 billion, the programme focuses on five key areas of action: supercomputing, artificial intelligence, cybersecurity, advanced digital skills and the use of digital technologies across the EU. Several aspects of the new Digital Europe Programme have a special focus on innovation in European public administrations. More specifically, the artificial intelligence strand will aim to build-up and reinforce the use of artificial intelligence within businesses and public administrations. Under the cybersecurity segment the programme will be supporting, together with Member States, the procurement of advanced cybersecurity equipment, tools and data infrastructures.

Figure 3 - Digital Europe Programme



The Digital Europe Programme's focus on ensuring the wide use and deployment of digital technologies across both the economy and society is of particular relevance to the GovTech industry. With this goal, the **Programme will aim to: ensure that the public sector and areas of public interest, such as healthcare, education, transportation, cultural and creative sectors, can deploy and access state-of-the-art digital technologies; offer to public administrations access to the testing and piloting of digital technologies, including their cross-border use; and support the uptake of advanced digital and related technologies by small and medium-sized enterprises, among other priorities.** It is also important to note that the Digital Europe Programme sees the aforementioned DIH as the core enabler to reach its objectives. Hence, the DIH network will be further strengthened after 2021.

All the efforts spent by the European Institutions in the last decade, and especially since 2015, are **key enablers to foster the rise of GovTechs and their partnership with governments**. Nevertheless, there are other factors to be considered when defining the GovTech startup ecosystem, as for instance, the legal framework of a country. Each Member State is characterised by a peculiar legal framework and their analysis goes beyond the scope of this paper. However, it is important to mention the main elements that can create a flourish environment for GovTechs. To this end, an interview with the legal expert Simona Frazzani was conducted and the main highlights are summarised in Figure 5.

LEGAL EXPERT - Interview pills

"Startups should receive a tax treatment that is tailored to their status and that incentivizes entrepreneurs to start a new venture. The tax treatment should also be extended to business angels."

Simona Frazzani
Associate at Grimaldi

Practices: **Banking Finance and Insurance, EU Law and Competition Law, Transport**

Publications: **Author, *The New era of Banking Supervision*, in Sistema Società (November 17, 2014)**

Author, *Reform on Market Abuse and Criminal Sanctions*, in Sistema Società (July 14, 2014)

"When it comes to GovTech, the three **main challenges** are represented by access to public process, **access to financial services and stakeholder engagement."**

"The key competitive advantages of GovTech startups are their ability to innovate and their ability to adapt their solutions to clients' needs. **When governments deal with GovTech, they are usually buying innovative services, high level of customisation and prompt assistance."**

2

Current trends in the GovTech startup ecosystem

European countries are facing a paradigm shift. ***European governments are moving away from the simple concept of digitisation of public services (eGovernment) towards a broader concept exploring "how governments can best use information and communication technologies to embrace good government principles and achieve policy goals"***[12]*. Additionally, governments start adopting deep tech technologies. Hence, there is room for SMEs and startups to harness emerging technologies and the proposed innovative solution to resolve governments' most pressing challenges. In fact, GovTech startups can have a key role in developing new services, helping governments rethink and reengineer their processes to become more efficient by using new technologies, and injecting new technologies into the government.*

2.1 Emerging technologies as a key driver for innovating

The increasingly connected and fast-paced world, coupled with changing citizens expectations of governments, raise the need for innovation in the public sector. Even if government innovation is not simply defined by the use of innovative technologies, as it comes from ideas such as innovative operating models, it is nevertheless interesting to focus on the key technologies underpinning the rise of GovTech. In fact, **emerging technologies act as a strategic driver to create open, participatory and trustworthy public sectors**; they help to improve social inclusiveness and government accountability, bring together government and non-government actors and contribute to the development of innovative approaches to long-term sustainable growth[13]. Hence, in this increasingly interconnected world, more dynamic actors such as startups and SMEs can help to change the way how governments operate and interact with business and citizens as well as with each other.

The European GovTech startup ecosystem is developing innovative solutions for public administrations by leveraging technologies, notably **Big data, Cloud computing and artificial intelligence**. The domains that are benefitting the most from this innovation are **Cybersecurity, SmartCities and CivicTech.**

12 Wavestone for European Commission (2018), The Role of eGovernment and Interoperability in the European Semester process. Available at: (last accede on 19/08/2019).

13 http://www.oecd.org/gov/digital-government/Digital-Government-Strategies-Welfare-Service.pdf

2.1.1 Big Data

Big data comes from multiple sources and is collected through multiple formats. Once collected, Big data is generally stored in electronic databases and analysed using dedicated software that enable the handling of large and complex data sets. Having **Big data enables governments to better tailor their offer and marketing efforts and to optimize decision-making processes by conducting deeper and richer analysis.** All matters related to the storage, handling and processing of datasets are an aspect of the GovTech sector. Better storage and usage of data bring new possibilities for the public sector. It can help administrations to create infrastructure and a solid base for future products and technologies. Administrations are collecting data and using it to deliver public services every day, and the possibility to remotely stock it, share it, and even process it can greatly affect the timing and quality of public services deliveries.

Having a safe, centralised and organised data-storage also opens the door for the **in-depth analysis of public data from governments and allows them to detect trends through data science**. In Europe, certain countries, such as Switzerland for instance, are strongly in favour of integrating Big data to foster innovation and increase the quality of public service deliveries. Central governments and public administrations greatly benefit from Big data. By collecting data from multiple sources, governments are able to promote better public services and optimise decision-making processes, thus **improving the quality and efficiency of public services**. To that matter, in Switzerland, two startups aim at bringing together public service and users: Politik.ch (CH) and Parquery (CH).

Politik.ch (CH), founded in 2017, provides a complete overview of the businesses of the Confederation and its cantons, in order to monitor, manage, and track political transactions. The goal is to **promote engagement and participation of citizens** by preparing an open administrative data accessible by all.

Parquery, operational since 2014, is a cloud-based solution which detects cars from static images, enabling **real-time occupancy information, thus optimizing parking management, revenues and enforcement.**

2.1.2 Cloud computing

With the ongoing digitisation of numerous services and processes, the cloud services industry, valued at EUR 170 billion worldwide in 2014[14], is estimated to reach a value of EUR 500 billion by 2020. It is not surprising that startups are closely following this trend and numerous companies are focusing on developing and bringing cloud platforms to European public administrations. **Cloud platforms enable users to work and collect documents in a synchronised IT environment. Administrators can share documents, work conjointly and assure a continuity of service through them**. They are a combination of IT and software components and are an extension of new data storage technologies.

14 https://www.alliedmarketresearch.com/cloud-services-market

This trend will only pick up pace, as governments increasingly focus on reengineering their services, and it will help to deliver faster, more personalised and less error-prone services in key sectors such as migration. To that matter, Cloud computing is proving itself helpful to central governments and public administrations to synchronise IT environments, ensure continuity of services and help deliver faster and more personalised public services. Some startups developed Cloud computing solutions to strengthen the ties between the government and its citizens.

