Shaping Digital Government Transformation in the EU

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Headlines

- Policy makers are faced with the urgency of embracing the complexity involved in the demanding task of 'reinventing governance in the digital age', at a crucial moment for the future of Europe and its role in the global policy debate.

- The future of Digital Government Transformation will depend on the capacity of governments to effectively 'steer' the digital transformation process, and the extent to which citizens will be actively in charge of their digital lives, with specific regard to their rights as data subjects.

- The Covid-19 emergency revealed the unpreparedness of our society to deal with unexpected challenges, but also raised hopes of exploiting the opportunities that emerged to achieve a real Digital Government Transformation.

Lift-off towards Digital Europe 2040

Taking on board the debate on digital transformation and global governance

The current debate on digital transformation is engaging scholars and policy makers worldwide and it has assumed a high relevance on the global governance agenda. In addition, in the aftermath of the Covid-19 pandemic crisis, narratives have emerged exaggerating either the benefits or the dangers of digitalisation and remote work.

The wider policy discussion on digital transformation focuses on the opportunities and challenges provided by new technologies such as 5G, IoT, cloud computing, and broadly defined Artificial Intelligence (AI). This debate also explores the growing power of the largest online platforms that have built their business models on the accumulation and utilisation of personal and non-personal data.

The policy tools under consideration are varied, ranging from algorithmic transparency to proposals for radical solutions, such as imposing a public utility regulatory regime on dominant online platforms. Nevertheless, careful consideration should be given to the risks and trade-offs of the policy solutions to be defined, as an unnecessarily restrictive approach could stifle innovation and, paradoxically, entrench the power of the incumbent players.

The European Commission expects that AI will significantly improve the lives of European citizens and bring major benefits to society and the economy through better healthcare, safer transport, more competitive industry, sustainable farming, and more efficient public administration. However, in order to take advantage of AI technologies, the public sector must also deal with a number of economic and organisational barriers. AI may also challenge the traditional cultural norms of society and face resistance from citizens to its widespread adoption.

With regard to this, an ongoing discussion is taking place on the legal and ethical implications posed by the greater use of AI. One key issue is transparency, or the lack thereof, in the algorithms on which AI applications rely. A need exists to study and understand where algorithms may go wrong in order to adopt adequate and proportional remedial and mitigation measures. Importantly, as technology advances, more instruments become available to quantify the degree of influence of input variables on algorithm outputs. Research is also underway that focuses on rendering algorithms more amenable to *ex-post* and *ex-ante* inspection.

The European Commission has been very active in collecting evidence and suggesting policy insights concerning AI and other new digital technologies, starting with the 2018 Communication on 'AI Made in Europe' and leading to the AI White Paper and the European Data Strategy part of the package 'Shaping Europe´s Digital Future' of February 2020.

In particular, the Commission White Paper suggests a strategy aimed at creating both an ecosystem of excellence and an ecosystem of trust, making AI systems 'ethical by design'. The European data strategy aims to establish a path for the creation of European data spaces, whereby more data will become available for use in the economy and society, but under a firm control of European companies and individuals.

In other words, the main vision characterising the Commission's initiative is the creation of 'human-centric AI', while at the same time supporting the EU's technological and industrial capacity and the uptake of AI across the economy, and preparing for socio-economic changes. A three-pronged approach also aims to promote European democratic values, respect for fundamental rights, and to contribute to a sustainable, climate-neutral and resource-efficient economy.

Scenarios for Digital Government Transformation at the horizon 2040

In light of both the findings of the DigiGov research and the broader debate on digital transformation pinpointed above, we have elaborated – as part of the prospective component of the study – future scenarios for Digital Government Transformation at the horizon 2040.

