Government digital services and children:

pathways to digital transformation

Summary

An increasing number of e-government services are available to children and families around the world, not least essential digital education, health and social services during the global COVID-19 pandemic. Digital services have a recognised potential to improve service relevance and accessibility for children. However, there is little systematic understanding of what types of services are available or the enabling factors that provide effective child rights support. Below are the main findings and recommendations.

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There are three distinct child age groups targeted by e-government: infants and young children (via parents), school-age children, and adolescents... and three categories of digital services that correspond to these age groups.

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There is insufficient data to get a clear picture of how children use digital services or of their impact... so regular global and national data and statistical collection is needed, especially in understudied regions.

03

Digital services are often driven by concerns over government efficiency and by a simplistic one-size-fits-all model, not the specific needs of the child... but the COVID-19 global pandemic is leading to increased prioritisation and acceleration of the digitization of social services and, in some instances, more user-centred service approaches.

04

Facilitators of child-sensitive e-government include identity management, adequate data protection, user engagement in service design, and consultation with relevant partners... and governments are aware of this. However, considerable progress is needed to turn these principles into practice.

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Implementation challenges of the transition to e-government are a hurdle to the development and delivery of digital services for children… so coordinated e-government initiatives — from enabling infrastructure, including internet coverage and speed, to internal systems, and e-services — and prioritisation of both national and subnational capacities are needed.

06

There are many barriers to the uptake of digital services by children and families, including lack of internet and equipment, access to legally valid identification or digital skills… so promoting digital inclusion is essential, through appropriate identity management, easy access and user-friendly services.

While e-government practices and systems progress, much still needs to be done to ensure accessibility and integrity as regards children and their data. Improving capacities at all levels of government, safeguarding data, ensuring cross-sector collaboration, and involving children and parents in design are all factors that must be put into practice.

Introduction

Digital technologies continue to change the dynamics of our economies and societies and, in so doing, have the potential to alter the character of modern government permanently. The 'digital revolution' has come with the promise of improved governance and more inclusive and responsive service delivery[1] and there are now many public websites, digital platforms and applications through which governments inform and assist citizens using information and communication technologies (ICT).

A central tenet of the transition to e-government is the digitization of public health, education, social and identity management services offered by national and local governments. Digitization in these areas is undertaken to expand service access to the public and, in particular, to traditionally underserved groups. The 2020 United Nations E-Government Development Index finds that 80 per cent of 193 United Nations (UN) Member States now offer some digital content or online services for youth, women, older people, persons with disabilities, migrants and/or those living in poverty.[5] While these services are increasingly common in the 21st century, they have become essential during the global COVID-19 pandemic — not least, for children and families. Amidst the digital transformation of government, technology has an increasing impact on a child's ability to enjoy the benefits of public health care, education and welfare initiatives,[6] and the COVID-19 pandemic has now brought the potential — and challenges — of digital services for children to the fore of policy planning discussions. As a result of school closures in over 190 countries[7] and the suspension of many vital face-to-face services,[8] more than two-thirds of countries have introduced a national online learning platform for children during the pandemic,[9] leading to a re-examination of the efficacy of these services for continuity of learning.[10]

Despite this, there is surprisingly little systematic exploration of the discourse and practices that ensure that e-government services can advance and protect the rights of children and young people. This briefing paper, therefore, attempts to answer the following questions:

1. What is the landscape of digital government services for children?

2. What drives the digital transformation of public services relevant to children and families?

3. What facilitates child-sensitive digital services?

4. What challenges do governments face to ensure child-sensitive digital services?

TERMS

What is e-government, and what are digital services?

Electronic government (e-government) is defined as 'the use of ICT and its application by the government for the provision of information and public services to the people'.[2] Narrowly defined, these public services are information, data or transactions provided by the government to people or entities within its jurisdiction, either directly through public sector agencies or by financing the provision of a service.[3] The focus of this brief is digital government-to-citizen (G2C) services relevant to children and families, specifically services whose use requires proof of identity and which sit at the heart of the citizen-state relationship: health care, education, social services, registration and taxes.[4] Within this focus, a digital service might take the form of a public health app to make appointments with a local doctor, a public school's e-learning platform with digitized curriculum content, an online license or passport application, or a local authority's video-call system for deaf and hearing impaired residents.