Heropolis (FR), startup founded in 2015, aims at putting security and safety at the centre of organisations, by providing them with a **real-time safety management platform**. The organisation indicates on the digital platform the safety procedures in case of emergency, and all members of the organisation are given the opportunity to send an alert. Thanks to a cloud-based solution, updating and diffusion becomes fast and effective.

Parkopoly (FR), a startup created in 2016, is transforming the valet drivers' sector by linking motor vehicle professionals to valets to provide **efficiency gains to organisations for car after-sales, handovers, and cross-site car transfers**.

2.1.3 Artificial Intelligence

The digitisation of public services and administration, the collection of data from SmartCities, Big data technologies, and associated vigilance on cybersecurity are some of the required building blocks for the successful implementation of artificial intelligence (AI) innovations. There are several AI use cases that are particularly useful for public services to improve their quality and efficiency. The most widespread example are chatbots. Chatbots are software programmes that provide automatic responses to users' needs: these user-friendly interfaces can help citizens navigate within government websites, assist them with filing out digital paperwork, as well as simply providing them with an answer to their queries. It can also assist public servants with their work: the San Diego Sheriff's Department has partnered with Microsoft, who will equip law enforcement officers with a conversational AI-based mobile application named Coptivity. Using Natural Language Processing (NLP), a core piece of technology behind AI, Coptivity understands the deputy's basic queries, such as requesting driving license checks, and answers them orally using its own code-based language. This innovation speeds up these routine procedures, thus saving time that can be used for more elaborate tasks.

AI is becoming increasingly intelligent, and due to its capacity to understand human language and process large amounts of data, it can and will be used to augment the quality of services - from traffic guidance to call dispatches. To that effect, some startups have implemented AI solutions to their services in order to **increase the interactions and facilitate communications between the public administrations and citizens.**

Leapcraft (DK), was founded in 2013, and aims at enabling **healthy and efficient urban habitat**. To do so, they develop different products that collect and gather various information such as air quality, noise levels, congestion or C02 levels, that are all consolidated on an Internet of Things staging platform, bringing modern IoT infrastructure to smart cities and smart building applications.

Plutoshift (USA), a predictive analytics platform for water utilities that extracts and processes data from sensors, meters and other devices, and then feeds it through deep machine-learning schemes to deliver insights. Public administrations can monitor the **health of assets and anticipate their failure**.

2.1.4 Cybersecurity

Public administrations can lack the internal resources to handle security issues related to cloud services, storage of their citizens' data, payment safety and other cyberthreats in the digital environment. Hence, GovTech startups focusing on cybersecurity are a rapidly growing industry. Startups also benefit from positive spillovers from increased awareness on this subject from other industries (financial services, telecommunications) and new regulations (e.g. GDPR). Because governments will have to, and want to, digitalise, and because of the precious character of their citizens' private data, they need to create a safe environment within their internet environment. That is why the role of the European Union Agency for Network and Information Security (ENISA) is becoming more prominent, and its competences have been strengthened lately. In fact, since 2019, following the bringing into force of the Cybersecurity Act[15], ENISA has been tasked to prepare the 'European cybersecurity certification schemes' that serve as the basis for certification of products, processes and services that support the delivery of the Digital Single Market. The European Cybersecurity Act introduces processes that support the cybersecurity certification of ICT products, processes and services.

Governments cannot allow data leakages of criminal records, secret-defence documents or other sensitive information. GovTech startups can help them secure their digital front doors and support the transition to fully digital data systems. As cybersecurity becomes one of the most important factors in the European digitisation, it represents a major pillar to the GovTech development. To that extent, many recently founded startups offer cybersecurity solutions to governments et corporate firms to secure citizens from cyber threats.

CyberY (UK), founded in London in 2014, delivers end to end solutions to help its clients implement **stronger and more sustainable innovation ecosystems**, and has contributed to shaping the UK government vision for cybersecurity.

Darktrace (UK), considered as one of the leading companies in cybersecurity innovation, was created in the UK in 2013, and applies top of the line **AI systems to cyberdefense**. It proposes a solution that reacts almost instantly to cyber threats and protects customer networks.

15 https://eur-lex.europa.eu/eli/reg/2019/881/oj

2.1.5 Smart cities

More than 75% of the European population is expected to live in urban areas by 2050[16]. New technologies allow governments and municipalities to gather useful information about how their citizens live and use public spaces, in order to make cities more efficient and liveable. **SmartCities are urban areas that harness technologies to deliver better services, reduce costs, and increase quality of life**. Urban infrastructure can greatly benefit from new technologies, for example, using Internet of Things (IoT) and sensors to better manage public space.

2.1.6 Civic Tech

Civic innovation is a fast-growing trend in Europe. New technologies and digitisation are helping citizens to connect with their representatives, cities and governments, which is a core component for rebuilding trust in government institutions. Startups can also improve public administrations by offering citizen-to-citizen services. By encouraging communities to engage with neighbourhood development technologies, these startups can stimulate interest in public action. Areas such as education, sustainability and public space are a strong pull factor for citizens.

16 https://ec.europa.eu/eurostat/statistics-explained/index.php/Urban_Europe_-_statistics_on_cities,_towns_and_suburbs_-_executive_summary

Smart Cities benefit from the GovTech ecosystem as it aims at improving the quality of life of everyone. To that matter, startups present in the Smart Cities domain are at the centre of the GovTech ecosystem, and many startups are being developed.

Geoide (FR), created in 2015, implements management solutions to increase **urban landscape efficiency and keep down energy costs in cities**. For that, the startup is keen at visualising and managing simultaneously safety procedures and a great variety of equipment at the same time, assess and evaluate situations in order to guarantee citizens' safety and prevent incidents to occur, whilst sharing the information collected to the citizens.

Zenpark (FR), created in 2013, is considered as a pioneer of **intelligent parking**. Indeed, it enables all drivers to book in advance their parking slots, in private parking lots, while **optimizing urban mobility and promoting sustainable development.**

An initiative in Spain, **SmartSantander**[17], acts as a **laboratory for SmartCity applications**. It disseminated more than 1 000 wireless sensors, which provide data on a vast array of parameters, from parking spots availability to environmental factors, such as heat and CO2 levels. Startups can partner with the initiative to access the data and propose solutions to help improve Santander's citizens' daily lives. The initiative has been expanded to other cities (Guildford, Lübeck, Belgrade), and helps to highlight the potential of SmartCity applications.

