United Nations | Department of Economic and Social Affairs

# UN Expert Group Meeting on e-Government

***29-31 March 2021***

# Background Paper

## "Towards a re-design of the UN eGovernment Survey"

Gianluca Misuraca

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# Contents

# 1 Background and scope

One of the flagship activities of the Division for Public Institutions and Digital Government (DPIDG) of the United Nations Department of Economic and Social Affairs (UNDESA) is the biennial UN e-Government Survey publication (established in 2003) that presents the ranking of e-Government development across 193 United Nations Member States by assessing e-Government development according to a quantitative composite index of online services, telecommunication infrastructure, and human capital indexes. It provides decision makers with information that enables them to identify their areas of strengths and challenges, as well as suggested options on how to improve.

So far, the e-Government Survey has been a powerful tool to capture and measure those capacities and services for all UN Member States. But the unprecedented challenges posed by Covid-19 have been tremendous, and not all governments have the capacity to respond effectively in tapping the vast opportunities of digital government and/or mitigating the inherent risks. Countries in special situations, such as LDCs, LLDCs, SIDS and countries with transition economies are often unprepared or ill-prepared, bringing forth the already in place digital divide and digital inequalities.

In light of the above, two key questions need to be addressed for the future of the e-Government Survey: **A)** ***In a post-pandemic era, is the survey still looking at the relevant aspects of e-Government?*** *and* **B)** ***How should its focus and methodology be adjusted to address emerging requirements and challenges for policy and decision-making in digital transformation?***

In order to answer these questions, the **2021 UN Expert Group Meeting (EGM)** organised by the Digital Government Branch (DGB) of DPIDG will discuss if, in today's pandemic response and recovery context, the UN e-Government survey should be adjusted so that it continues to realize its objectives.

This **Background Paper** has been prepared to facilitate the discussion at the EGM on 29-31 March 2021 and it is based on the results of the analysis conducted by the Consultant under the overall guidance of the Chief of DGB and in strict collaboration with DPIDG, DGB Team.

The methodological approach followed included the following activities:

1. **Detailed analysis on what e-government and digital government mean today**, in light of the major changes and issues in the area of the adoption of the 2030 Agenda for Sustainable, Development, of digital transformation and the post-Covid recovery and development, reflecting on the contributions and purpose of the survey and providing suggestions on what its main focus and content should be.
2. **Review of the Member States Questionnaire (MSQ)**, to solicit feedback from Member States and other stakeholders on their expectations for future Surveys.
3. **Report on the future methodological approach** for gathering information and data for the Survey and collect information from governments and other sources, to propose detailed improvements to the Survey in the short-term, and to suggest more radical changes to the focus and approach of the survey in a longer-term scenario.
4. **Summary of the key findings** and relevant information to frame and aid the DGB Team in the preparation of the EGM, including defining a preliminary set of recommendations to be addressed in the next version of the Survey based on above analytical work.

After having briefly introduced the background and scope of the paper, this document presents an overview of the key results of the analysis, highlighting research trends and gaps in the area of Digital Government in relation to the Sustainable Development Agenda in a post-Covid society. It then outlines implications for the UN e-Government Survey, providing suggestions for improvement in the short term and some ideas for changes of the approach in the longer term.

Following the debate at the EGM, a **Final Report** will be prepared by UNDESA with the support of the Consultant, who will provide an analysis of consolidated comments/feedback from experts during the meeting, describing the lessons learned in the whole process, and identifying priority areas and concrete actions to improve the methodology of the future UN e-Government Survey.

## 2 Digital Government's role for the Agenda 2030: towards a post-Covid digital society

In the last decades, the public sector worldwide has been experiencing a rapid transformation affecting governance processes, public service delivery and policy-making mechanisms. In conjunction with ongoing processes of economic globalization and public sector reform, this transformation has been driven in particular by the widespread adoption of **Information and Communication Technologies (ICTs)** that have provided opportunities for digitalizing and re-designing internal administrative processes and offering services online, engaging citizens and stakeholders to innovate delivery systems that are more efficient, effective and user-centred (Misuraca and Viscusi, 2015).

**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 combination, is probably the most pervasive yet. Furthermore, this transformation is happening in the context of fundamental demographic, environmental and public health challenges in which the public sector has a crucial role to play to enable sustainable development.

Over the last 10 years, the discourse concerning **e-Government** has evolved in the light of rapid advances in digital technologies such as social media and collaborative networking tools, big data and predictive analytics, search and discovery tools and other emerging technologies. Concepts such as Government 1.0, 2.0, 3.0 and 4.0 have been introduced into the literature. Various authors have also begun to use terms such as **"Digital government"** and "Digital government transformation", which are the focus of most recent research and policy interest (Barcevičius, et al. 2019).

In parallel to the evolving nature of digital government across the world, the concept of sustainable development has also been somehow renewed in the digital age, in line with the **Agenda 2030**. Frequently referred to as "*development that meets the needs of current generation without compromising the ability of future generation to meet their own needs"* as defined in a milestone report published in 1987 (Goodland and Daly 1996), the current conceptualization of sustainable development has extended its original focus on the nature of economic growth only, to more widely encompass the wider discourse on how solutions to needs of society can be not only economically viable, but also environmentally bearable, and socially equitable at the same time (Mensah 2019).

The 17 **Sustainable Development Goals (SDGs)** formulated by the UN in fact aim to realize the vision of mapping the main global challenges in a coherent system that goes beyond seeing each challenge in isolation (United Nations, 2015 a/b). Within this context, the role of ICTs to support sustainable development and governance innovation has long been recognised and is considered having a direct impact on SDGs 16 and 17, while also having a cross-cutting impact at sectoral level and to enable the overall achievement of the Agenda 2030 objectives and targets.

However, as of today not many contributions to mainstream literature on ICTs, eGovernment and public sector management have materialized in extending the focus of ICTs for development to the wider perspective of sustainable development. Such **research gap** also results in overlooking the specific potential of Digital Government – and of specific emerging technologies - to tackle traditional sustainability challenges in particular, and the wider challenges of UN SDGs, in general (Misuraca & Viscusi, 2011; Medaglia & Damsgaard, 2020; Misuraca & van Noordt, 2020, Vinuesa et al., 2020, Misuraca & Medaglia, forthcoming).

As a matter of fact, 2020 marked the 15th anniversary since the second phase of the **World Summit on the Information Society (WSIS)** took place (Geneva, 2003 and Tunis, 2005). One of the main aim of the WSIS was to bridge the global digital divide separating rich countries from poor countries by spreading access to the Internet in the developing world. Fifteen years later, the world is a very different one, and digital technology is shaping our daily life and behaviours, and underpinning critical infrastructure upon which modern societies depend on.

However, despite the fact that digital development is clearly accelerating across all continents, possibilities for using ICTs to revamp the delivery of public services is not always following and **the path to digital inclusive and sustainable development is yet to be ensured**, especially in Least Developed Countries (LDCs) and Small Island Developing States (SIDS).

Central to this argument is also the fact that existing literature fails to explicitly acknowledge a fundamental duality between two distinct problem domains found within the research body. Through an extensive review of 184 journal articles and conference proceedings, Brown and Grant (2010) suggested a partitioning of the existing literature into two distinct streams of research: (1) those studies that focus on understanding **technology "for development"** and (2) those studies that focus on understanding **technology "in developing" countries**. More than an exercise in semantics, the authors argue that the two streams represent separate sets of research objectives that are currently being conflated and addressed interchangeably within the same research environment.

At present, there appears to be little recognition or explicit acknowledgement of this branching of research domains, as well as little reflexive discussion on the epistemological, methodological and theoretical implications of this delineation. **A discussion related to the effectiveness and relevance of the two separate research agendas should therefore be enabled** as research on ICT and development often involves assumptions on the nature of ICT-enabled innovation and on the way such innovation contributes to development (Misuraca & Viscusi, 2011).