Methodology

To answer these questions, the authors undertook a global scan of government and norm-setting institutional websites. The aim is to identify the types of digital services offered to children and families as well as the issues surrounding the use of these services. This effort was supported by a review of relevant academic and grey literature. To gain practitioner insights, exploratory interviews with 28 representatives from government, civil society and international organizations were conducted in five countries — Bangladesh, Brazil, Ghana, Sweden and Timor-Leste. Countries were selected to represent different levels of economic development, a range of service portfolios, and various stages of governments' digital transformation. Timor-Leste, for example, is a low-middle income country with limited public services. It has comprehensive plans for e-government and is in the early stages of ICT infrastructure roll-out. By contrast, Sweden is a high-income welfare state that is consistently ranked in the top 10 leading countries in e-government development globally.

TABLE 1: SOCIO-ECONOMIC INDICATORS FOR CASE STUDY COUNTRIES

INDICATORS	CASE STUDY COUNTRIES				
Description	Bangladesh	Brazil	Ghana	Sweden	Timor-Leste
Population (total, millions) (2019, est.) (UNDESA, 2020)	164.69	212.56	31.07	10.11	1.32
Percentage of child population) (UNDESA, 2018)[11]	38.79	32.99	47.83	23.12	59.69
Urbanization (% of population) (2020) (UNDESA, 2020)	39.40	87.60	56.70	88.20	32.80
GNI per capita ($) (PPP) (est.) (WB, 2018, 2019)	4, 976 (2019)	14, 263 (2019)	5, 510 (2019)	54, 507 (2019)	4, 379 (2018)
Literacy rate, adult (% ages 15 and over) (WB, HDR, 2019)	72.90	92.00	71.50	99.00 (2014)[12]	58.30
Employment to population ratio (% ages 15 and over) (WB, HDR, 2019)	35.30 (2017)	40.33 (2019)	29.01 (2017)	45.11 (2018)	34.49 (2016)
Youth not in school or employment (% ages 15–24) (WB, HDR 2019)	27.39 (2017)	24.16 (2018)	30.50 (2017)	6.13 (2018)	20.95 (2016)
Internet users, total (% of population) (WB, HDR 2019)	15.00	67.50	39.00	92.10	27.50
Mobile phone subscriptions (per 100 people) (WB, HDR 2019)	97.30	98.80	137.50	125.10	103.20
E-Government Development Index Ranking (2020)	119	54	101	6	134

Abbreviations: GNI = Gross National Income, HDR = Human Development Report, PPP = purchasing power parity, UNDESA = United Nations Department of Economic and Social Affairs, WB = World Bank.

What is the landscape of digital government services for children?

The analysis reveals that digital government services address three distinct age groups of children and young people, each with a different set of characteristics, rights and obligations with regard to public services:

- **0 to 4-year-olds:** infants and young children who are entirely reliant on parents and guardians for services and therefore engage indirectly with authorities;

- **5 to 14-year-olds:** children who are the direct beneficiaries of services. While reliant on parents and guardians, 5 to 14-year-olds are generally of school age. They can therefore be in direct contact with government service providers through collaboration with authorities providing education, health or day care services. For schoolchildren around the world, online teaching platforms for student-teacher and home-school communication are ubiquitous.

- **15 to 18-year-olds:** adolescents whose legal rights and obligations are increasingly similar to those of adults. Public services are increasingly aimed directly at adolescents directly rather than their parents and guardians.

Further, we find three main categories of public services for children, which broadly follow the age groups identified:

1. **Services which directly address children:** These include health care and education services such as electronic patient journals and school-student-parent portals widely available around the world. During the COVID-19 pandemic, these have become the primary service delivery mechanism; Timor-Leste for example, managed to get an estimated one in eight of 0.45 million students online during the initial months of the pandemic,[13] while China's 'cloud schooling' platform for guided study has ensured continued education services for 180 million full-time students.[14] Direct services also include social services for children (often adolescents) such as 'youth services' in Sweden.[15] Sites such as Abu Dhabi's KidX also provide gamified civic education for children to learn about the roles and responsibilities of different government agencies.[16]