These scenarios were co-designed during an online foresight Policy Lab involving the experts and stakeholder representatives who form part of the DigiGov Community. This allowed the validation of the underlying assumptions proposed by the research team, and the generation of ideas to enrich the storyboards and approximate them to possible realities through retro-planning, as well as integrating insights that emerged from the structured discussion, embracing the opinions of multiple actors with conflicting views and divergent interests.
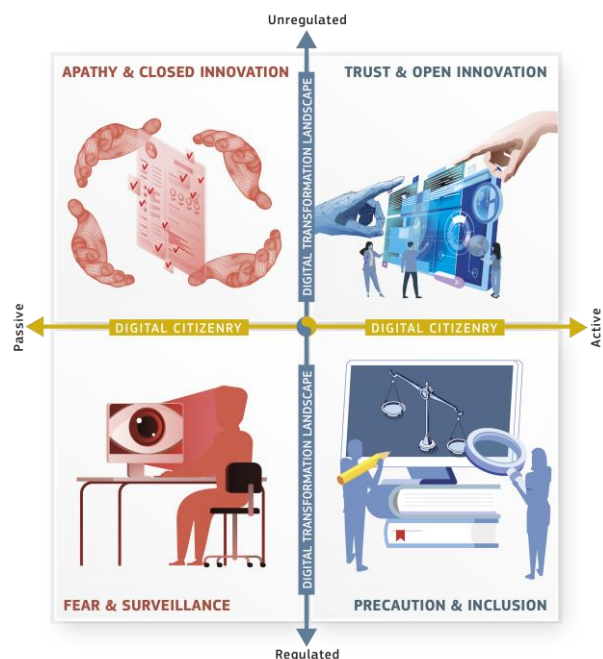
In this regard, and in view of the allegedly positive side-effect of the Covid-19 pandemic, which appears to have accelerated the full digitalisation of many aspects of our lives, there are two broader aspects that should be considered when addressing digital transformation and the role of the public sector. The first concerns digital strategic autonomy and data sovereignty. The second is about the trade-off between a precautionary and a cost-benefit approach to data governance and AI regulation.

The first aspect inspired the European data strategy and was further emphasised in a recent report for the European Parliament that expressed concern that, while Europe is at the forefront of research and on a par with its global competitors, it nonetheless lags behind the US and China when it comes to using this research to developing commercially-viable products and services. In response, the

data strategy proposes the construction of an EU data framework that would favour and support the sharing of data for innovators, particularly in the business-to-business (B2B) or government-to-citizens (G2C) domains.

The second aspect points to the importance of finding a balance between managing risks and boosting innovation. The policy debate revolves around two competing positions. On the one hand, some stakeholders argue that any attempt to regulate the digital transformation landscape would undermine efforts at innovation. An opposing view suggests that in the face of uncertainty, a strong regulatory approach based on the precautionary principle is necessary. Opponents of the precautionary principle argue that a cost-benefit analysis, applied case by case, is more reasonable. In the domain of AI in particular, the precautionary principle suggests that although dangers should not be downplayed, they should not be overstated either, because this may induce a negative public discourse that would constrain innovators from taking risks on investment and experimentation.

Building on this emerging debate and the need to find appropriate policy responses for Europe´s digital future within an evolving global context, our proposed scenarios for Digital Government Transformation 2040 are defined on the basis of two main dimensions: a) the digital transformation landscape, ranging from 'regulated' to 'unregulated'; and b) digital citizenry, ranging from 'active' to 'passive'. The dimension of the digital transformation landscape shows the extent to which government is 'steering' the process, rather than leaving to the market the responsibility for dealing with the ethical, societal and economic consequences of adopting technologies. The digital citizenry axis measures the extent to which individuals are actively in charge of their digital lives, especially with regard to their rights as data subjects. The resulting four scenarios are depicted in the figure and briefly described below.

Scenarios for Digital Government Transformation 2040

Fear & Surveillance. While this scenario may bring to mind the surveillance of the population exercised by authoritarian governments, it cannot be ruled out for our democratic societies. Although temporary, the imposition and acceptance of very severe restrictions on freedom and rights (including free movement within the EU) during the Covid-19 outbreak may, paradoxically, be read as a signal that our democratic 'antibodies' against the 'virus' of fear and control are not necessarily as strong as we may believe. One can imagine a dystopian scenario in which fear of the proliferation of Covid-19 or some other viruses, and a desire for security, has made democracies drift towards a regime under which citizens exchange their rights in return for security and health and accept widespread surveillance, based on exploitation of their data by governments and big businesses. This means full government control over digital transformation, but without regulation or laws protecting personal data. In this scenario, European values with respect to AI and privacy could be disregarded, while digital inequalities may be amplified by a lack of attention to specific groups of citizens, particularly those who are most disadvantaged and digitally excluded.