With less than ten years left to achieve the SDGs, developing countries need to carefully define development objectives, and at the same time take into account the prevailing environment for focusing on digital solutions. **Assessing the digital readiness and maturity levels**, cost implications and risks of use as well as the drivers and barriers that could determine its impact and appropriateness is therefore key (ADF, 2020).

In this perspective, the **potential that Digital Government holds to support development goals is coupled with the wider policy discussion on digital transformation** that focuses on the opportunities and challenges provided by new technologies such as 5G, IoT, cloud computing, and broadly defined AI (Coombs, 2020; Sipior, 2020). 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 (Misuraca et al., 2020).

As a result of the ongoing pandemic, in fact, the massive cultural shift to online learning and distance working, coupled with the increase of eCommerce and multimedia offerings for home entertainment, with related threats and further innovation required in shopping, logistics and service fruition, are expected to provide **new mechanisms of social connection**, guaranteeing social distancing and health prevention through effective prediction of risks and monitoring of citizens behaviours (Misuraca, 2020).

In practice, **the dilemmas of the Information and Knowledge Society** that we have been facing since several decades now, **have been accelerated at a very fast pace**, as digital technologies are not only changing the way we live, but they are fundamentally transforming how we work and do business, how we educate our children, study and do research, train ourselves, and how we are entertained. In a **"Digital and hyperconnected Pandemic society"**, where everyone can create, access, utilize, and share information and knowledge, for enabling individuals, communities and people to achieve their full potential in promoting their sustainable development and improving their quality of life, it is crucial that governments and public sector organisations worldwide are able to steer the digital transformation process.

To achieve this objective, enhancing the quality of public sector management and institutional capacities, especially in developing economies and Least Developed Countries (LDCs), in line wth findings from recent research, it is crucial to **"reframe" public sector innovation**, which refers 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*". (Misuraca et al, 2020)

As the fallout of Covid-19 showed and as we head towards a digitally dependent future, the **need for digital resilience** has never been greater to ensure that our society evolves in a sustainable manner towards a path of transformation compatible with sustainability and shared prosperity.

# 3 Implications on the UN e-Government survey

The benchmarking study conducted by UNDESA and based on the global e-Government survey is clearly the most renowned one worldwide. However, there are several other surveys and benchmarks to measure e-Government development and the uptake of ICTs in the public sector across the globe using various methodologies, provided by universities, companies, public-private organizations and other multi-lateral international organizations and regulatory bodies.

A recent comparison of a selection of these methodologies conducted in 2017 as background for the discussion at the 2018 UN Expert Group Meeting on e-Government included the Networked Readiness Index (NRI) by the World Economic Forum (WEF) and Insead, the Digital Economy and Society Index (DESI) of the European Commission, the e-Government Rankings by Waseda university-IAC International, the Middle-east digitization index by Mckinsey, and the HAL global e-government evaluation report. In general terms, the review concluded that the high-level macro indicators used to measure the uptake of the ICT and e-Government in the public sector of a country are mainly related to the technology infrastructure, affordability, human capital, level of smart government, availability of online services, transparency, cross-border mobility, and participation level. These studies also use a mix of instruments (benchmarking, bench-learning, self-assessment) and methodologies (mystery shopping, survey, web research, public data analysis, user testing, interviews) to measure the progress of e-Government in various countries (UNDESA, 2017).

Other indexes that is worth considering are related to broader efforts to measure the impact of ICTs for development, such as the Partnership on Measuring ICT for Development, an international and multi-stakeholder initiative led by the International Telecommunication Union (ITU) and aimed at improving the availability and quality of ICT measurement. The latest edition has been published in December 2019 and it is complementary to the efforts conducted by ITU in measuring the Information Society with a number of initiatives to collect, synthesize and disseminate statistics and data that have been enlarged and revised frequently over the past years, in order to consider the evolving nature of the phenomenon, but thus limiting their comparability over time.

Beside this, efforts from independent researchers have been constantly driving the development of measurement of the Information Society. From the mid-1990s to the early 2000s, it was primarily researchers that repeatedly measured and kept track of the performance of the telecommunications industry. More recently, since 2008, an **Integrated Contextual Iterative (ICI) approach** has been adopted by researchers to measure the Information Society, in the hope of understanding the complex context in which the Information Society has developed, and which has also been influenced by the Information Society phenomenon itself (e.g. Ferro et al., 2010). The index integrates various indicators into a single-number index. On the other hand, it is equally valuable that the approach takes contextual settings into consideration. In particular, factors that are unique to a society's special context are included in the index. Weights are assigned based on the relevance of these factors (Ferro et al., 2010), which, however, falls short of explaining how to measure. Therefore, it is suspected that impartially choosing contextual factors and objectively weighting them still remains a challenge and may incur criticism (see e.g. Grönlund, 2009).

In addition to the major benchmarking and indexes mentioned above, most International Organisations have supported and contributed to the development of measurement of the Information Society in general, whose indicators are of relevance to Digital Government (and in part used for the UN e-Government Survey). The OECD, EUROSTAT and the World Bank in particular have developed social and economic databases from which data is retrieved for various indicators and indexes. Their databases, to a large extent, determine the data availability, which is a critical issue in indicator selection. Their specialty in education, health, and economic and social factors has enriched the measurement of the Information Society and helped construct more integrative and comprehensive measures that can be used for capturing the sectoral aspects of Digital Government and possibly measure the uptake of Digital services and their specific impact on society.

More recently, the **OECD** published the **Digital Government Index 2019**, which is a first effort to translate the OECD Digital Government Policy Framework (DGPG) into a measurement tool to assess the implementation of the OECD Recommendation on Digital Government Strategies and benchmark the progress of digital government reforms across OECD Member and key partner

countries. The OECD Survey is composed of 94 questions covering each of the dimensions and transversal facets of the DGPG. In some cases, a number of questions include sub-questions. Survey respondents comprised high-level digital government officials of 29 OECD member countries and 4 non-member countries. The Survey considered evidence until August 2018 from the central/federal level of government encompassing all central/federal ministries and agencies.

The effort has been commendable, involving directly policy makers in the design and data gathering and evaluation, and the report provides a useful source of the trends observed through analysis of the pilot version of the OECD Survey on Digital Government 1.0. However, both the Survey and the Digital Government Index are underlined as being an initial exercise conducted by the OECD to measure how governments are embracing the strategic use of digital technologies and data for improved functioning of institutions and services' design and delivery.

The analysis of the various benchmarking studies conducted shows that these mainly assess the progress made by an individual country over a period of time and compare its growth against other countries. This is assumed to have a political and potentially economic impact and can influence the development of e-Government services. These benchmarking surveys and reports serve as a tool for countries and public institutions to learn from each other, identify areas of opportunities and challenges in e-Government or Digital Government, and accordingly develop strategies, policies, and initiatives for those areas. They also help in assessing the ICT-readiness of each country and build capacities in gap areas. They further enable discussions of intergovernmental bodies, including the United Nations General Assembly and the Economic and Social Council, on the critical role of ICTs and issues related to e-Government for development.

However, lack of access to technology, poverty and inequality hinder citizens' uptake of ICTs and e-Government for sustainable development. Also, levels of e-Government maturity are directly related to income levels, as most of the developed countries have a higher maturity as compared to developing countries (UNDESA, 2017). But, most importantly, the reflection already ongoing at UN level and more broadly within the scholarly and policy-makers' communities is about the **scope of measuring e-Government in the post-Covid Digital age**.