To that matter, **many CivicTech startups have the common goal of fostering citizen participation in civic life, allowing municipalities to communicate with their inhabitants through smartphone applications or digital platforms** for the purpose of co-creating community projects, sharing neighbourhood propositions, and even connecting public workers all around the world to share ideas :

Apolitical (UK), a British initiative created in 2015, aims to create a **worldwide network of public servants**, where all public servants can learn from each other, about all hot topics. It enables all public servants to share their ideas, issues, and get advice from their peer from across the world.

Cap-Collectif (FR), created in 2013, is a platform that was created to i**mprove the relationship between the citizens and the public institutions**, especially by providing public polls. By doing so, organizations can learn about the citizens' expectations regarding local or national politics, and thus improve and redirect their projects.

17 http://www.smartsantander.eu/

2.2 Definition of the success drivers

Within the broader ecosystem of startups and SMEs, it is possible to identify **success factors that can support GovTech organisations in achieving their business goals**. This paragraph aims at defining those common success factors.

2.2.1 Access to public markets and funding

Efforts are required to provide GovTech startups with **access to public markets**, and for public administrators to procure their solutions. It is important, therefore, to make the **procurement process more open and simpler in order to increase the interactions between public agents and GovTech startups**. Hence, public procurement is notoriously bureaucratic and time-consuming, and in the end, it drains organisations' resources and staff morale.

On one hand, there is the necessity to wisely spend public money and to avoid the risk of collusion. On the other hand, central and local public administrations are using sub-optimal solutions and they are relying on large and known vendors, which tend to overcharge and struggle to innovate. Thus, there is this pressing need for innovative solutions and creative approaches to overcome this procurement barrier.

The Official Journal of European Union (OJEU) set several procurement restrictions and requirements at different thresholds. According to OJEU suggestions, small contracts are awarded based on the Most Economically Advantageous Technical (MEAT) criterion, whereas larger contracts have a formal process defined by the regulation. **The process cycle of larger contracts** (above EUR 144 000 for Central governments, EUR 221 000 for other public sector entities) **can be shortened by partnering with a system integrator (SI), or by succeeding to enter into a framework agreement**. This offers startups an easier path to market by integrating their solutions within the offerings of larger contractors. This kind of partnership simplifies the bureaucratic burden for startups and increases their credibility. Additionally, these partnerships can be useful to startups by providing them opportunities to international expansion and a larger client base. For instance, the London Councils works with a system integrator, London Ventures, which induce services provided by multiples SMEs to answer the cities' needs.

Another work-around is offered by **Framework Agreements** (FA). FA are lists of suppliers with preferred access to public markets: public sector bodies will often only procure from companies who are suppliers listed on the framework. They are not a guarantee of future contracts but **help to simplify procurement processes. They also include a higher spending allowance for SMEs than within regular procurement procedures**. Frameworks often select listed suppliers on recurring application time windows, and last for a defined period.

In addition to access to public procurement, GovTech startups need to consider another factor that is important for their growth, **access to public funding**. Usually, governments launch programmes which provide startup funding and growth support, but, lately, governments are becoming increasingly more open to **new initiatives in order to fulfil public needs: open-challenges and government-backed programmes invite startups and SMEs to provide solutions to public issues through designed sponsorship**. CivTech 2.0 is a Scottish government initiative that calls for solutions to specific issues, and startups and SMEs are required to fulfil extensive tenders' requirements. Public entities are also welcoming pilots and free trials in some instances. This open call for challenges allows startups and public actors to develop a relationship before sales, and to better understand and align with each other. Pilots allow GovTechs to design proof-of-concepts without entering restrictive procurement procedures; free trials allow public workers to validate the value that a new solution might bring and its usefulness. But free trials and pilots can make startups choke through piling costs, and those small actors should keep cautious and find the right balance between gaining exposure and securing stable sales.

An example of GovTech that succeeded in overcoming these challenges is CityMart. During an interview, its CEO and founder, Sascha Haselmayer, remarqued how CityMart has been able to understand the importance of obtaining trust and educating governments about existing problems with the public procurements processes by selling them the right technology, adding value to their service and providing them with an interesting story telling. The main highlights of the interview are summarised in Figure 6.

SUCCESS STORY - **CITYMART** - Interview pills

Keeping in mind that **public procurement** accounts for around 10% of the GDP, Citymart wanted to change the way in which governments "procure", or in other words, how they can **improve the process of buying goods and services** that cannot be obtained internally.

Sascha Haselmayer
CEO and Founder

Startup name: **Citymart**

Year of foundation: **2011**

HQ: **London**

Category: **General Public Services and Administration**

Mission: **Citymart believes every procurement is an opportunity: to innovate, to save money, win contracts and improve life for city workers and residents.**

Contact: **sh@citymart.com**

The development of a **technology** with a long term perspective valued throughout the selection of a fair **price** for the service in addition to a good **story telling** are the three ingredients of **success**.

Usually the **competitors** can copy you or can **take the attention** of your clients. In this sector, the second one is **more dangerous** because government are very busy, easily distracted and therefore, tend to rely only on trusted parties that they already know. For Citymart it was key to **build trust with the governments**, because a trusted position in the market is very valuable.

The main problem for Citymart was that there were **no available data** about government procurement processes. **Startups** should have "**more voice**" to provide evidence to the governments and to influence the research behind multiple topics.

2.2.2 Understanding governments' challenges

Several countries are bringing startups and potential public sector clients together by creating dedicated GovTech laboratories, where public sector challenges are announced, and startups can propose their solutions. The GovTech labs in the UK, Portugal and Poland are just a few examples. These laboratories help the **opening of communication channels between startups and the public sector, and usually are connected to granting programs to financially sustain startups**. For example, Lithuania plans on launching a GovTech lab, which will foster and support its startup ecosystem, and will also foster opportunities for them to work with public organisations. This initiative is supported by the Minister for Economy and Innovation, and is driven by the desire to encourage young and innovative businesses to develop, test and commercialise solutions, thus improving the relation between the public sector and society. This way, solutions will be found to solve specific public sector challenges.

When it comes to understand governments' challenge, it is important to have an **open dialogue with public administrations**. Denmark is facilitating the collaboration between GovTechs and public administrations through its Innovation Centre. As reported in Figure 7, Thomas Poulsen, COO of the Innovation Centre of Denmark, suggests to young startups "to build something tangible, visible and encourage new form of collaboration".

2.2.3 Access to data

GovTechs need to have solid access to data to be able to innovate. Initiatives to make data public will allow the development of new solutions startup. When data is not made public, it favours big players who have their own access to data. For instance, the **Executive Agency for Small and Medium Enterprises (EASME) is looking towards fostering leadership and collaboration between cities and regions** across the economy, in order to transform territories, and **facilitate startups and SMEs' access to talents, technologies and Big data.** This will allow startups and SMEs, who are more agile and innovative, to analyse the business needs of territories come up with solutions that fit everyone's expectations, from the governments to the mayors' offices, passing by society.