Precaution & Inclusion. This scenario resembles an extension of the traditional European social model with a more precautionary bent, in which managing risks and ensuring inclusion may limit the potential for innovation. It also places Europe's digital sovereignty at the forefront. Governments take an interventionist approach to the regulation of digital transformation and impose a 'public utility regime' on key infrastructure and dominant online platforms. For online platforms, this approach means new rules and decisions on digital competition policy (monitoring of anti-competitive mergers, taking into account the price of acquisitions and data assets; a new definition of market power; auditing of collusive algorithms, etc.). In addition to direct regulatory action, the digitally transformed government, as both a user and provider of digital services and infrastructure, sets an example and establishes good practices for the exploitation of data. The GDPR is implemented in full, and new measures and policy actions carry Europe beyond it, establishing a data governance model that is based on the full sovereignty of individual data subjects. Citizens are aware of their rights as data subjects and fully empowered to act in their own interests. They are also engaged in creating public value for the common good, and contributing to avoid social fragmentation and discrimination, strengthening digital social inclusion and increasing solidarity at both local and pan-European levels.

Apathy & Closed Innovation. Under this scenario, 'unregulated' digital transformation means that online platforms and tech giants can maintain their market power and may actually increase their dominance in terms of access to data and the continuous learning and improvements of their algorithms. Without direct public sector support for the development of 5G networks and other key infrastructure, its deployment may be delayed due to a lack of financial resources and/or might only be made available in densely populated urban areas, generating a polarisation of access (and thus widening the digital divide). In relation to data protection, the implementation of the GDPR is patchy and differs between countries. Individuals do not exercise ownership rights over their data, and large private platforms continue to extract the "behavioural surplus" (as it has been termed by Shoshana Zuboff, 2019) without effective oversight or sanctions. Citizens are passive and little concerned with their digital rights as data subjects. Imbalances in the European data economy (i.e. exporting raw data, importing refined results) are unlikely to be addressed. Policy suggestions concerning more individual control over data and their ownership remain only on paper, with no tangible implementation or effective results.

Trust & Open Innovation. In this scenario, there is no strong market regulation, and genuine multi-sectoral partnerships exist. We thus imagine a bottom-up process emerging from the digital ecosystem of innovators and users. Full individual sovereignty over data is achieved from the grassroots and takes advantage, for example, of blockchain-based technologies, which are widely accepted and deployed by all market players. NGOs, digital activists and visionaries manage to mobilise society and contribute to the emergence of an active digital citizenry. This scenario is the quintessential innovator's dream, a sort of 'back to the future' return to the utopian 'Silicon Valley' origins of the Internet. In such a scenario, a digitally transformed government could be a key actor and play a central steering role as part of a new and authentic, distributed and networked digital governance that relies on open innovation, as access to data is no longer monopolised by a few oligopolistic market players. The regulatory dimension of the digital transformation landscape should, in fact, be intended to relate not only to legal norms. Instead, it should be seen from the perspective of effectively governing data-driven digital developments, making the public sector a catalyst to unleash innovation and encourage the adoption of new technologies.

Implications for policy and research

Lessons learned: back from the future...

As is well-known by futurists, "*a scenario is a possible world... a world that does not have to be, but may yet come to pass...*" This means that none of the scenarios outlined above can be expected to occur exactly as they are described; rather, a mixture of elements from each scenario will shape the future society in which we will live. Which elements these are will depend on policy decisions taken today, and will reflect the current value systems in culture and governance.

Therefore, neither 'leave it to the market' nor 'make it a public utility' can adequately represent the full range of values, economic interests and state priorities of the EU and its Member States. Digital infrastructure, if totally unregulated, will not automatically ensure widespread innovation and reach all segments of society. In the same way, interventionist regulation would not necessarily produce the desired outcomes and might also inhibit innovation, if not well calibrated and implemented in a specific way to promote investments and social impact.