Clearly e-Government development measurement over the years and across countries has been an important driver to analyse the relative and absolute development of e-Government world-wide and to start measuring the development against the 2030 Agenda for Sustainable Development and other major international commitments and goals. However, the question of how to build effective public sector governance and use digital technologies to make the functioning of government more efficient and improve the delivery of government services for organizations and individuals, remains yet unaddressed by the current benchmarking efforts that do not fully capture direct and indirect outcomes and impacts.

Moreover, while benchmarking e-Government is an important element to support policy design and evaluation, the limitations and risks that supply-side only approaches have, should not be underestimated. To complement supply side and indicators-based benchmarking exercises, there are other categories of measurement frameworks and models to assess digitally-enabled services and modes of delivery. These can be used for gathering feedback on usage and satisfaction to improve service quality, development and delivery, in order to assess if services match user expectations and to what extent they are perceived as useful and effective.

Even though different approaches can be used – either as a quality assessment and assurance tool (internally focused approach) or as a 'satisfaction' measurement tool (externally focused approach) – each approach to measurement could serve to better understand the effective realisation of the goals in concrete contexts and according to specific needs in a given situation. **Quality of services and user satisfaction** are in fact two central parameters which allow governments to learn more about user needs and demands. These types of information are important for the continuous improvement of Digital Government. However, despite the importance of such frameworks for policy interest and benchmarking purposes, the information gathered address mainly the service provision and usage side of e-Services rather than the take-up and adoption by the public administrations, businesses and citizens (see e.g. Scholta et. al., 2019).

In this respect, the measurement of Digital Government should clearly consider its **impact in socio-economic terms**. This is clearly limited by the lack of standard indicators and comparable information made available over time by international and national official statistics, that are instead gathering only more general data on public sector output and performance. Therefore, most of the data needed for collecting relevant indicators will have to be constructed and gathered from scratch, since there are very few already compiled official statistics that can be used to measure the more short-term and intermediate impact of Digital Government. In a development context, it is therefore suggested to integrate, as part of the national statistics offices, granular indicators that can be then used for monitoring digital services, gathering comparable data through a **network of Digital Government correspondents worldwide**, so to collect data "at the point of production", using common and comparable instruments and indicators. To achieve this goal UNDESA may act as the central hub of the network, cooperating with relevant International Organisations and academic and research centres active in measuring Digital Government and digital transformation more in general.

Furthermore, Digital Government **evaluation cannot be limited to a strictly quantifiable impact** and should include both: a) impacts that are directly 'cashable' or that can be rendered in monetary terms as opportunity values; and b) impacts that are intangible and cannot be rendered in monetary terms. Once these two different dimensions are both considered, a classical approach would be to distinguish clearly between quantitative and qualitative measures, and to keep them separate when building aggregate indicators from elementary measures and indicators that can be extracted from a monitoring system that is structured according to a multi-level data gathering approach.

As a matter of fact, given the current pandemic situation and the important advances in data-driven digital modelling and simulation techniques, the review of the methodological approach and the conceptual foundations of the Survey is very timely and could mark an historical moment. While in fact one of the strengths of the survey is the availability of a long series of longitudinal data that can enable comparison across the world and measure the evolution of e-Government, it seems that in a post-pandemic era, although still looking at the most relevant aspects of e-Government, **the survey should be redesigned to better capture the multi-dimensional and multi-governance characteristics of Digital Government.**

While more elaborated recommendations to prepare the ground for the further discussion during the EGM will be outlined in the next Sections, the key issues emerged during the preliminary analysis guided by specific research questions are reported below:

The first question of ***What does e-Government and Digital Government mean today?*** has been discerned looking at the transformative impact of digital innovation *vis-à-vis* the traditional channels of online service delivery of the previous generations of e-Government. In doing this, a particular attention should be given to discussing the critical trends in digital transformation and to what are the main issues and challenges emerging in light of the pandemic and the response of public sector organisations, in search of strengthening digital resilience and multi-level governance.

As far as ***the purpose of the UN e-Government survey*** is concerned, the benchmarking study conducted by UNDESA remains the most renowned worldwide and its relevance and significance is confirmed by the expectations raised for policy-makers, and by the studies that use the results both at academic/research level and for practitioner-generated reports. However, it is suggested **to revamp the scope of the analysis** integrating new dimensions and adopting innovative approaches, maintaining to the extent possible the comparability across time that is one of the main added value of the survey. In this regard, more attention should be given to the **demand side of Digital Government**, by exploring measures to assess **quality of services and user satisfaction.**

The **uniqueness of the UN e-Government Survey** will therefore remain, but it could be enriched by more granular data that could enhance the current knowledge base and data-insights, matching better supply and demand, and paving the road for possible measurement of outcomes and better understanding of impacts on the achievement of the 2030 Sustainable Agenda objectives. **A dedicated study should be conducted to assess how can new technologies and Digital Government best advance the SDGs and targets and ensure that no one is left behind**, looking at *how the survey can contribute to realizing the 2030 Sustainable Agenda*.

# 4 Insights and recommendations on the way forward

## 4.1 Suggestions for short-term improvements

The UN e-Government Survey evolved over time in order to avoid to be considered simply a 'ranking' exercise (also in view of the spectrum of the number of countries analysed: 193 worldwide). Following critics on the methodological approach and consultations with experts to revise the survey, it had been modified to better reflect the higher expectations of e-Government development and assessment around the world. In this regard, significant changes to the survey instrument have been introduced in the latest editions, focusing more on how governments are using websites and portals to deliver public services and expand opportunities for citizens to participate in decision-making. However, the limitations that these approaches have should not be underestimated. In particular, the linkages between the quantities and the qualities that these indicators should trigger show **the need for a more sophisticated way of measuring e-Services and assessing their effective uptake, adoption, and their socio-economic impacts and contribution to the SDGs**.

For example, a recent comparative analysis by the Civil Services College of Singapore (Maniam, 2019) reviews most recognised frameworks assessing e-Government, and concludes suggesting to consider a diversified set of indicators in order to better capture the quality of a digitalisation effort, building in part on the work by Dunleavy et al., (2006), and in particular using the indicators called **"success"** (which can be measured inversely, by the number of projects scrapped) and **"price competitiveness"** (which refers to the money cost of government projects, compared with similar efforts in other governments and other sectors). To these indicators it is suggested to add a modified dimension for **"relative effectiveness"**, related to hardware reliability, software efficiency, bandwidth sufficiency, and with further qualification in terms of specific IT systems and dynamicity. The study proposes then to complement these measures with four indicators for **usage,** usability and usefulness of government digital platforms to citizens, businesses and other stakeholders; **security** of government data; **timeliness** of completion for major government IT projects; **the use of data and data analytics** for broader policy purposes.

Similar attempts to propose more in-depth evaluation of e-Government outcomes and impacts have been carried out at both academic and policy level, but in most cases they remain theoretical exercises difficult to be applied to large-scale inquiries, such as the UN e-Government survey.

For example, in 2005 the European Commission conducted the **e-Government Economics Project (eGEP)**, with a view to going beyond supply-side benchmarking and capturing real and concrete impacts for users. The study ran between 2005 and 2006 and produced, among others, the following outputs: 1) a measurement framework, with 100 indicators of impact, and implementation approach; 2) a methodology to measure the costs of e-Government and an estimation of e-Government expenditure in 2006 for the EU; 3) a formalized economic model of the impact of e-Government on public sector productivity and GDP growth that was first piloted with case studies and then run with available aggregate data.

Unfortunately, limited follow up by EU Member States has caused this project to be more valuable for its methodology than for the evidence produced. However, it remains to date the most noteworthy attempt to develop a mechanism for evaluating e-Government impacts at EU level and the **eGEP measurement framework** could provide an interesting approach to be considered as a starting point for a more in-depth analysis of impact and how to assess the back-end office and the transactional services generated.