A GovTech that successfully managed to access data is represented by Polyteia. Faruk Tuncer, CEO and founder, shared the key factors that led to the achievement of this results as summarised in Figure 8.

SUCCESS STORY - **CONSULATE GENERAL OF DENMARK** - Interview pills

In terms of the approach used to ensure an effective way for **startups and governments to encounter** themselves, the **American** one seems lighter and more **effective** than the European one.

Thomas Poulsen
COO

Project name: **Citymart**

Year of foundation: **2011**

HQ: **Palo Alto, California, USA**

Category: **General Public Services and Administration**

Contact: **thopou@um.dk**

The **understanding** of governments' challenges is a **key success factor** for GovTech to gain competitive advantage, indeed there are plenty of examples which demonstrate the failure of projects due to lack of communication.

Along its life-cycle a startup can encounter different **challenges** mainly related to the **selection process** made by the governments, resulting in the amount of time startups need to invest without ever seeing money.

My advice to young startups: to build something **tangible, visible** and encourage new form of **collaboration.**

SUCCESS STORY - **POLYTEIA** - Interview pills

The idea was born starting from the need of understanding how municipal leaders like mayors, county heads, department heads **take their decisions** and how they **use data** to influence their decisions.

Faruk Tuncer
CEO and Founder

Startup name: **Polyteia**

Year of foundation: **2018**

HQ: **Berlin**

Category: **General Public Services and Administration**

Mission: **Polyteia is the smart governance platform for cities and towns.**

Contact: **faruk.tuncer@polyteia.de**

The key **success** factors behind Polyteia have been **cooperation** with the cities and the **focus on the public sector**.

What really **differentiates** Polyetia from others is that they fully embrace the reality of Government's **decision-making process**.

The first main challenge is the **slow government sales cycle**. Even if governments are motivated, the public procurement procedures that are in place take long time to be realized and to receive a feedback. The second main challenge is about the **heterogeneity** of skills and expectations that exist among different administrations. So the best advice is to focus on strengthening the **brand** and pushing on **reputation**.

3

The European GovTech startups radar

*This report aims to investigate the **GovTech ecosystem at the European level**. In this perspective, in addition to defining what a GovTech is, Chapter 1 also highlighted the role GovTech startups play in advancing government innovation. GovTech startups foster the use of emerging technologies to reshape the way governments operate and help them deliver better and more efficient services while enhancing interactions with businesses and citizens. In Chapter 2, the main trends shaping the public sector innovation were identified, among which are Big data, cloud computing, cybersecurity, artificial intelligence, SmartCities and CivicTech.*

*Following the overview provided on the European GovTech ecosystem, this report presents **the radar of European GovTech startups**, which maps a total of **500 startups within the 27 Member States, the UK and Israel**. As this is the first edition of the European GovTech startup radar, it does not, neither aims to, map all the GovTech startups in Europe. This is because, given that GovTech is such a rapidly developing sector, there are always new startups emerging in the field. Furthermore, some startups cater to several clients and do not necessarily specialise in working for governments only, making them harder to map or categorise.*

This chapter, firstly, presents the methodology followed to put together the European GovTech startup radar and then breaks down, in a detailed way, the composition of the radar by sector and technology, providing some reasoning behind the trends that emerge from the radar.

3.1 Identification of the criteria and data sources

Before setting out to select GovTech startups for the creation of the European GovTech startups radar, the criteria to be used for the selection of relevant GovTech startups has to be determined. For the purpose of the European GovTech startups radar, we define GovTech startups as:

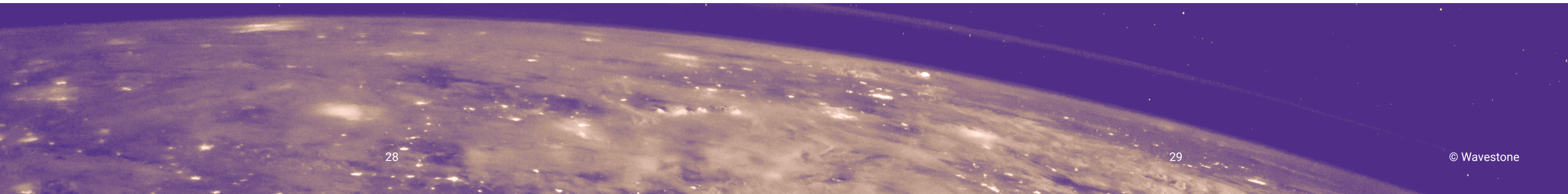
- **Companies younger than 10 years**
  The companies included in the radar were incorporated from 2010 onwards
- **Companies with headquarters located in Europe**
  The geography of this radar is European Union centric. It implies that only companies founded in one of the 27 Member States, the UK and Israel[18] are included
- **Companies that fall under our definition of GovTech**
  Under Chapter 1 were included

Based on these three main criteria, a total of **500 GovTech Startups were identified, analysed and classified according to the public sector segment that they target and their core technology**. The identification and selection of the startups relied mainly on three accredited sources: Crunchbase[19], Dealroom[20] and research papers.

18 10 startups from Israel were included due to numerous studies confirming their strong presence in the European ecosystem.

19 Crunchbase, owned by TechCrunch, is a leading platform for finding business information about both private and public companies on a global scale.

20 Dealroom identifies promising companies and helps businesses and governments to explore companies providing innovative solutions.



3.2 The European GovTech startups radar: public sector view

The European GovTech radar maps a total of 500 GovTech startups. When clustering startups together, the **key sectors** to which startups provide their solutions emerged.

In order to apply an accredited classification to the European GovTech startups radar, and at the same time, to make the radar easy-to-read, a modified version of the Classification Of the Functions Of Government (COFOG)[21], was used.

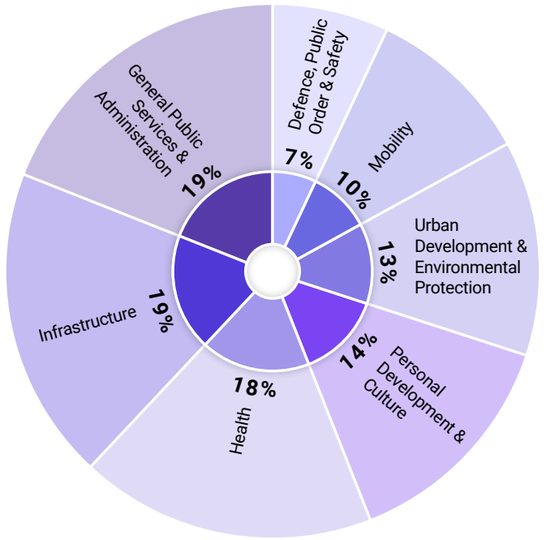
This initial classification was hardly applicable to the European GovTech startups radar for two main reasons. The first one being the rapidly evolving offer of public services with the consequential rise of new sectors. Secondly, a majority of the startups in the radar offer solutions that relate to multiple categories of the COFOG classification.