The distinction between interventionism and *laissez-faire* to some extent mirrors the juxtaposition of the precautionary and the cost-benefit approaches. In order to harness digital

transformation, governments will have to find a way to solve the dilemma that exists between innovation and regulation, in collaboration with researchers, market players, and innovators. This would allow the building of the governance framework necessary to spur innovation and build trust. Through firm, coordinated action between the EU and the Member States, the EU can virtuously connect *makers* (innovators) and *shapers* (regulators) to create an innovation-enhancing governance and regulatory framework that respects European values and rights while providing economic opportunities for all users (individuals, companies and public administrations).

This may, for instance, mean taking a precautionary approach when uncertainties concerning crucial and value-relevant issues require it, by adopting a more stringent approach to regulation. Alternatively, it may mean managing risks by assessing the costs and benefits of regulation and, when the costs outweigh the benefits, employing a softer approach or substituting it with co-regulation, steering self-regulation, and collaborating with innovators in the process of standardisation. Particularly with respect to AI, a 'sandbox' approach to regulation is advisable, and is in fact already being proposed and developed in some pioneer countries.

Policy and research recommendations

In view of the results of the empirical and conceptual components of the research, but bearing in mind the lessons learned from theoretical excursions into the future at the horizon 2040, as well as the current high-level policy debate on the implications of digital transformation for today's society, we have identified a concrete set of actionable policy and research recommendations.

These recommendations indicate directions to be pursued today in order to accumulate evidence to support policy and regulatory approaches that can maximise the positive features of the scenarios outlined above, and minimise the negative ones. These can help in anticipating unexpected risks and managing challenges, trade-offs and emerging dilemmas linked to governance innovation in the digital age.

The policy recommendations are the following:

Examining the dynamics of government platformisation versus distributed network effects. In light of the fact that several private online platforms have increased their market power on the basis of their access to and accumulation of personal data, recent research has introduced the notion of 'platform governance' as a new paradigm for redefining citizen-administration relationships. It is, however, important to gain a better understanding of the dynamics involved in the platformisation of government services, to ensure that this process benefits and empowers citizens, rather than being turned into a tool for administrative control.

Embracing e-Government 4.0 and experimenting with new 'modes of regulation'. Like Industry 4.0, e-Government 4.0 is transforming the way jobs are performed and social relations coordinated. This is affecting the very social fabric of our societies, including their 'mode of regulation' – namely, the institutional, normative and cultural elements that hold societies together. Evidence-based, inclusive debate and creative regulation are needed to

ensure that such radical changes do not result into growing inequalities and do not undermine the capacity of societies to undertake collective action. The public sector certainly has a crucial role to play in this process, not only as user or regulator but also as catalyst for the building of partnerships and to stimulate the creation of an environment that enables innovation.

Building an ethical framework to minimise the negative implications of new technologies. AI and related predictive and cognitive technologies and applications offer opportunities, but also raise concerns about their fairness and neutrality. In their dual roles as regulators and users of AI, governments should design a framework to ensure algorithmic transparency and accountability. Stakeholders should be included in this debate, and public-private partnerships should be formed to ensure that benefits are shared widely, without stifling innovation. This includes favouring the adoption of AI and other emerging technologies through the development and use of innovative public procurement, data spaces and 'regulatory sandboxes'. Policy makers should also consider introducing regulations to ensure that AI systems are designed with an ethical framework in mind, aligned with the guidance of the European Commission, set out in the new Digital Strategy and related AI White Paper.

Opening access to data through a legal framework that protects privacy and promotes interoperability and sharing. Personal data, ranging from contact details and identity numbers to personal photos, is being accumulated by both private and public sector organisations. Such data is used to personalise service provision, market insights, behavioural nudges and administrative control. The EU was the first to adopt a comprehensive, multinational framework for personal data protection (the GDPR) and is expected to further develop this on the basis of the recent European Data Strategy. The EU is well positioned to take a lead in this field, given that personal data is being collected and shared across borders, while local or national approaches tend to fragment the field, create administrative costs and limit innovation. A well-designed framework for personal data protection should maximise data openness and accessibility, while ensuring security and minimising risks. It should be based on a mix of regulatory and market-led mechanisms. It is necessary to ensure interoperability among various data sources, as well as data sharing and effective cooperation between public and private data providers.