Clearly the approach proposed in the eGEP project cannot be applied in its entirety to the UN Survey, especially in the short term. However, a number of indications could be adapted and implemented in the survey, both in terms of data gathering and in the way the analysis is performed.

In this respect, some specific issues should be considered:

First of all, the **UN e-Government Development Index (EGDI)** is measured as the weighted average of normalized scores on the three most important dimensions of e-Government, namely:

(i) the scope and quality of online services quantified as the **Online Service Index (OSI)**;

(ii) the status of the development of telecommunication infrastructure or the **Telecommunication Infrastructure Index (TII)**; and

(iii) the inherent human capital or the **Human Capital Index (HCI)**.

Each of these indices is a composite measure that can be extracted and analyzed independently.

A question that should be considered is whether such dimensions are effectively capturing the phenomenon that we are now labeling as Digital Government, which by definition is an evolution of the simple use of ICTs in government, and has the inherent property – and ambition – of transforming public administration processes and services, as well as changing the way governance systems operate and policy-making mechanisms are designed and implemented, including improving quality of services, while strengthening citizen participation and democratic institutions.

In this perspective, it should be also considered that the **purpose of assessing Digital Government** strategies is twofold: on one side it aims at support reporting to stakeholders on the accomplishments of the implementation of the strategy; and, on the other side, to facilitate policy learning and support evidence-based policy making for the transition towards Digital Government.

**Measuring the impact of Digital Government** in fact is not only about assessing to what extent the expected results have been accomplished, but it involves also gaining an understanding about the mechanisms that led to results and the ones that did not. This requires adopting a **theory-based approach**, which means that the expected impacts are based on a specific understanding of a theory of change[1], which is a key underpinning of any impact evaluation, given the cause-and-effect focus of any policy intervention.

Such approach depicts a sequence of events leading to outcomes and a logic model, also referred to as a results chain, which is a useful tool to model a theory of change. In such a model, the concepts of inputs, activities, outputs, outcomes and impact are employed to assess the contribution, relevance and performance of policy instruments.

Therefore, it would be necessary to devise a conceptual framework in the form of a logic model to make explicit what are the relationships existing between the specific indicators and dimensions of e-Government contained in the three indexes used for the survey score (OSI, TTI and HCI) and the proposed categories of e-Government / Digital Government that are currently reflected in the different **stages of online service development**.

In addition, it could be useful to make data available in open format for researchers and policy makers and to develop a dashboard and visualization tool to illustrate the results per indicator and ensure comparisons at country and regional level. Some examples of **dashboards and data visualizations** that could be considered are those developed by the European Commission **Digital Economy and Society Index (DESI)**[2] or the simpler **CO-VAL** project dashboard[3] which attempts at assessing co-creation in public services across EU local government, through 18 indicators divided in five categories.

On the other side, it is important to note that **making data of the MSQ available may be source of concern by Countries** and that data should thus be anonymized before being made public. This may be different with regard to the disclosure of the Online Service Questionnaire (OSQ) as this should be subject to a disclaimer specifying that the questionnaire does not necessarily represent the opinion of the country or the UN.

However, the possibility to integrate the MSQ and OSQ should be explored and, rather than having only one assessor per country, it may be considered the option to create a **network of Digital Government correspondents** and have them play a convening role, through gathering data and opinions from different stakeholders in the country, organising focus groups or Delphi surveys.

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1 A theory of change is "a description of how an intervention is supposed to deliver the desired results. It describes the causal logic of how and why a particular project, program, or policy will reach its intended outcomes" (Gertler et al., 2011, page 22).

2 DESI — Digital Scoreboard - Data & Indicators (digital-agenda-data.eu)

3 https://www.co-val.eu/dashboard

Strictly related to the limitations of the approach for Stages of Online Service Development, and the way it is currently structured, is the fact that comparing digital "sophistication" of countries that have substantial differences in traditional development indicators may risk comparing apples and oranges and not being particularly significant. The same, however, applies if the analysis is limited to the development of digital services, *per se*, in terms of performance and productivity, without **considering the effects in terms of enhancing democratic governance and citizen participation**, that are the ultimate aim of the specific SDGs 16 and 17.

In this respect, an option to further qualify and reinforce the Stage model approach could be that of integrating the e-Participation Index (EPI) into the Model, considering it the highest level of **Digital Government transformation**. In line with the results of the detailed analysis made by Le Blanc for UNDESA in January 2020, the e-Participation Framework has in fact clear value in attempting to measure the level of supply of services from the government to inform/engage and interact with citizens, although this may be particularly challenging for countries that display a limited participation of citizens in the democratic governance of society.

However, a systematic review of literature on e-Government adoption barriers (Savoldelli et al., 2014) showed that, in addition to the traditional **technological-operational** and **managerial-organizational** dimensions, an important set of barriers can be found in what is defined the '**political/institutional**' dimension, which is strictly linked to the way the public policy management process is structured in different contexts and administrative traditions.

To this end, different groups of countries could be classified depending also on their governance characteristics and institutional settings. Based on this, a **revised version of the Stage Maturity Model (MM)** should integrate specific characteristics of e-Government as identified by several scholars and a new conceptualisation could be proposed.

A particular issue that should be also included in the revised e-Participation framework, is the consideration of **Data-Driven policy-making techniques and policy modelling approaches**. In this regard, a specific dimension and survey questions should be integrated into the analysis.

Furthermore, an important aspect to consider since the outset of the new survey design concerns the analysis of the data that will be gathered. Although for obvious reasons the current approach is based on rather simple statistical techniques, it may be worth exploring some more sophisticated methods for data analysis, which could allow a more insightful representation of results, and focus for instance on an in-depth contextual analysis of the data gathered, exploring a more structured comparison between countries part of similar clusters at geographical or development level.

Finally, with regard to the relevance of current indices taken from ITU (Telecommunication Infrastructure Index) and UNESCO (Human Capital Index), it seems that more specific indicators could be considered. For instance, a specific index may be developed based on a subset of the **International Digital Economy and Society Index (I-DESI)**. This Index mirrors and extends the DESI by utilising 24 datasets to enable trend analysis and comparison of the digital performance of 45 countries. The analysis includes the EU27 Member States and 18 non-EU countries that have a global distribution. The various indicators are grouped into the following key areas of analysis: 1) Connectivity; 2) Human Capital/Digital skills; 3) Use of Internet Services by citizens; 4) Integration of Digital Technology by businesses; 5) Digital Public Services; and 6) Research and Development in ICTs.

A **comprehensive view focused on digital infrastructures, services and skills** could give a better account of a country's context for Digital Government, provided that data are available and comparable. Otherwise an important effort of data gathering and harmonization may be required.

## 4.2 Some proposals for long-term changes

At the eve of the 20th Anniversary of the UN e-Government Survey, and in light of the profound changes in our society that the pandemic brought to the fore, but also the important advances in computing power, algorithmic capacities and data-driven technologies that are transforming our governance systems, **a "new Digital Governance era" is opening up**. A radical review of the methodological approach and the conceptual foundations of the UN e-Government Survey is therefore required to accompany and mark this historical moment.

In particular, while the main strengths of the survey should be maintained, including the **unique capacity to provide a global perspective** and overview of all 193 UN countries, and at the same time serve as a benchmark for comparative analysis across the world's regions, the UN Report has also an important aim to contribute advance Digital Government policies and strategies, through a bench-learning process, stimulating knowledge exchange and in-depth review at country level.

For this reason, and considering also differences between various countries and regions in the world in their Digital Government progresses, as well as internal capacities and the availability of data for monitoring and evaluation of initiatives, the survey could be redesigned so to capture better the **multi-dimensional aspects and multi-governance characteristics of Digital Government**.