These being the reasons, a customised categorisation that uses COFOG as a basis was used to map the startups in the radar:

1. General Public Services and Administration;
2. Infrastructure;
3. Health;
4. Personal Development and Culture;
5. Urban Development and Environmental Protection Mobility;
6. Mobility; and
7. Defence, Public Order and safety.

Figure 4 provides an overview of the European GovTech startup radar results and the breakdown per category.

Figure 4 - GovTech startup breakdown per public sector segment



Note: The chart was compiled by Wavestone based on the European GovTech Startup Radar database. N=500.

21 The COFOG classification was created by the Organisation for Economic Co-operation and Development (OECD) in 1999 and then updated in 2011. The latest version of the COFOG classification is characterised by ten main categories that cluster the public services by macro sectors, and a second level that defines the specific domain.

3.2.1 General Public Services and Administration

GovTech startups classified under this category refer to startups that aim to **modernise and empower public administrations** by fostering connections, collaborations and interactions between governments, companies and citizens; to optimise the management and the efficiency of governments by **digitising general public services, activities and bureaucracy; and to enhance consensus and transparency in decision-making.**

This category was drawn from the governmental function "General Public Services" identified by the OECD that encompasses executive and legislative organs, financial and fiscal affairs, external affairs, foreign economic aid, general research, basic research, R&D related to general public services, general public services, public debt transactions and transfers of a general character between different levels of government. The database of GovTech startups highlighted some trends that led to the creation of a new categoryderived from "General Public Services" that was defined as "General Public Services and Administration".

This category includes **19.20% (96) of startups and it represents one of the two categories with the highest number of companies**. The reason for such a high proportion of startups belonging to this group is the variety of public services that are gathered under this group and the level of innovation that GovTechs can bring to governments in relation to those services. For instance, startups are helping governments in increasing public participation in the decision-making process; in empowering city officials to better serve their communities through access to data; in making online identity verification through smartphone or any computer device, and in providing a smart governance platforms for cities and towns that produces real-time analytics and reports.

3.2.2 Infrastructure

This category refers to GovTech startups that **deliver** solutions corresponding to the fields covered by the COFOG under the form of **infrastructures**, with a focus on transportation facilities including logistics and shipping, industries, energy management, water management, environment monitoring (water, air and earth thanks to technologies such as sensors and drones), agriculture, fishing, space and satellite-associated services.

Within the framework of the Europe 2020 strategy stands the desire of the EU to develop: modern infrastructures that will stimulate jobs, growth and investment; the deployment of Intelligent Systems; and the digitalisation of numerous sectors. In addition, one of its main objectives consists in developing sustainable solutions that will contribute to a **resilient Energy Union in line with the forward-looking Climate Change Policy** to ultimately contribute to a **smart, sustainable and inclusive economic growth.**

This category consists of **96 startups, or 19.20%** of the total GovTechs of the radar. The analysis highlighted **some trends among GovTech startups that aim to develop infrastructures**. Innovation is focusing in developing efficient, sustainable and safe infrastructures to enhance the following sectors: energy, telecommunications, tourism, resource tracking, agriculture and farming, fishing, engineering, and space technologies as satellite.

3.2.3 **Health**

This category of the European GovTech startups radar mirrors the structure of the one defined in the COFOG classification. The "Health" category includes GovTech startups providing solutions related to **products, services or technologies which improve the access, research and providing of healthcare, sickness and disability, and old age.**

The Health sector is one of the pillars of general interest within the European Commission due to its **social and economic role**. In fact, it accounted for **9.9% of public expenditure relative to GDP in 2015**[22] for the EU28.

According to the EU Health Programme 2014 – 2020 concerning the health sector, the EU is facing **three major challenges in this domain**. The first one is that the sector will be needing one million additional health professionals by 2020. Second, the sector needs to increase research spending in the fight of chronic diseases. Hence, health spending is estimated to double by 2050. Third, there is the need to strengthen cooperation between Agencies and Scientific Advisory Committees among Member States. These challenges in the heath sector provide a window of opportunity for GovTech startups.

A total of 91 startups (18.20%) provide services and solutions related to the Health category. Most of the Health startups built in the GovTech Radar have for purpose to increase the amount of digital **transcriptions of patient data** (facilitation of monitoring and processing of personal health data with electronic health records or wearable devices for instance) and another major part of startups aim to implement technological solutions in **health treatment and diagnosis analysis.**

3.2.4 **Personal Development and Culture**

This category is the result of the merge among two categories of the COFOG classification, **"Recreation, Culture and Religion" and "Education"**. This category includes the following public services: recreational and sporting, cultural, broadcasting and publishing, communities, R&D recreation, religion, education (pre-primary, primary, secondary, post-secondary non tertiary and tertiary) subsidiary services to education, R&D education, unemployment, social exclusion, R&D social protection and social protection.

The implementation of the Europe 2020 strategy aims to create an inclusive society by promoting a cross-border and inter-cultural cooperation in education, research, youth, culture and sport while developing individuals' skills, mobility, jobs and growth. In addition, technological transformation, global competition forces and demographic changes must be considered as they affect the way people work, consume and live, making the labour market very dynamic and diverse. To achieve these objectives, **massive investments in skills, education and lifelong learning systems are required** so that Member States can leverage the full potential of education and culture to boost job creation, economic growth, social fairness and Europe unique identity.

In this perspective, the radar highlights some trends in line with the Europe 2020 Strategy. **A total of 13.60% (68 startups) of the identified GovTech startups** provide solutions to help Member States to address the abovementioned challenges. In particular, GovTechs are designing their solutions to **rethink education, teaching and learning by using AR and intelligence artificial**. The same technologies are used to connect skilled individuals and promote collaborations among them and help them to access employment.

22 Health at a Glance: Europe 2016 – State of Health in the EU Cycle. Joint publication of the OECD and the European Commission

3.2.5 **Urban Development and Environmental Protection**

The group of startups related to "Urban Development" addresses **solutions to digitise public utilities and municipalities to ultimately optimise processes of public administrations within the context of smart cities**. This category includes city planning tools, real estate, construction, intelligent home systems, sustainable living, revitalising ecosystems and communities, robotic assistance and intelligent voice interfaces

The group of startups related to Environmental Protection addresses **solutions related to waste management, pollution abatement and protection of biodiversity and landscape.**

The COFOG categories of "Housing and Community Amenities" and "Environmental Protection" include: housing and community development, water supply, street lighting, housing and community amenities and associated R&D; and waste management, pollution abatement, protection of biodiversity and landscape

These two categories were merged into a single category of the European GovTech startup radar "Urban Development and Environmental Protection". The reason being is that **these two sectors are usually addressed together due to the increasing awareness of the importance of environmental protection when it comes to define the urban development strategy.**

From the European Commission perspective, cities are seen as both the source of and solution to today's economic, environmental and social challenges. As urban areas are defined as engines of European economy and catalysts for creativity and innovation in the European Union, urban development is needed to be in the centre of EU's Regional Policy.