2. **Services aimed directly at adolescents on the threshold of adulthood:** These services generally target 15 to 18-year-olds. They are often found in health care and education but are also related to voting and legal rights, tax, pension, driver's licensing and/or military service. Examples include Generation NYC[17] from the City of New York, tailored 'Welcome to Adulthood!' content on Finland's Suomi service platform[18] and South Korea's Kids information and service universe.[19] Examples are predominantly found in high-income countries, but there is some evidence of these in middle-income countries, such as Brazil's remote applications for mandatory military enrolment.[20] While these are growing in number, practitioners noted that adolescents can have high expectations of the design and ease of use of digital services, and can find government digital services cumbersome.[21]

3. **Services associated with infants and young children but addressed to parents or guardians**: These include prenatal and primary health-care services, birth registration and child benefits. A majority of these services are available for parents of newborns, infants and young children aged 0 to 4 years through online platforms and apps, such as those in New Zealand,[22] Singapore,[23] South Korea[24] and Israel.[25] Our analysis finds that in low- and middle-income countries there is limited use of technology by responsible authorities in service provision for infants and younger children, and there is a lack of online information or transactional services aimed at children, parents or guardians.

While parents act as intermediaries to access digital services on behalf of children, some children, and more often adolescents, act as intermediaries for family members. Both our analysis and the Kids Online survey of 25,000 9 to 16-year-olds in 19 European countries, finds evidence of both patterns.[26] The EU Kids Online study shows that parents tend to engage in mediation practices and support their children to use the internet safely while children tend to help their parents when they do not know how to deal with internet activities. This may indicate a continuing generation gap, where parents lag behind their children in digital skills. Similar patterns are found in Bangladesh, Brazil and Sweden, where there are indications of teenagers using public and private online services on behalf of their parents, particularly when parents have limited digital skills, low educational attainment levels or lack confidence in the local language.[27]

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Beyond the categories outlined above, getting a picture of number or use of family and child-relevant government digital services is tricky. We know, for example, that by the end of 2019, 53.6 per cent of the global population made use of the internet.[28] In 2017, 71 per cent of 15 to 18-year-olds were found to be active internet users,[29] and 95 per cent of 15-year-old students in OECD countries are accessing the internet at home.[30] However, very little is known about overall levels of child internet access, for example how many do not have access and why. Some studies, like Global Kids Online, provide information on children's digital skills and online experiences and activities in general. The closest question to accessing 'public service' in the Global Kids Online and EU Kids Online surveys is on the use of the internet to seek health information online, although the type or source of content that children access was not differentiated. Over half of the approximately 22,000 internet-using children aged 12–16 years surveyed reported seeking health-related information at least once a month during the early stages of the COVID-19 pandemic. In the 28 countries on 4 continents, this varied from 78 per cent in Finland to 28 per cent in the Philippines, with girls generally more likely to do so than boys — except in Chile, France, Ghana and South Africa.[31]

Academic literature and research on prevalence and access rely heavily on data from the International Telecommunication Union (ITU) or, in Europe, from Eurostat digital economy and society statistics. The data disaggregation is available primarily by country and by households or individuals aged 15 years or older. While national sources exist in Europe, and countries such as Australia[32] and Brazil,[33] they do not necessarily follow the same statistical norms and definitions as ITU and Eurostat. Further, 'youth' as a focus group is not consistently defined ('youth' is defined as 15–24 years old by ITU and 16–29 by Eurostat), and it is difficult to subdivide the data further to focus only on under-18s.

There is no systematic collection of data on internet and technology access and use by children under 15. This lack of data was often pointed out as a challenge for design and targeting of digital services for children and families by policymakers and civil society representatives interviewed for this brief. While some beneficial data on the use of the internet by children (such as reasons for internet use, digital skills levels, and associated risks of internet use[34]) is generated by initiatives such as Global Kids Online and EU Kids Online, these are undertaken in a small number of countries and do not include statistics on the overall use of digital services. In Sweden, data are collected on child internet and technology use from birth, but respondents are parents or guardians while the child is under age 15.[35] Out of roughly 150 questions asked by the biannual UN E-Government Development Index, less than five per cent are directly relevant to children (questions regarding applying for a birth certificate or identity card online, or information or services about health care, education or enrolment in school or day care). In some cases, it is not clear if the question targets 'youth' above or below 18 years of age.[36]

What drives the digital transformation of public services relevant to children and families?