Building human capacity to ensure successful Digital Government Transformation. Civil servants play a key role in fostering the diffusion of new technologies within government. Digital Government Transformation requires new digital skills, which open up new job opportunities. Governments should create new roles related to the competences required by new technologies, and design career paths to attract highly skilled professionals. Significant advantages come from building talent from the inside, due to an in-depth understanding of the public sector's mission as well as its mode of operation. This endeavour could take advantage of a pan-European approach, building on a peer-learning process for sharing

knowledge and practices, and embarking on multi-sector and cross-country experiments to address common challenges.

Taking advantage of predictive analytics to improve policy making and service delivery. Predictive analytics offer a range of options for data-driven policy making, and have already been used by governments in areas as diverse as public safety, public health, education, housing, transportation, defence and others. Predictive analytics could contribute to the more efficient use of public resources, helping organisations to deliver services more quickly and to undertake a preventive approach. Nevertheless, the use of analytics involves a variety of ethical and empirical risks, ranging from personal data protection to biases in historical data. In many instances, there is a lack of quality data to generate meaningful predictions. From the policy perspective, in order to take advantage of predictive analytics, the public sector should: a) invest in the internal capacity and skills necessary to work with data and use predictions in an informed way; b) ensure interoperability among various data sources, as well as data sharing and cooperation between public and private data providers; and c) guarantee transparency as to the way in which predictive algorithms are created and used.

Being selective about impacts and realistic about trajectories: moving from linearity to complexity. A significant share of the literature on e-Government comprises prescriptive analyses that are overly optimistic, normative and express high expectations with regard to the potential of digital technologies. This trend has been apparent ever since the initial wave of literature on e-Government. The impacts of digital transformation should therefore be identified realistically and in ways that favour empirical measurement. While we are aware that benchmarks and scorecards remain an essential part of policy monitoring and evaluation, such measures often assume a linear progress that does not reflect the reality of digital transformation in government. In fact, the process of transformation unfolds in twists and turns, through changing hypes and discourses, via different projects and applications, and is subject to both incremental change and radical innovation. In many EU countries, new and innovative technological initiatives coexist with old ones. The vocabulary and methods of complexity theory and analysis should therefore be applied to Digital Government, and embraced by the public sector and by policy makers alike.

Creating a culture of digital transformation and innovation within the public sector. Organisational and bureaucratic obstacles hamper the use of new technologies in the public sector. Interdepartmental differences and inter-institutional competition create bureaucratic silos that slow down the pace of transformation. A successful digital transformation requires a conceptual and cultural change within the public administration concerned. Therefore, a culture of innovation should be encouraged within the public sector. Governments should set out a long-term vision for the advancement of data-driven governance and technological innovation. For example, many cities have introduced the role of Chief Data Officer (CDO), a person in charge of fostering technological innovation in various departments within government and improving IT capacity. Together with a long-term vision, governments should set

concrete targets and communicate effectively the results obtained, as well as measuring progress and assessing socio-economic impacts.

With regard to **future research** to support policy design, the underlying point that emerged from the current study is that evidence to inform policy making in relation to the innovative use of AI and other cognitive and predictive technologies and applications in the public sector is very much in demand. For example, when designing and implementing the experimental approach of one of the case studies, the research team liaised with the public sector institutions involved in the initiative. This process was very valuable for the public administrations concerned, as it helped to expose (and, eventually, test) the assumptions under which an innovation is expected to work. After concluding the case study, the research team presented its findings to the practitioners working to further develop the application at the core of the case study, and provided evidence-based advice.

More fundamentally, our empirical research has shown that digital innovation is currently very relevant to the public sector. With many innovations still under discussion or in a pilot stage, raising funding and political support for further investment may be difficult due to limited resources and, sometimes, limited evidence that previous innovations have delivered the efficiency gains promised.

On one level, such situations call for some careful and theory-informed analysis as to why the expected gains were not realised. For example, were the expectations unrealistically inflated from the very beginning, or did something in the policy process prevent the original objectives from being achieved? On another level, such situations call for broader, more systematic discussions, using, for example, foresight approaches and Policy Lab techniques.