Therefore, from 2014 to 2020, the urban dimension has been placed at the heart of Cohesion Policy where about 50% of the European Regional Development resources will be invested in its development. The Cohesion Policy beyond 2020 will keep investing in regions of Europe. This will especially focus on five policy objectives around a smarter, greener, connected, and social Europe with new cross-cutting objective in order to bring Europe closer to citizens thanks to the support of developed investment strategies at local level.

The 64 startups (12.80%) that constitute this category are providing solutions in this domain. In particular, they are supporting governments in modernising the way in which urban development is managed. Due to the amount of data available, urban development can **leverage innovative technologies, as AI and Big data, to take more efficient decisions and cut costs**. These decisions are leading to a more responsible use of natural resources and a greater use of alternative energy's sources.

3.2.6 **Mobility**

Startups classified under this category refer to GovTechs that aim to **reinforce capabilities of public entities and citizens by optimizing and modernizing mobility; providing alternative transport solutions; enhancing mobility as a service (MAAS) and shared mobility; optimising parking solutions and travel itineraries; and generating improved plans.**

This category derives from the governmental function "Economic Affairs" identified by the COFOG classification that encompasses general economic, commercial and labour affairs, agriculture, forestry, fishing and hunting, fuel and energy, mining, manufacturing and construction, transport, communication, other industries and economic affairs and associated R&D.

Although "transport" is presented as a subcategory of "Economic Affairs", the analysis of GovTech startups revealed a significant proportion of companies that develop products or services related to transportation or mobility and, thus, it was decided to create a separate category for "Mobility".

The mobility and transport sector is a key component of the Europe 2020 strategy, which encompasses the development of modern and adequate infrastructures and intelligent transport systems (ITS), measures to improve the safety, security and environmental performance: this strategy ultimately aims to provide European citizens and businesses with secure, safe, efficient, competitive and sustainable transport services: the Single European Transport Area. To achieve these, investments, innovation and digitalisation are required to digitalise and decarbonize Europe's transport network to best serve individuals and maintain EU's influence globally. In addition, the implementation of digital technologies and sustainable and innovative transport and mobility solutions play a key role in the EU's energy and climate objectives and solutions are being brought to solve roads' congestion, sustainability, air quality, infrastructure while maintaining high levels of competitivity.

This radar highlighted some trends among the **52 GovTech startups (10.40%)** that aim to provide solutions to the field of transport and mobility. In fact, most identified solutions aim to optimise or modernise mobility, provide alternative transport solutions among which some environmental-friendly ones, empower citizens and public entities with accesses to new services, **promote mobility as a service and shared mobility, and optimize parking solutions and travel itineraries.**

3.2.7 **Defence, Public Order and Safety**

This category represents the gathering of two different categories as defined by the OECD, "Defence" and "Public Order and Safety". The "Defence" category covers startups that are in relation to military defence, civil defence, foreign military aid, R&D in defence and defence, whilst the "Public Order and Safety" category englobes Police Services, Fire-Protection Services, Law Courts, R&D in Public Order and Safety, Public Order and Safety.

For the purpose of the GovTech startups radar the two categories have been merged, due to the common scope providing services which help **increasing citizen safety inside and outside of the country.**

In the past four years, progress in EU security and defence initiatives were significant. In 2016, the European Commission proposed a European defence action plan to enhance autonomy in the European Union, meet current and future security needs and strengthening its ability to act with partners. In 2017, the European Defence Fund (EDF) was created to coordinate, supplement and amplify investments in research (grants for collaborative research in innovative defence technologies and products), development of prototypes and acquisition of defence equipment and technology.

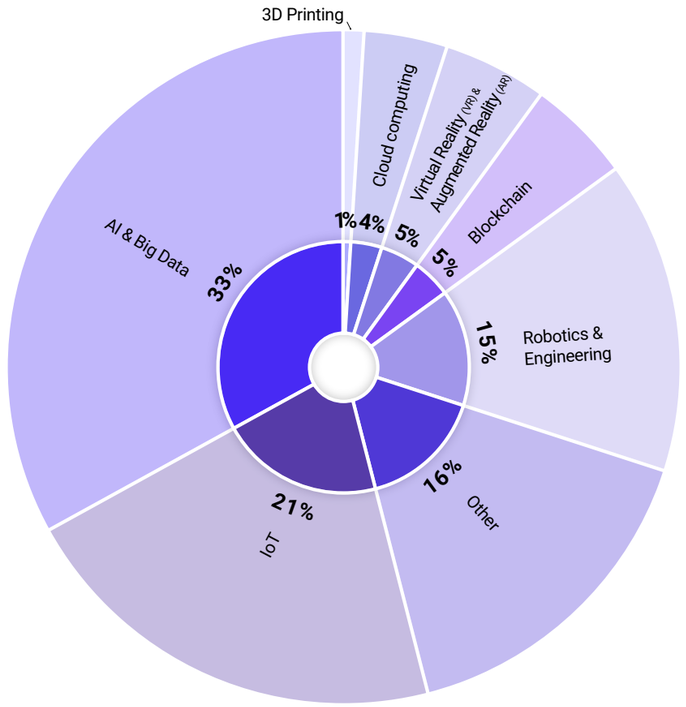
The analysis highlighted that only **33 GovTechs (6.6%)** are providing solutions in this domain and they are mainly focusing on providing solutions related to **cybersecurity and IT infrastructures**. The low amount of startups in this category, despite the market opportunity, might be due to the fact that it is a capital intense sector and public administrations have stricter procurements requirements when it comes to national defence and security.

3.3 The European GovTech startup radar: technology view

The GovTech industry is a developing sector that is increasing its role in the digital society and GovTechs are developing not only new services, but also new technologies. Therefore, an analysis on the technologies used by GovTech startups can offer valuable insights to governments, companies and citizens. To this end, the European GovTech startups radar includes a sub-categorisation, which clusters GovTech startups according to the technology they use.

Figure 5 provides an overview of the European GovTech startup radar results and the breakdown per technology.

Figure 5 - GovTech startup breakdown per technology



Note: The chart was compiled by Wavestone based on the European GovTech Startup Radar database. N=500.

The main technologies that constitute the sub-categorisation are the following:

1. **Artificial intelligence and Big data;**
2. **Internet of things;**
3. **Robotics and engineering;**
4. **Virtual reality and augmented reality;**
5. **Blockchain;**
6. **Cloud computing;**
7. **3D printing; and**
8. **Others.**

Some of these technologies were already highlighted under Chapter 2, while describing the main trends within the European GovTech startup ecosystem.