In each of the countries explored, policymakers identified two primary drivers of the digitization of services:

1. **First, drivers of the roll-out of ICT in the public sector were articulated in terms of broader national economic and development targets.** In low- and middle-income countries, policymakers framed the need for e-government within broader goals established by national development strategies, such as revenue generation, increased productivity and economic growth, job creation and welfare for growing populations. National development plans such as Timor-Leste's 2030 Strategic Development Plan,[37] strategies subsequent to Bangladesh's 'Vision 2021' framework,[38] Ghana's Shared Growth and Development Agenda,[39] and 'Ghana Beyond Aid' were frequently referenced as starting points for e-government in those countries. This economy-centric approach was also evident in Brazil, where the national digital transformation is coordinated at the federal level by the Ministry of Economy[40] and in Sweden.[41] In each of these cases, the digital services were identified as a primary mechanism to achieve these goals.

   In high-income countries, with a large portfolio of public services and advanced integration of ICT in the public sector, continued digital transformation is driven more by specialized strategies to support national productivity, cost efficiency, competitiveness, and innovation within the public sector. Sweden is a case in point. 'A Sustainable Digitalised Sweden' (2017-2022)[42] focuses on enhancing digital skills nationwide, on enabling citizen participation in the digital transformation and increasing trust and security in online services. Supporting strategies include the Digital First programme for the digital revival of the public sector (2016–2018)[43] and Putting the Citizen at the Centre[44] for increased usability and ease of access to digital services. Here, there is a focus on digital service quality, access and use, with the aim of transferring the benefits of digital technologies in the public sector to all users.

2. **Second, policymakers interviewed identified the need for cost-savings and service efficiency as a primary driver of the transition to digital services.** In Ghana, interviewees indicated that the digitization of birth registration was driven in part by a need to save on the resources employed in analogue birth recording.[45] In Sweden, interviewees described how a digital parent platform was driven by a need to reduce repeat interaction and follow-up times with parents to relieve municipal resources.[46] These findings confirm what we already know: that efficiency gains (not user needs) are the primary driver of the transition to digital services. Online and call centre services are between 2 and 3.5 times cheaper than paper and physical services in the Nordic countries[47] and up to 75 times cheaper to produce in Latin America and the Caribbean.[48] The European Commission estimates that 'digital by default' can save the 28 members of the European Union € 6.5 billion annually.[49]

What facilitates child-sensitive transformation?

Our analysis sought to identify the factors which ensure that targeted, suitable and quality digital services are delivered to children and families. These factors are: identity management, governance, partnerships, donors and norm-setting institutions.

3.1 Identity management

This is a vital prerequisite for analogue and digital service access and delivery for children, but is fraught with challenges for the government at every stage of the digital transformation. Globally, over one billion people are unable to prove their identity and therefore lack access to vital services.[50] Of these, 47 per cent are below the national ID age of their country. Identity management was, therefore, identified as a critical component in efforts to provide digital services to children. In Timor-Leste, where only 30 per cent of children under the age of 5 are registered with birth certificates,[51] the government is developing a Unique ID system that aims to have IDs for 100,000 individuals, or 13 per cent of the population by 2023.[52] The unique identifier will be a basis for access to e-government services. Ghana has recently introduced the Ghana Digital Card, an e-ID through which citizens aged 15 and over will have a digital certification that allows access to digital public and commercial services.[53] In Sweden, all individuals are issued a unique identification number at birth or when granted residency in the country. Over the age of 12, electronic IDs are then issued by banks to bank account holders, which can then be used to access digital services.[54]

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SPOTLIGHT

The challenges of ID management for digital services for children

ID management was identified as a significant challenge for digital service delivery plans. In Timor-Leste, interviewees noted many challenges with the development of the new Unique ID system, including the alignment of existing ID issuing authorities and birth registration problems for children in remote rural areas.[55] In Ghana, interviewees noted that while there are plans to integrate ID management databases held by relevant agencies (Births and Deaths Registration, the National Identification Authority, Ghana Statistical Service), the current siloed system allows for ID gaps or duplication and leaves little opening for data integration.[56]