At the same time, the survey should provide indications on how to improve key areas of development and pave the way for assessing concrete **policy impacts at country and regional level in relation to the achievement of the Agenda 2030**, including both a focus on SDGs 16 and 17 but also a broader analysis of the cross-cutting effects of Digital Government on other SDGs.

To this end, three –somehow complementary - proposals are advanced for discussion during the EGM 2021, and for possible consideration as follow-up actions, including:

1. **Develop a public value holistic assessment framework and implementation methodology, based on a comprehensive conceptual model and system of indicators**

From a theoretical viewpoint, the framework proposed should build on a categorization of good governance characteristics in Digital Government value drivers and dimensions, integrating the focus of research in social studies, namely the approach grounded on the assumption of the reciprocal influence between social and technological issues (Avgerou et al., 2004). This assumption is recognized as a core element of the approaches sharing a socio-technical perspective (Cherns, 1976; Clegg, 2000; Mumford, 1995, 2003; Trist & Murray, 1993) that conceive the social and the technical sub-systems as interdependent, and deal with the reciprocal fit of social and technical solutions within the innovation process. The mutually shaping relationship between technology, organizational structures, and actors informs the concept of technological frame (Bijker et al., 1989). It deals with the co-construction of the technical and the social worlds, while the concept of socio-technical reference frame (Flichy, 1995) helps to think through the ways in which different actors and different social worlds interact using a technology.

Reference could also be made to specific work in the area of e-Government planning and measurement (e.g. Batini et al, 2009)[4] that, building on a number of scholarly contributions in the area of social studies and ICTs, argue for the adoption of a wide definition of e-Government as a system of ICT-enabled innovation policies for the public administration and related governmental functions. In this view, ICT-enabled services can be considered high-level, context-sensitive interventions aimed at introducing and facilitating gradual changes (Cohen & Levinthal, 1990). This framework should be considered as an **interpretative model to better understand and capture the multiple dimensions of Digital Government transformation** and that could serve as an initial step to be further translated into a full-fledged measurement framework, complemented by an operational implementation methodology.

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[4] See in particular Batini, C., Viscusi, G., Cherubini, D., (2008), 'eG4M: The Planning Methodology', QD Research Report, University of Milan Bicocca, DISCO, Starrylink Ed..; building on previous work conducted for the Italian Government for the development of the eModel under the Italian Presidency of the G8 (2001) and the Italian Initiative on e-Government for Development (eG4D) conducted with the United Nations and the World Bank in the period 2002-2005.

To be developed further, this framework could be subject to refining and validation in 'real-life settings' and could thus benefit of a piloting approach, which should take into consideration different contextual factors, governance characteristics and legal mechanisms. In general terms, however, supported by the vast body of literature reviewed, three 'public value drivers' that serve as key principles to set the overall framework could be identified as follows (Misuraca, 2012):

**Value driver 1 - Performance:** it includes effectiveness and efficiency (enabling optimal use of resources for citizens and tax payers in the service delivery); and as an indirect dimension also responsiveness (serving all citizens in a consistent and predictable way).

**Value driver 2 - Openness:** it includes knowledge sharing, in terms of access to information and interoperability; and accountability (creating standards against which the individuals providing a service can be held accountable), that also serve as a *proxy* to transparency (bringing visibility to the service workflow for citizens by means of an automated service delivery) and participation (enabling the process of empowering citizens to legally control the service delivery to their advantage) with the ultimate aim of ensuring consensus orientation (following democratic practices).

**Value driver 3 - Inclusion:** it includes equity and inclusiveness (referring to citizens receiving the service on an equal basis and providing services to disadvantaged and minority groups in society), which also implicitly ensure the respect of the rule of law (ensuring that the laws and regulations governing the service are applied in an impartial way).

## 2. Develop a broader theoretical framework to assess Digital Government impact on SDGs to contribute to a better understanding of the effects on the 2030 Agenda

As anticipated, the focus of the Survey could be more directly oriented to assess how technological innovation can best advance the Sustainable Development Goals (SDGs) and ensure that no one is left behind, **looking at how the survey can contribute to better understanding the effects of Digital Government on achieving the 2030 Sustainable Agenda goals**.

As a matter of fact, the SDGs represent a commitment by all UN Member States to pursue development efforts, including ending poverty and hunger, promoting well-being and education, reducing inequalities, fostering peace, and protecting the planet. Member States and their governments are supposed to take ownership of the SDGs, strengthen the implementation means, and improve public governance as both the means and the end to development. As argued by Janowski (2016) in his seminal paper on the topic, the capacity of Governments to undertake these tasks is critical for implementing SDGs.

To this end, Janowski developed three lines of arguments: 1) that the Member States should strengthen the SDG implementation by building Digital Government capacity; 2) that according to the Digitization, Transformation, Engagement and Contextualization stages of the Digital Government Evolution model (Janowski, 2015), 87% of the 169 SDG targets require Digital Government capacity at the highest Contextualization stage; and 3) that less than 31% of the Member States reached this stage and 55% did not advance beyond the lowest Digitization stage.

However, despite the fact that the role of digital technologies to support sustainable development and governance innovation has long been recognised and is considered having a cross-cutting impact, only a handful of digital government empirical studies explicitly refer to the SDGs in analyzing their data. Among these exceptions are an analysis of the extent to which governmental websites provide information in relation to SDGs (Meschede, 2018); and a study investigating how a number of Digital Government indicators contribute to the measurement of ten SDGs (Marcovecchio et al., 2019). This shortcoming results in a fragmentation of research efforts around the topic areas of Digital Government and Sustainable Development that is not consolidated around a shared framework, and thus hinders the systematic advancement of research.

To tackle this shortcoming, a specific investigation is being carried out (Misuraca & Medaglia, forthcoming), to provide a preliminary mapping of existing and potential Digital Government research against each of the 17 SDGs, with the goal to sketch an agenda that can stimulate future research in this important area, and serve as a starting point for a review of the focus of the UN Survey.

A review of empirical studies on Digital Government to map the types of *foci* on issues related to sustainable development, using the 17 UN SDGs as a classification tool, has been conducted, drawing on the Digital Government Reference Library (DGRL) version 16.6 (Scholl, 2020).[5]

The first remarkable finding is that of all the body of research on Digital Government in the past six years, only a fraction of it focuses on sustainability and sustainable development. The 291 items resulting from the keyword search, in fact, represent less than 7% of digital government research published since 2015.[6] Another important finding is that among the 291 studies tackling sustainable development within the Digital Government research area, most of the SDGs are covered by at least one example of empirical study. A number of studies tend to highlight the role of a particular technology in tackling one or more of the SDGs. Other empirical studies focus on specific platforms and channels adopted by governments to tackle sustainable development goals.

In view of the current shortcomings in the field on one side, and the crucial role of Digital Government to contribute to the SDGs, a systematization of research in the key area of Digital Government and sustainable development is both urgent and needed. To initiate this process, based on the mapping of *foci* and gaps of Digital Government research against the 17 SDGs, a preliminary set of research questions for each of the SDGs should be identified. These could serve to establish a coherent framework in this topic area and guide upcoming efforts in revising the UN Survey to provide a better understanding of the impact of Digital Government worldwide.

On the other hand, it is very important that future research on Digital Government and the SDGs does not overlook the unintended consequences and potentially negative impacts of digital technology initiatives by governments. An area of research in Digital Government that is currently booming is the one of Artificial Intelligence for public services. The many initiatives at national and supranational level across the world are stimulating an emerging body of research within the Digital Government area (Misuraca and van Noordt, 2020, Dwivedi et al. 2019; Janssen et al, 2020; Sun and Medaglia, 2019). AI applications, such as machine learning applied to policy-making, however, can also potentially carry a downside in perpetuating and emphasizing biases in discrimination.