The main goal of this section is to **provide an overview on the technologies that European GovTech startups are leveraging to innovate within governments**. To this end, the abovementioned technologies will be described to understand how they can benefit public administrations.

3.3.1 Artificial intelligence and Big data

These technologies were already detailed under Chapter 2, and together they represent **33% (166 startups) of the underlying technology** that GovTechs use to deliver their services.

Due to the rapidly increasing amounts of data available to governments, and due to a more organised way to store and use data, public administrations can deliver better public services. To this end, startups are focusing on two main aspects related to Big data: **collection and analysis**. A successful collection process is related to ability of creating new devices that can gather as much data as possible or to the ability of reusing existing devices to automate data collection. In both cases, it is critical to integrate these solutions within the public infrastructures. For example, in Denmark most of the water management companies are owned by the Government and a GovTech startup created a system that integrates the existing water pipeline with state-of-the-art sensors. In this case, the startup was able to satisfy the need for data of public administrations by concretely addressing the problem of tracking the water flow instead of thinking to a solution for the macro-system of water management, which eventually would have resulted in a more expensive solution.

For what concerns the use of data, **its most innovative usage is through artificial intelligence**. As said before, the collection of big amounts of data one of the required building blocks for the successful implementation of artificial intelligence (AI) innovations. The application are numerous, from chatbots to call dispatches, from machine-learning to infrastructure management.

3.3.2 Internet of Things

The Internet of Things (IoT) consists in **a network of physical objects that are connected to the Internet and that can electronically gather, treat and share information.** The Internet of Things is embodied through a large variety of **"smart" devices** that are applicable to many fields including industrial processes to measure production processes; health through the monitoring of the human body or urban planning within the context of smart cities. The objective of this technology lies in having a multitude of "smart" devices that **self-report in real time important information** more quickly than a human intervention-based system. IoT has the potential to radically transform many fields and to **improve decision-making processes and general efficiency,** offering a competitive advantage to governments to reduce overall costs.

Additionally, "smart" devices are often used by GovTechs to provide real-time information to public bodies. The use of real-time information can result in a reduction of roads' congestion in peak hours, in a prompter reaction of the police in case of danger or even to prevent structural disaster of public infrastructure.

A total of 103 (20.6%) companies of the GovTech radar are using this technology.

3.3.3 Robotics and engineering

Robotics are a subset of engineering, which consists in the use of scientific principles to design and build **structures and machines to be applied to various fields of expertise**. Robotics, as for it, is a branch of engineering that encompasses mechanical, electronic and information engineering and computer science. In this perspective, robotics aims to replicate human actions and can be used for a broad range of applications. Robotics and engineering play a **key role to help companies in their economies of scale or processes**, or help people increasing their quality of life. Environmental protection and the integration of renewable source of energy with the existing one is attracting an increasing number of startups. These GovTechs are applying state-of-the-art technologies and are looking for governments' support to undertake challenging engineering projects and scale their solutions from single facilities to entire cities.

That is to say that robotics and engineering play an essential role in most of the categories previously defined, especially in *Health, Mobility, Defence, Public order and safety and of course Urban development and environment protection*. Within the GovTech startup radar **77 (15.4%) startups provide solutions that rely on robotics and engineering.**

3.3.4 Virtual Reality and augmented reality

Virtual reality (VR) consists in a computer-generated simulation or an artificial 3D environment in which individuals can interact and explore as they might in the real world thanks to the use of special electronic devices including electronic goggles equipped with a screen or gloves with sensors. As we perceive the environment through our senses, perception mechanisms and interpretations made by the brain, VR seeks to **generate an artificial and illusory environment through the presentation of artificial information to human senses**. This technology is relevant to governments as it enables added-value applications: VR can simulate environments and, thus, provide a broad range of **training opportunities** for military, medicine, law enforcement, driving, etc. In addition, VR generates **immersive experiences** that enhance numerous activities such as tourism, education, movies and real estate.

Contrary to VR, Augmented Reality (AR) does not create an artificial 3D environment but **puts virtual visual, sound and sensory information on top of the existing physical environment to enhance the real-world experience**. AR enables the rise of data collection, deeper and refined analysis of the environment of its users while providing them with knowledge and features or services such as interactive travel itineraries. Furthermore, AR enables tangible benefits, including the enhancement of purchasing processes thanks to the visualisation of products in specific environments or the optimisation of the learning process in the health care sector thanks to the projection of detailed 3D images of body systems. Although smartphones and tablets are technically limited, a proliferation of a smart eye-wearable device would enable to fill the gap between real and virtual worlds, thus benefitting to the development of AR.

Despite the various application of these technologies, **only 25 startups (5%)** are applying them. This could be primarily due to the early stage of those technologies and their currently rather limited applicability in the public sector. Nevertheless, the number is likely to increase in the near future.

3.3.5 Blockchain

A blockchain is, in the simplest of terms, a time-stamped series of **immutable record of data that is managed by cluster of computers not owned by any single entity**. Each of these blocks of data (i.e. block) are secured and bound to each other using **cryptographic principles** (i.e. chain). This technology consists of a shared and immutable ledger that aims to facilitate the recording of transactions and tracking of tangible and intangible assets in a network, thus reducing risks and cutting costs. Information is stored in blocks that are tied up together forming a chain of blocks that no one can tamper with. Blockchain has the potential to drastically transform and improve the various aspects of everyday operations, including those of public administrations. In fact, the technology is used to provide governments and citizens with trusted electronic ID solutions that ensure full transparency in transactions, thus reducing time and cost of operations. In this perspective, blockchain ensures, user-centricity, traceability and high levels of trust in digital public services.

The use of blockchain within public sector is increasing and it is evident by an increasing number of national strategies focusing on the integration of this technology into the public sector. An example is provided by Germany: the German government has passed a new strategy[23] outlining the ways the country is planning to use blockchains. The strategy sets the government's priorities in the blockchain space, such as the digital identity, securities and corporate finance.

For the time being, the GovTech startup radar contains **24 (5.4%)** companies using blockchain.

3.3.6 Cloud Computing

Cloud computing was identified as **one of the main trends** within the European GovTech ecosystem, but **only 18 companies, or 3.6% of the startups, are providing Cloud computing solutions**. The reason relies on the financial resources needed to develop and provide this technology. Thus, lots of startups provide solutions that use Cloud computing services offered by larger players.

Due the high interest in this domain, this trend will only pick up pace, as governments increasingly focus on reengineering their services and using cloud computing.

23 https://www.bundesfinanzministerium.de/Content/EN/Standardartikel/Topics/Financial_markets/Articles/2019-09-18-Blockchain.html#:~:text=The%20German%20government%20has%20adopted,potential%20to%20advance%20digital%20transformation

3.3.7 **3D Printing**

3D printing, also called **additive manufacturing**, is a computer aided manufacturing tool that builds 3D objects where **specific features were previously coded on a software system**. The objects can be made of basic materials or custom materials, and its variety of usable materials strongly increases.