ID management problems are also evident in countries with many established e-government initiatives. While not a challenge unique to Brazil, the country's citizens must provide copies of birth and registry certificates as well as proof of address or residence to legally identify themselves. As a result, Brazilian authorities have difficulties integrating analogue and digital services caused by multiple ID numbers if citizens are registered in multiple states or move between states.[57] As a result, Brazil is working on a new electronic ID system which is expected to improve identity management and, in turn, improve access to public services. In Sweden, interviewees indicated that the decentralised approach to electronic IDs, which are issued by banks to bank account holders, creates an extra layer of technical complexity to electronic identity management not seen in countries such as Denmark or Estonia, where public-private partnerships help to maintain joint public key infrastructure, electronic ID and eSignature infrastructure.[58]

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3.2 Digital governance

Across the board, interviewees identified the establishment and implementation of proper legal and policy frameworks for digital governance as a prerequisite to digital services relevant to children. In Timor-Leste, for example, processes are underway to establish legislation and policies on cybersecurity, cyber-crime, privacy online, open data and data access.[59] However, most of the discussions focused on the importance of child data protection. In Brazil, the new Data Protection Law (due to come into effect in January 2021) includes clear considerations of data protection for minors. It outlines the parental role in consent for access to child data online.[60] In Sweden, national strategies and legislation are influenced by European Union-wide standards, such as the General Data Protection Regulation articles on child consent online. However, Sweden and other EU member states have lobbied the European Commission and UN agencies to increase the ambitions of these standards.[61] Globally, there are few specific safeguards for children's data, an issue that is at the root of initiatives such as UNICEF's 'Responsible Data for Children' and 'Data Governance Manifesto'.[62]

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Further, 15 to 18-year-olds are more likely to access digital services directly and therefore have different data security and privacy needs. For instance, to facilitate doctor-patient trust regarding reproductive information and care, adolescents in Sweden (12 to 18-year-olds) and Denmark (15 to 18-year-olds) have exclusive access to their personal patient and medical records.[63] In Brazil, adolescents aged 16 or older can register to vote in elections.[64] In Ghana, practitioners highlighted the need for government agencies to consider risk mitigation for 15 to 18-year-olds through security measures built into digital service platforms, as well as awareness-raising initiatives on how to protect personal data.[65] Beyond data protection, age disaggregation in digital governance frameworks was raised as an access issue. In Timor-Leste, where social assistance is granted from the age of 15, discussions highlighted a need for legal provisions to issue electronic IDs to under-15s with social assistance needs — such as children with disabilities — to access required services.[66]

3.3 Partnerships

Three types of partnerships were found to have an important role in the development and roll-out of child relevant digital services: public-private partnerships (PPP), partnerships between the public sector and civil society (PCP) and intra-governmental partnerships (PUP).

PPPs: The role of the private sector in e-government initiatives is thought to be vital where governments are unable to meet resourcing needs for capital intensive ICT infrastructure, expensive digital systems or the specialized skills required to operate them.[67] National and subnational governments, therefore, seek a 'win-win' solution through long-term contractual arrangements with companies to finance and operate ICT in the public sector.

In Sweden, interviewees highlighted the benefits of PPPs in the health sector and pointed to success stories in Estonia and Denmark in relation to electronic IDs, digital signatures and data exchange.[68] In Ghana, a PPP was undertaken from 2010 to digitize the processes and services of the Ghana Revenue Authority and Registrar General's Office, with an agreement for the private sector to majority finance, build and operate e-tax and electronic business registration platforms until their investment costs were recovered.[69]

The system was then handed back to government agencies for continued operation. More recently, a partnership with mobile service operator Airtel Tigo Ghana facilitated the pilot of Ghana's digital birth registration system,[70] and policymakers noted that scaling the system would require a national PPP with telecommunications operators.[71] Further, universal service funds (a type of PPP which pools contributions from telecom companies to increase access to telecom services) have been used in Colombia, Ghana, Malaysia, Pakistan and Turkey to provide internet subscriptions and laptops to low-income students, and open community ICT centres in impoverished areas.[72] However, the success of PPPs for e-government remains a contested issue.[73] There are also mixed results in emerging economies, including considerable underutilisation or mismanagement of the universal service funds set up.[74]