From this perspective, a three-fold research agenda emerges from the analysis conducted: (a) Maybe the expectations we entertain with regard to ICT-based innovations are wrong and we are missing some important objectives; (b) What combination of technology, procedures and resources makes an innovation possible?; and (c) How do these new technologies change and challenge the power balance between public authorities, private companies and citizens, and how should this balance be reimagined for the benefit of society?

With regard to these issues, our research points to the need to undertake further in-depth thematic or organisational-level studies. These should be carried out in the fields of, for example, public transport, smart city and living environments, education, public health and education, among others, as well as on more traditional public administration operations and digital public services.

While our literature review revealed that a variety of previous research endeavours have been undertaken in these domains, the emergence of AI-based or platform-based solutions is now fundamentally altering the context, including the respective roles of the public and private sectors. Following up on these changes and supporting the public sector with pertinent evidence is therefore of the utmost importance and urgency.

Specific research could involve systematic mapping of innovative public services in a variety of fields and contexts.

Two distinct research directions are possible here. First, research could provide pragmatic actionable, evidence-based advice on what works and what does not, including questions surrounding the functioning of data ecosystems, and effective interoperability across domains and countries.

Second, such research could analyse in a more fundamental way the implications of ICT/AI-based innovation on governance and society. In relation to this, and in line with the revision of the European Interoperability Framework (EIF) envisaged in the Digital Europe Programme (DEP), a more prominent role should be given to all forms of public sector innovation. Moreover, as demonstrated by our research, the public value orientation of digital transformation actions should be an essential part of the next EU Governments Interoperability Strategy, addressing both organisational and governance innovation and related challenges.

During earlier waves of e-Government research, the academic consensus was that ICT-based innovation will, by and large, benefit citizens. Current scientific discussion is much more equivocal.

From a research perspective, this suggests the need to explore how, for example, data is used and governed in the public sector, how it is shared, as well as what checks and balances are in place. In practice, the unresolved and ever-crucial issue of governance 'with and of' ICTs, is now further amplified, as in the era of Artificial Intelligence we have a third aspect to reflect upon: governance 'by' algorithms, an issue that is already raising concerns and fears, as it entails the potential to redefine power relations and generate imbalances within democratic governance systems.

Evidence and key insights

State of play: Digital Government in theory

Historically, technological change has always influenced the public sector – but the current wave of innovation, which draws on artificial intelligence (AI), geographic information systems (GIS), Big, Open and Linked Data (BOLD), Application Programming Interfaces (APIs) and other emerging technologies and their combined application, is probably the most pervasive yet. The public sector has been experiencing a rapid transformation that affects governance, public service delivery, citizen engagement and decision-making. Furthermore, this transformation is happening in the context of fundamental demographic, environmental and public health challenges in which the government has a crucial role to play.

Research analysing the role of technology in government is vast and varied. It has focused on questions such as the impact of technology upon government and society, and explored how different actors within the public sector harness technology for their own goals. The literature has constantly meandered between two poles: technological determinism and sociological multi-directionality. Determinist thinking gives prominence to technology and assumes that it is bound to have a relatively foreseeable impact, based on some internal, functional logic. The sociological view investigates the role of the actors involved in the transformation process and assumes that they will appropriate technology in their own idiosyncratic ways, and

thus the impacts of the very same technology in government may vary significantly.