In conclusion, since the UN SDGs are shaping the global agenda, by extending the notion of sustainability beyond the realm of environmental impact, to include economic divides, social inclusion, and institutional impacts in a coherent whole, the link with Digital Government should be strengthened and a comprehensive analysis could be the focus of the redesigned UN Survey post-2022.

### 3. Explore the use of policy modelling based on dynamic systems and data-driven models, embracing complex systems approaches for policy simulation and visualization

As anticipated, **embracing data-driven, experimental and AI-assisted data-gathering systems and dynamic simulation models** may be useful to move from traditional statistical approaches to social computational techniques. Clearly, these methods require that particular attention is given to collect, filter, curate and intelligently tap bottom-up data, available from multiple sources, and incorporate them in dynamic social simulation models to data gathering, monitoring and evaluation.

At the same time, considering that “no size-fits all”, especially as the aim is to develop approaches that could be used all over the 193 UN Member States, appropriate consideration must be given to the need to consider diversity of local content. This should guarantee in fact that different cultural backgrounds and perspectives are taken into account, especially with regard to LDCs, SIDS and

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5 The database includes journal articles, conference proceedings, books and book chapters. The criteria used for a reference item to be included in the database are: that it has passed an academic peer review process; that it has been published in the proceedings of an academic conference or in an academic journal; that it has been published in English (or, if published in another language, an English-language translation must be publicly available); that it is of at least seven pages (or equivalently, 3,700 words) in length (including references) for a non-technical article; that it is of at least four pages (2,250 words) in length (including references) for a technical article.

6 The keywords used were “sustainable development”, “sustainability”, “SDGs” in both title and abstract. The keywords search covered a period starting from 2015, which is when the UN SDG have been published, until February 2021. The search resulted in a total of 291 items. For each one of the items, the relevance against each of the 17 SDGs was assessed.

countries with transition economies which are often lagging behind in terms of statistical modelling capacities and may not be ready for using advanced digitally-enabled data gathering systems.

For this reason, it is important to recognize that countries across the world are at different stages of implementation of their national ICT policies and e-Government strategies. Digital infrastructure development should thus form the main focus of analysis and the role of intermediaries should be also investigated, as well as giving emphasis on the use of mobile technologies and attempting at exploring how emerging technologies can effectively support development objectives through enabling a new data intelligence paradigm (ADF, 2020).

However, advances in Data Science and computational modelling and simulations - also known as 'Policy modelling', a concept boosted by the European Commission since 2008, is in fact an established technique that could support more sophisticated analyses, provided robust empirical evidence and data is available (European Commission, 2020).

An important point that should be underscored is the fact that some of these approaches that rely on complex systems are not complicated in their implementation, and do not necessarily require large data availability. In some cases, in fact, they are based on quality judgements and perception, which may serve to fill data gaps when comprehensive statistics are not available or it is too costly to conduct large surveys (which nevertheless could be replaced by representatives' panels of online / offline users in certain cases). Therefore, some experimental approaches could be designed and piloted in selected countries and world regions, in order to test the feasibility of such approaches and the possibility to replicate and scale them up in the development of the UN Survey post-2022.

Some possible approaches that may be further elaborated and adapted to the Digital Government phenomenon, and its relation with the SDGs and the Agenda 2030, include: building transition progress quality indicators and exploring the use of complex systems approaches for policy simulation and visualization, experimenting for instance with "hybrid" System Dynamics (SD), Agent Based Modelling (ABM) and Oriented Bayesian Nets (OBNs), among others.

For example, an approach combining the Transition Progress method developed by the European Bank for Reconstruction and Development (EBRD)[7] with innovative modelling techniques, integrated with a comprehensive visualization of results of the impact of Digital Government on SDGs could be explored. These methods and visual representations of probabilistic models have been used in research and practice over the past 20 years for a variety of modelling purposes, in order to structure and visualize any kind of reasoning, forecasting and decision-making problems in conditions of uncertainty.

The appeal of this approach is that it could facilitate the representation of the cause-effect relationships between key variables constituting relevant targets for policy-making, as well as the transmission mechanisms of specific public policy interventions, highlighting the dependencies between variables and noting their variations, before and after an intervention occurs.

In addition, this would allow the possibility of integrating external data to validate the cause-effect relationships that are defined by the underlying theory to exist between some variables, and to compare results based on the empirical evidence that confirms the existence of some of those dependencies. This would therefore facilitate both data gathering and rendering to policy-makers, practitioners and researchers, as well as citizens.

[7] https://www.ebrd.com/economic-research-and-data/transition-qualities-asses.html

# 5 Conclusion and next steps

To demonstrate the timeliness of the reflection we are confronted with during the 2021 UN EGM on Digital Government, and the importance to address the link between this complex phenomenon and the SDGs, a comprehensive study with results of an analysis of the impact of Digital Government on sustainable development has been published on 20th February 2021, exactly while the complete draft version of this Background Paper was being finalised.

The study by Castro & Lopes (2021) uses a logit model to review a sample of 103 countries in the period 2003-2018 and the results suggest that "*e-Government development is a positive determinant for a country to attain sustainable development, proxied by adjusted net savings, that embraces a country's economic, social and environmental development"*.

The analysis further provides evidence that "*e-Government increases the probability to attain sustainable development mostly in developing and transition economies, also suggesting that economic growth and gross national income per capita are significant positive influences in sustainable development in the whole sample and that countries with lower age dependency and natural resource rents are more likely to have sustainable development*".

The fact that developing e-Government allows promoting sustainable development, especially in developing and in transition economies, is of particular importance, as it confirms the hypothesis that digital transformation can be a key driver of change in governments if they want to enhance transparency, accountability and efficiency, and that at the same time it can facilitate integrated approaches to public service design and delivery, promoting sustainable and inclusive economic growth, social development and environmental protection. In all this, good governance is considered crucial to manage efficiently all resources for the well-being of current and future generations.

Digitalization is in fact profoundly changing societies around the world and at an accelerating pace. While the positive effects are evident, digital transformation also has its drawbacks leading to risks and unintended consequences for societies worldwide.

The role of Digital Government is predominantly related to SDG 16: Peace, Justice and Strong Institutions, and to a lesser extent, SDG 17, Global partnership for sustainable development. In a hyper-connected world, in fact, data and digital technologies are crucial to ensuring effective and accountable governments, and the use of digital public service delivery can strengthen institutions and increase trust and transparency, in addition to enhance productivity and service-quality.

However, as a matter of fact, digital technologies and governance innovations are fast emerging as powerful agents of change that can both accelerate and hinder our trajectory towards achieving the entire set of 17 Sustainable Development Goals (SDGs) defined by the Agenda 2030 and many of the 169 targets aimed at resolving environmental, economic and social challenges worldwide.

The global goals are increasingly shaping international, regional, and local policies, strategies and actions to eradicate poverty, reduce inequalities, reverse planetary destruction, enhance human capabilities, and strengthen global partnerships towards sustainable development. The digital transformation of our governance systems is thus an inherent characteristic of modern society that should be considered as pre-requisite of sustainable development, and assessed as cross-cutting dimension of all policies promoting sustainable development.

For instance, as highlighted in a study of the Digital Future Society (2019), while governments around the world are integrating digital technologies to make public services more efficient, cost-effective, secure and transparent, these same technologies also contribute to the achievement of the SDGs by improving the quality and accessibility of public services (e.g. Health SDG 3, Education SDG 4), increasing inclusivity and access (Inequalities SDG 10) and optimising processes in cities and accountability of governments and the protection of fundamental rights (Sustainable Cities SDG 11, Institutions SDG 16).