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Despite the popularity of the PPP model, the majority of public-private relationships discussed in interviews were commercial arrangements to procure new products and services for digital service delivery (and, as such, not PPPs).[75] This is reflected in the literature, which finds that the term 'PPP' is often applied to outsourcing or privatisation for e-government.[76] It shows the prevalence of more traditional client-contractual relationships between government and the private sector for digital services, even as discourse on PPPs is evolving towards consultative and collaborative approaches.[77] Central government authorities in Brazil, Sweden and Timor-Leste tend to procure bespoke solutions from companies or tailor those already on the market. By contrast, less well-resourced authorities in Timor-Leste and municipalities in Brazil and Sweden procure more standard solutions.[78] Policymakers also discussed direct integration of superior private digital services to avoid duplication or competition. Interviewees in Ghana expressed the view that government digital services should integrate popular commercial mobile money interoperability systems as payment modalities for digital public services, rather than developing public equivalents.[79] Similarly, in Sweden, private sector electronic ID providers are certified by the central government and integrated into government services.[80]

PCPs: Formal and informal collaboration between the public sector and civil society plays a strong role in promoting child issues within digitization initiatives. All five countries explored are formally required to publish new legislation for public consultation. In Bangladesh, Brazil, Ghana and Sweden, civil society has pushed for increased internet accessibility and digital skills initiatives.[81] In Timor-Leste, child rights and gender equality advocates will play a role in ongoing consultations on the government's digital inclusion framework.[82] In Sweden, formal and informal consultation with civil society stakeholders — and sometimes, lobbying by civil society actors — are considered the norm for digital service development.[83]

PUPs: Intragovernmental partnerships, including with agencies mandated to advocate for child rights, were identified as necessary for the effective development of digital services for children. In Timor-Leste, where planning guidelines require women's and children's components in every government plan, interviewees highlighted the active engagement of the Ministry of Social Solidarity and Inclusion in consultations on e-government policies and initiatives.[84] In Bangladesh, interviewees noted several PUPs involving central and local government partners and digital agencies for digital health and education initiatives.[85] In Ghana, the National Information Technology Agency has been a collaborative partner to multiple sectoral agencies; for example, it played a role in drafting the National eHealth Strategy and piloted health ID systems for the Ministry of Health.[86] Despite these examples, policymakers in Brazil, Ghana and Timor-Leste noted that overall, PUPs were piecemeal and often challenging.[87]

In Sweden, joint strategies between central, regional and local authorities are common, and interviewees representing local and regional authorities highlighted that central government often proactively consults with them before publishing strategies related to both ICT and children.[88] There is an increasing level of collaboration by clusters of local and regional authorities for the internal development and maintenance of IT systems and ICT solutions. Similarly, joint procurement initiatives to optimise the cost-benefit have been increasingly used in the last two decades.

3.4 Donors and international norm-setting institution

These actors are influential in child-sensitive digital services, though influence varies based on the income level of the country in question. In the lower-middle income countries explored, many relevant digital service initiatives have been undertaken with the support of international donors and UN agencies. In Ghana, efforts towards digital birth registration were supported by UNICEF and the World Bank. The efforts to develop a Unique Identifier system in Timor-Leste — a vital basis for its e-government plans — is supported by UNDP and UNICEF. Globally, UNESCO, the World Bank and regional development banks support such initiatives in other beneficiary countries. The COVID-19 pandemic has also seen a strong donor role in the roll-out of digital services for children as part of crisis response efforts in low- and middle- income countries. In Bangladesh, for example, UNICEF has supported the development of virtual juvenile courts[89] and worked with the ICT Division of the Government to develop and implement the country's education continuity plans.[90] As a donor-country itself, Sweden is instead influenced by European Commission recommendations and regulations.[91] These recommendations drive continuous improvement of digital infrastructure (e.g. broadband targets), and availability of online services including birth certificates or enrolment in day-care and education through 'government once-only' and 'digital-by-default' principles.

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What challenges do governments face to ensure child-sensitive digital public services?