Since the early 2000s, a prominent feature of the literature on e-Government has been the assumption that it develops in stages, from simpler forms to more sophisticated and advanced ones. The starting point is always some sub-optimal situation – whether actual or expected – in which the technology used is very basic and the public sector is inflexible, backward-looking, bureaucratic and unfit to address the social challenges of the time. With the introduction of more sophisticated technology, the public sector can then progress towards an advanced state in which it engages innovative solutions to address the most complex societal needs. The initial perspective here is usually deterministic; however, the view of many authors is nuanced by emphasising the 'intervening' variables such as values and culture, organisational changes and internal procedures, that must be implemented in order to take advantage of the opportunities offered by technology.
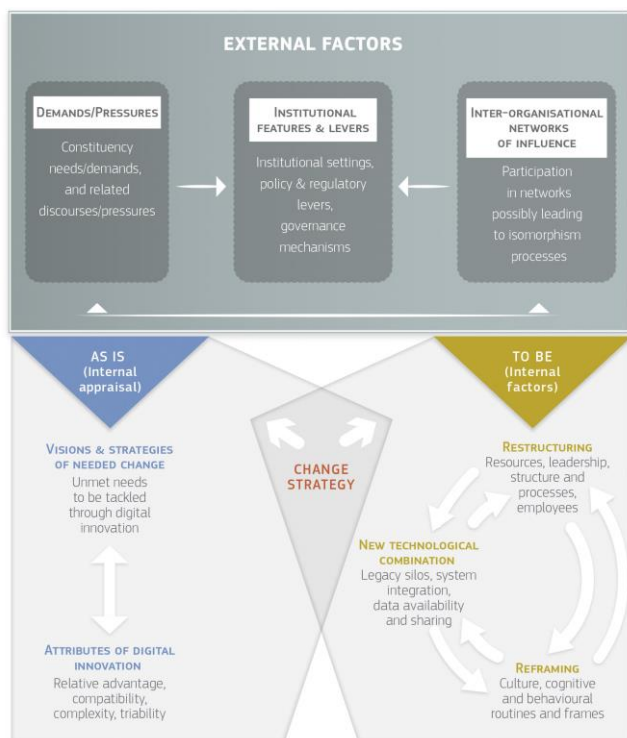
Over the last 10 years, the academic and policy discourse concerning e-Government has evolved in the light of rapid advances in technology such as social networks, collaboration tools, big data analytics, search technologies and others. Concepts such as Government 1.0, 2.0, 3.0 and more recently 4.0 have been advanced, and various authors have also begun to use terms such as 'digital government', 'ICT-enabled innovation in the public sector' and 'data-driven governance', which are the focus of this analysis and for which we developed an original definition of Digital Government Transformation (DGT).

The need to reframe ICT-enabled public sector innovation: DigiGov conceptual framework

The conceptual framework developed as part of our research (DigiGov-F) aimed to contribute to the systematising and reconceptualising of the underlying concepts involved in the analysis of digital transformation within the context of public sector innovation. To build the framework we first reviewed types of innovation in the public sector, including the intrinsic attributes of innovations, as well as their organisational and environmental antecedents. Second, we analysed the characteristics of the different models of public administration, from the Weberian model to New Public Management (NPM) and New Public Governance (NPG). Third, we considered the dimension of technology in order to understand which new data-driven technologies characterise the new wave of Digital Government Transformation.

In line with the evidence gathered from the case studies, the importance emerged of 'reframing' public sector innovation. With this, we refer to the need to consider both tangible changes in procedures, functions and institutions, as well as a 'cognitive restructuring' that concerns values, culture and shared understandings to articulate a reinforced set of values for the public sector ethos. In other words, we need to take into account the fact that ICT/AI-based technologies provide the government with powerful tools and capacity for 'nudging' citizens to behave in one way or another, and this must be considered carefully from both a research and a policy perspective.

The figure below presents a stylised graphical representation of the main elements underlying the strategy for change required to implement digital transformation in the public sector, and which are considered in DigiGov-F.

DigiGov-F: elements for Digital Government Transformation

DigiGov-F suggests the steps involved in a digital government initiative, and identifies the most pertinent external and internal factors. The first steps entail decisions concerning public values and strategy. These underpin the design and implementation of the initiative and eventually, when the initiative is institutionalised, its effects.

The lines connecting the various elements of the figure indicate possible linkages, without assuming any deterministic or linear relationship. In practice, there could be substantial lag between one step and the next. Furthermore, while the technologies adopted may contribute to the achievement of transformative effects, they can only do so when integrated with and supported by other elements of the framework.

The conceptual framework was designed to convey the dynamic nature of Digital Government Transformation. In line with the insights obtained from the empirical research stream, the framework suggests that, depending on the effects of the transformation, changes may be introduced both at the level of public values and of strategy.

In order to achieve the intended impacts and avoid possible negative side-effects, such changes may include decisions to increase investment in human resources and technology, improve service delivery, increase adoption and other choices.