At the same time, citizen participation, often enabled by digital technologies, contributes to the SDGs by increasing collective action towards sustainability, climate change and life on earth (Sustainable Cities SDG 11; Climate and Life SDG 13,14,15).

The evolution of data ethics and the strengthening of privacy regulations also contribute to the SDGs by improved inclusion through unbiased decision-making (Gender SDG 5, Inequalities SDG

10), and enabling new digital business models that reinforce trust and transparency. This contributes to the SDGs by providing adequate information about data exchange (Education SDG 4, Consumption SDG 12) and by improving privacy and trust-based networks (Infrastructure SDG 9, Justice SDG 16, Partnerships SDG 17).

Nevertheless, an important aspect to consider is that although digital inclusion is increasing overall, the inclusion gap has instead widened, as the effects of the pandemic have shown in all its crude reality, not only in developing countries, but also in many industrialized economies, that have been unprepared to face the shift to distance education, remote working and the new “on-life” situation.

Inequalities in access and use of digital technologies result in the fact that some people are better equipped than others to harness digital technologies and achieve better well-being outcomes in their jobs, income, health, and relationships. While digital inclusion can contribute to the SDGs by reducing societal differences (Poverty SDG 1, Gender SDG 5, Inequalities SDG 10), boosting economic growth (Work SDG 8), and integrating innovative solutions (Infrastructure SDG 9), current metrics tracking digital inclusion and digital equality for traditionally marginalised groups are not always appropriate and should be improved.

At the same time, and very central to the debate around the revitalizing and re-designing of the UN e-Government survey approach, is the concept of Digital Cooperation, whose efforts can contribute to bridging the digital divide in the unequal ability to access and use ICTs, creating opportunities that contribute to the SDGs by forming close collaborations between public, private, academic and third sector actors (Partnerships SDG 17), introduce value-adding jobs (Work SDG 8, Inequalities SDG 10), develop relevant knowledge (Education SDG 4) and early warnings related to the well-being of entire populations (Health SDG 3), as the Covid-19 emergency has demonstrated being essential in time of crisis.

Building on this initial review of the intertwined relation between Digital Government and SDGs, the experts participating in the 2021 UN EGM are invited to reflect upon the global and regional perspectives on digital transformation and to suggest improvements to the survey methodology to better measure e-Government and how it contributes to the implementation of the SDGs.

Given the overarching umbrella of leaving no one behind (LNOB) of the 2030 Agenda and supporting digital inclusion, the EGM will particularly discuss possible improvements in the methodology for measuring e-Participation (the e-Participation Index - EPI), with the aim to better capture emerging trends and how to assess them in the e-Government Survey approach.

In this exchange of views and suggestions on whether and how to adjust the focus, the approach of the UN e-Government Survey will be taken into account in light of the feedback and suggestions received from Member States during the online consultations held throughout the year and integrated in the Report of the 2021 EGM.

The recommendations that will be formulated as part of the Report will serve to update the current methodological approach of the Survey for 2022, ensuring it contributes to implementation of the Sustainable Development Agenda 2030. They will also help to set the ground for revisions of future editions, considering the possibility of a more radical change of the focus and approach of the survey to ensure a more rigorous and scientific nature of the methodology and analysis, and the possible development of new or revised indicators and data gathering techniques.

Future approaches for gathering information and data for the survey, and to possibly collect information from governments and other sources rather than only rely on an analysis of government portals, should however consider the need to align with the ICT-related indicators of the current SDG global indicators framework. These should also take into consideration the way the Survey could contribute to the review of the implementation of the Sustainable Development Agenda 2030, and the World Summit on the Information Society (WSIS), in particular Action line C7 on e-Government and all actions on which Digital Government is impacting, in a post-Covid-19 digital society.

## References


- ADF- Agence française de développement, (2020). *Emerging Uses of Technology for Development: A New Intelligence Paradigm*, Draft Policy Paper, available at - https://www.afd.fr/sites/afd/files/2020-10-04-48-33/PP6_DRAFT_web_BAT.pdf
- Avgerou, C., (2010) *Discourses on ICT and development*. Information technologies and international development, 6 (3). pp. 1-18.
- Barcevičius, E., Cibaitė, G., Codagnone, C., Gineikytė, V., Klimavičiūtė, L., Liva, G., Matulevič, L., Misuraca, G., Vanini, I., Misuraca, G., (Ed.), (2019). *Exploring Digital Government transformation in the EU - Analysis of the state of the art and review of literature*, EUR 29987 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-13299-8, doi:10.2760/17207, JRC118857
- Batini, C., Viscusi, G., Cherubini, D., (2008), 'eG4M: The Planning Methodology', QD Research Report, University of Milan Bicocca, DISCO, Starrylink
- Brown., A., E. & Grant, G., (2010) *Highlighting the Duality of the ICT and Development Research Agenda*, Information Technology for Development, 16:2, 96-111, doi: 10.1080/02681101003687793
- Castro, C., Lopes, C. (2021). Digital Government and Sustainable Development. Journal of Knowledge Economy. https://doi.org/10.1007/s13132-021-00749-2
- Coombs, C. (2020). *Will Covid-19 be the tipping point for the Intelligent Automation of work? A review of the debate and implications for research*. International Journal of Information Management, 55, 102182. https://doi.org/10.1016/j.ijinfomgt.2020.102182
- Digital Future Society, (2019). Towards Agenda 2030: Digital Future Society and the Sustainable Development Goals, https://digitalfuturesociety.com/report/towards-agenda-2030
- Dunleavy, P., Margetts, H., Bastow, S., and Tinkler, J., (2006). Digital Era Governanance: IT Corporations, the State and E-Government (Oxford University Press, 2006).
- Dwivedi, Y. K., et al., (2019). "Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy," International Journal of Information Management, Aug. 2019, doi: 10.1016/j.ijinfomgt.2019.08.002.
- European Commission, (2020). Study on data tools and technologies used in the public sector to gather, store, manage, process, get insights and share data, Report of the Study Data analytics for Member States and Citizens, the study (Framework Contract DI/07624 - ABC IV Lot 3)
- Ferro, E., Dwivedi, Y., K., Gil-Garcia, J., R., Williams, M. D.(2010). *Handbook of Research on Overcoming Digital Divides: Constructing an Equitable and Competitive Information Society.* Pages: 858, IGI Global, ISBN13: 9781605666990DOI: 10.4018/978-1-60566-699-0Gertler, Paul & Martinez, Sebastian & Premand, Patrick & Rawlings, Laura & Vermeersch, Christel. (2011). Impact Evaluation in Practice, 2nd Edition, The World Bank, available at https://www.worldbank.org/en/programs/sief-trust-fund/publication/impact-evaluation-in-practice
- Goodland, R., and Daly, H. (1996). *Environmental Sustainability: Universal and Non-Negotiable*, Ecological Applications (6:4), pp. 1002–1017
- Grönlund, Å. (2009). *ICT Is Not Participation Is Not Democracy - eParticipation Development Models Revisited*. Lecture Notes in Computer Science, 5694, 12–23. http://adsabs.harvard.edu/abs/2009LNCS.5694...12G
- Janowski, T., (2016). "Implementing Sustainable Development Goals with Digital Government – Aspiration-capacity gap," Government Information Quarterly, vol. 33, no. 4, pp. 603–613, 2016, doi:10.1016/j.giq.2016.12.001
- Janowski, T., (2015), Digital government evolution: From transformation to contextualization, Government Information Quarterly, Volume 32, Issue 3, 2015, Pages 221-236, https://doi.org/10.1016/j.giq.2015.07.001