For the time being, only a limited number of startups (1%) are providing 3D printing solution to the public sector, but this technology is expected to keep on expending is presence due the numerous benefits it can bring to public sector. In particular, this technology is especially helpful within the health sector since it allows more reactivity and flexibility when it comes to the creation of specific drugs or implants.

3.3.8 **Other**

GovTechs uses a variety of different technologies that goes beyond the ones listed above. For this reason, a category that gathers all the other technologies was created. The majority of these startups provide services through an **app or a website** that aim to offer **e-learning services**, enhance **online communication, connections and interactions** between multiple parties, provide **specific exchange platforms** (e.g. marketplaces) and **foster communication and sharing of information for decision-making processes.**

Conclusion

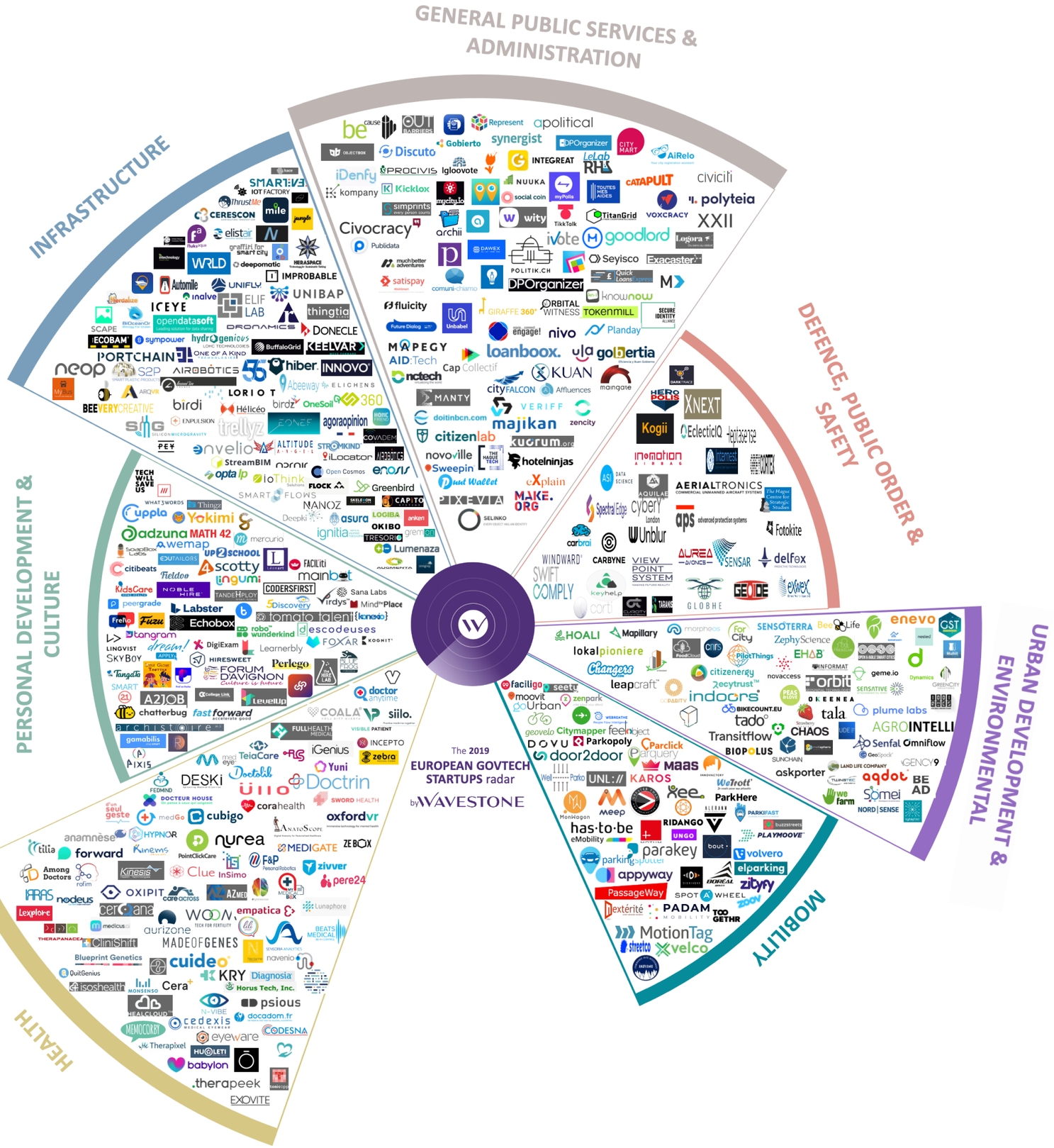
Governments are increasingly dedicating resources to innovate the way in which public services are delivered. The innovation does not only target the way in which services are provided to citizens and business, but it embraces a broader concept of modernisation of public administrations. It involves technological progress, improvement of the internal processes, stimulation of the economy through new initiatives and the fulfilment of the constituents' needs by dint of new policies.

In this context, the B2G ecosystem is evolving at an increasing pace and new players are shaping its internal dynamics. We identified the GovTech sector as one of the most relevant ones due to its ability to harness emerging technologies and offer innovative solutions to help to solve the key challenges faced by the public sector at all levels, i.e. national, regional and local.

The data collected within the European GovTech radar shows that key governmental sectors, such as General Public Services and Administrations and Infrastructure and Health are the ones benefitting the most from the GovTech startups. The fact that relatively small and medium companies were able to enter in these critical domains is due to the ability of GovTechs to adopt the latest technologies like AI or Big data and to customise their offer to accommodate the needs of public administration.

However, it is revealing that GovTechs, which adopt more capital intense technologies, such as Cloud computing, account only for a small portion of the market. It indicates that the sector is still facing some challenges that are capping its growth. These challenges are related to the limited access to public procurement and the lack of legal frameworks supporting SMEs. Thus, the bottom-up push for innovation of GovTech startups has to be matched by the willingness of governments and institutions to create a sustainable ecosystem. This trend has already started-off with several financial initiatives at European and national level trying to create incentives for innovative GovTech startups to proliferate. However, the lack of legal initiatives is slowing down the process and it is damaging the GovTech sector, and, most importantly, it is damaging the ability of governments to innovate by leveraging the backbone of the European economy composed by small and medium enterprises.

To this end, several countries, as for instance France, have started to adopt a more proactive approach by opening up the dialogue with the GovTech ecosystem to understand its needs and to collaborate in addressing them while supporting the government in its digitalisation process. The results are encouraging, but the untapped potential is considerable. The French experience shows that there is the need for a central government that adopts a political decision to incentive collaboration with startups and support them, especially when it comes to public procurement. This cultural change will allow putting the technologies to serve the public interest.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