Digital Government in practice: insights from empirical case studies and experiments

An important part of this research consisted of designing and conducting four empirical case studies, which were used to further refine and validate the conceptual framework as well gathering insights from empirical analysis.

The study explored the following cases and experiments:

- The use of digital applications to report non-emergency issues to local government in the city of Vilnius in Lithuania (Tvarkau Vilnių);

- The use of body-worn cameras in policing in the UK, and in comparison with other countries;

- Privacy and trust, as revealed by an online experiment in Germany and Spain, based on surveying a panel of 1,400 citizens on four hypothetical new digital services in the domains of health, transport, security and voting;

- The Kids Go Green programme in Italy, which promotes sustainable mobility by school children and their families, and has so far been piloted in the cities of Trento and Ferrara.

The combined results from the review of the state of the art and the empirical analysis led to the following key insights:

The limits of automation and AI. Automation does not necessarily lead to productivity gains. For instance, achieving results through the use of AI-enabled systems or advanced machine learning for big data analysis still requires human inputs and oversight. Such gains may only be achieved over time, and success depends on resolving a number of practical issues that include designing an adequate implementation process and changing the administrative culture. The cases of Tvarkau Vilnių (Lithuania) and of body-worn cameras (UK) both converged on the observation that outcomes are at times difficult to isolate at sectoral level, and should be considered at systemic level.

Digital Government Transformation is a dynamic, non-linear process. Findings from the case studies show that in the short to medium term, duplication of efforts and stratification of delivery channels may actually increase rather than decrease the costs of public administration. Once services are up and running, new needs emerge, requiring new investments and a new iteration to improve the service. This finding also suggests that future research should explore how to embrace complexity and emerging solutions in the domain of data-driven public sector innovation.

The strategic importance and two-fold nature of legitimacy and trust. Despite the potentially positive effects stemming from the use of technologies to deliver public services and improve government operations, some important challenges need to be addressed in relation to trust and legitimacy. In fact, analysis of the results from the case studies shows that legitimacy and trust are, at the same time, both an important process-level prerequisite and an end outcome of the digital transformation of governance systems and policy-making mechanisms.

'Repetita juvant': users' needs and the persisting risks of digital divide. While this may not sound new in 2020, the cases show unequivocally (albeit from different angles) that users' needs and adoption remain an issue that is not fully addressed by digital innovation initiatives, and which requires greater consideration, particularly in relation to new

AI applications. These new technologies may generate new forms of digital divide, as evidenced in the online experiments conducted in Germany and Spain into perceptions regarding privacy linked to new digital public services. The issue of AI adoption and acceptance by users, and that of potentially new forms of discrimination, should be given greater salience and attention in both applied research and policy initiatives.

Realism about engagement, open governance and co-production. The claims made by supporters of open governance, coproduction and civic engagement should be approached with caution. Active citizenship will benefit from new technologies, but civic disengagement and decreasing political participation is a notable trend in advanced democracies that cannot be reversed simply by applying ICT-based solutions or opening up any kind of public data, as demonstrated in particular by the findings from the case of Tvarkau Vilnių.

The importance of generating public value. Both the analysis of the literature and the results from the case studies confirm the importance of outcomes beyond productivity and efficiency gains. Specifically, they point to the importance of effectiveness, legitimacy and trust, as well as inclusion and sustainability. For instance, effectiveness gains appear prominently in the body-worn cameras case, but they contribute to the important outcome of increasing legitimacy and trust through better police behaviour and better accountability. The Kids Go Green case in Italy shows that the project fosters inclusion by improving learning processes and creating a community network. It also offers innovative teaching methods that improve the digital skills of both children and teachers, as well as modifying the relationship with parents and, in turn, increasing awareness of the impact of sustainable mobility, nudging a positive change of behaviour.

While other external factors will certainly influence both policy choices and effects, the aspects presented above are crucial and should be taken into consideration in policy design, implementation and delivery. They should inform the choice of technology, the process of organisational change, and interactions with stakeholders and citizens.

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Related publications

- Misuraca, G., Barcevičius, E. & Codagnone, C. (Eds.), *Exploring Digital Government Transformation in the EU – Understanding public sector innovation in a data-driven society*, EUR 30333 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-21326-0, doi:10.2760/480377, JRC121548

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