- Janowski, E. Estevez, and R. Baguma, (2018). “Platform governance for sustainable development: Reshaping citizen-administration relationships in the digital age,” Government Information Quarterly, vol. 35, no. 4, Supplement, pp. S1–S16, Oct. 2018, doi: 10.1016/j.giq.2018.09.002.
- Janssen, M., Brous, P., Estevez, E., Barbosa, L. S., and Janowski, T., (2020). “Data governance: Organizing data for trustworthy Artificial Intelligence,” Government Information Quarterly, vol. 37, no. 3, p. 101493 [1–8], 2020, doi: 10.1016/j.giq.2020.101493.
- Le Blanc, D., (2020), E-participation: a quick overview of recent qualitative trends DESA Working Paper No. 163, ST/ESA/2020/DWP/163
- Maniam, A., (2019). What Digital Success Looks Like: Measuring & Evaluating Government Digitalisation, Civil Service College, Opinion Issue 21, 30 Jul 2019, https://www.csc.gov.sg/articles/what-digital-success-looks-like-measuring-evaluating-government-digitalisation
- Marcovecchio, I., Thinyane, M., Estevez, E., and Janowski, T. (2019). “Digital government as implementation means for sustainable development goals,” IJPADA, vol. 6, no. 3, pp. 1–22, 2019, doi: 10.4018/IJPADA.2019070101.
- Medaglia, R., and Damsgaard, J., (2020). *Blockchain and the United Nations Sustainable Development Goals: Towards an Agenda for IS Research*. In: PACIS 2020 Proceedings: AISeL, 2020
- Mensah, J. (2019). Sustainable Development: Meaning, History, Principles, Pillars, and Implications for Human Action: Literature Review, Cogent Social Sciences (5:1)
- Meschede, C., (2019). “Information dissemination related to the Sustainable Development Goals on German local governmental websites,” Aslib J. Inf. Manag., vol. 71, no. 3, pp. 440–455, 2019, doi: 10.1108/AJIM-08-2018-0195.
- Misuraca, G., Medaglia, R., and Aquaro, V., (forthcoming). Conceptualising Digital Government in relation to the United Nations’ Sustainable Development Goals: towards a research agenda, in proceedings of Dg.O 2021, Omaha, Nebraska, USA
- Misuraca., G., (2020). *Rethinking Democracy in the “Pandemic Society” - A journey in search of the governance with, of and by AI*, in Proceedings of the First International Forum on Digital and Democracy. Towards A Sustainable Evolution 2020, 10-11 December, 2020. CEUR Workshop Proceedings (CEUR-WS.org), Vol-2781 urn:nbn:de:0074-2781, ISSN 1613-0073
- Misuraca, G. (2012). "Assessing ICT-enabled innovation for governance and policy making", PhD Thesis--College of Management and Technology, EPFL, Lausanne, Switzerland. EPFL, Switzerland, Lausanne, Switzerland
- Misuraca, G. (2012). e-Governance: Past, Present and Future: A theoretical framework for prospective policy analysis, in 'eGovernance, A Global Journey'. Vol. 4, 09/2012. Edited by Finger, M., and Sultana, F., IOS Press, BV, Amsterdam
- Misuraca G., (2007), *e-Governance in Africa, from Theory to Action: a handbook on ICTs for local governance*, International Development Research Centre / IDRC and Africa World Press, July 2007
- Misuraca, G., Barcevičius, E., Codagnone, C., (2020). *Exploring Digital Government Transformation in the EU: understanding public sector innovation in a data-driven society*, EUR30333 EN JRC Science for Policy Report, Publications Office of the EU, Luxembourg, doi.10.2760/480377
- Misuraca, G., Codagnone, C., & Rossel, P. (2013). *From Practice to Theory and back to Practice: Reflexivity in Measurement and Evaluation for Evidence-based Policy Making in the Information Society*. Government Information Quarterly, 30, Supplement 1, S68-S82.
- Misuraca, G., and van Noordt, C.., (2020). *Overview of the use and impact of AI in public services in the EU*, EUR 30255 EN, Publications Office of the European Union, Luxembourg, 2020, doi:10.2760/039619, JRC120399.
- Misuraca, G., and Viscusi, G., (2011). “e-Governance for Development: designing an operational roadmap for ICT-enabled Public Administration Reform,” in Global Strategy and Practice of e- Governance: Examples from Around the World, IGI Publisher, 2011.

- Misuraca, G. and Viscusi, G. (2015). *Shaping Public Sector Innovation Theory: an Interpretative Framework for ICT-enabled Governance Innovation*, Electronic Commerce Research 15(3), 303-322. https://link.springer.com/article/10.1007/s10660-015-9184-5
- OECD (2020), *Digital Government Index: 2019 results*, OECD Public Governance Policy Papers, No. 3, OECD Publishing, Paris, https://doi.org/10.1787/4de9f5bb-en.
- Savoldelli, A., Codagnone, C., Misuraca, G., (2014). *Understanding the e-Government Paradox: learning from literature and practice on barriers to adoption*, in Government Information Quarterly, Special Issue "Towards Smarter Governments: New Technologies & Innovation in the Public Sector
- Scholta, H., Mertens, W., Kowalkiewicz, M., & Becker, J. (2019). *From one-stop shop to no-stop shop: An e-government stage model*. Government Information Quarterly, 36(1), 11–26.
- Sipior, J. C. (2020). *Considerations for development and use of AI in response to Covid-19*. International Journal of Information Management, 55, 102170. https://doi.org/10.1016/j.ijinfomgt.2020.102170
- United Nations, (2015a). *Transforming Our World: The 2030 Agenda for Sustainable Development, UN* - https://sustainabledevelopment.un.org/post2015/transformingourworld
- United Nations, (2015b). *About the United Nations Sustainable Development Goals.* https://www.un.org/sustainabledevelopment/sustainable-development-goals
- UNDESA (2017). *Review of the focus and methodology of the United Nations E- Government Survey - Background- and Method Paper.* UN/DESA EGM 2018 on The Role of Public Institutions in the Transformative Impact of New Technologies
- UNDESA (2020). COVID-19: Embracing digital government during the pandemic and beyond, Policy Brief #61 - https://www.un.org/development/desa/dpad/publication/un-desa-policy-brief-61-COVID-19-embracing-digital-government-during-the-pandemic-and-beyond
- Pan, S. L., and Zhang, S., (2020). “From fighting Covid-19 pandemic to tackling sustainable development goals: An opportunity for responsible information systems research,” International Journal of Information Management, vol. 55, p. 102196, doi: 10.1016/j.ijinfomgt.2020.102196.
- Scholl, H. J., (2020). “The Digital Government Reference Library (DGRL). Versions 16.0—16.5,” 2020. [Online]. Available: http://faculty.washington.edu/jscholl/dgrl.
- Sun, T. Q. and Medaglia, R. (2019). “Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare,” Government Information Quarterly, vol. 36, no. 2, pp. 368–383, Apr. 2019, doi: 10.1016/j.giq.2018.09.008.
- United Nations (2015a), “About the Sustainable Development Goals,” United Nations Sustainable Development. https://www.un.org/sustainabledevelopment/sustainable-development-goals
- United Nations, (2015b) “Transforming our world: The 2030 Agenda for Sustainable Development,” Available at: https://sustainabledevelopment.un.org/post2015/transformingourworld
- Vinuesa, R., et al., “The role of artificial intelligence in achieving the Sustainable Development Goals,” Nature Communications, vol.11, no.1, Jan. 2020, doi: 10.1038/s41467-019-14108-y.
- Zheng, L., Kwok, W. M., Aquaro, V., and Qi, X., (2019). “Digital Government, Smart Cities and Sustainable Development,” in Proceedings of the 12th International Conference on Theory and Practice of Electronic Governance (ICEGOV 2019), New York, NY, USA, Apr. 2019, pp. 291–301, doi: 10.1145/3326365.3326403.