Analysis and interviews identified the following contextual, implementation and design challenges for governments seeking to deliver effective and inclusive digital services for children and families:

Internet penetration and speed: As might be expected, countries with established ICT infrastructure have more established and varied digital services available for children and parents. In Sweden, internet penetration is high (92 per cent of the population in 2019). While improved infrastructure and skills development are ongoing priorities, the strategic focus is on high-speed mobile (100mb plus) and digital skills for specific user-groups (such as seniors).[92] However, low levels of internet penetration were cited as a primary challenge for digital service plans in Bangladesh (15 per cent), Timor-Leste (27.5 per cent) and Ghana (39 per cent) and.[93]

Digital skills of service users: All four low- and middle-income countries identified low levels of digital skills among the general population as a major hurdle to the roll-out of digital services. Although Brazil has the highest proportion of internet users of the four countries (67.5 per cent of the population in 2019)[94] disparities in digital skills' levels — primarily the result of social inequalities — present a challenge. Many vulnerable people are unable to access social benefits because they lack IT skills needed to register themselves on the national register.[95] Differing levels of digital skills between children and their parents were also identified as hindering child access to digital services.[96] This concerns both access to indirect digital services for children (e.g. e-health services) and the inability of parents to properly oversee direct child use of digital services (e.g. e-learning platforms) due to their lack of ICT know-how.[97] In Ghana, interviewees raised the need for the government to run public awareness campaigns on available digital services and responsible internet use practices (such as child data privacy) to improve uptake and proper use of digital services.[98]

Inclusive digital services: Known causes of the 'digital divide'[99] were regularly raised as challenges for inclusive digital service delivery thereby limiting the application of ICT to improve the cost-effectiveness of the health and education sectors. Inaccessible or expensive internet and digital devices and insufficient digital competences were raised alongside factors such as age, gender, language, socioeconomic status and geographic location. These national experiences are manifested at the global level. While 80 per cent of UN member States offer digital content or online services in 2020, this varies widely between countries in different regions of the world: Europe has the largest proportion of countries (93 per cent) offering online services to vulnerable populations while Oceania (65 per cent) and Africa (55 per cent) have the least.[100] Among vulnerable groups, people living in poverty and migrants are most neglected in access to digital services,[101] and it is clear that the COVID-19 pandemic is likely to entrench existing divides between communities and countries.[102]

While 'youth' appears to be the main service target among minors, the majority of online content and services target over-18s, followed by adolescents aged 15 to 17.[103] Where services are available, internet access is a significant issue. In Brazil, the government uses websites to guarantee that both adolescents and young adults can participate in the national entrance examinations (for secondary but especially tertiary education), but a lack of internet access means that many are unable to register.[104] Further, while the use of digital services for children and minors is on the rise globally, international statistics and studies show that low-income countries are not following suit.[105]

National-subnational capacity gaps: The variable ability of federal and subnational governments to offer and maintain digital services presents a challenge to digital service delivery. In Ghana, varying degrees of connectivity, hardware and know-how at the municipal level is a challenge that is recognised by digital transformation strategies.[106] In Brazil, discussion identified a relative lack of digital know-how among municipal government staff when compared with civil servants at the federal level.[107] Inequalities *across* subnational governments were also raised, as interviewees in Brazil noted that some cities offer many digital transactional services, online information for citizens and online service portals, while others do not.[108] While local government in Sweden is comparatively well-staffed and resourced, it is challenged by digital know-how, a need to improve and change management capability, in particular introducing a culture of innovation, new partnership models, user-centric and whole-of-government thinking.[109] Overall, findings are consistent with recent conclusions of the 2020 Local Online Service Index, which found lower levels of 'e-government readiness' among municipalities compared to national government. Of 100 cities globally, most city portals offer government information with few or no transactional services available.[110] However, nearly all city portals are accessible from mobile devices, confirming the awareness of local governments of the importance of mobile technologies in multichannel service delivery.

> Interviewees emphasised the potential benefits of a stronger central government role to provide direction and practical guidance on both the digitization of services and for a strategic focus on children.

Implementation challenges: Despite the strategies in place, a lack of integrated policies and actual implementation can undermine digital service delivery in the following ways:

- **Inconsistency due to different strategies, resources and implementation at national and subnational levels**: In Brazil, the presence of multiple levels of government (federal, state and local) mean that there are simultaneously different phases and scales of digital transformation. While the federal government has many strategies and initiatives for digital services, states and local governments often have few functional initiatives or applications for citizens due to a lack of capacities or funding.[111] In Sweden, decentralisation of decision-making and service delivery requires a higher level of cross-governmental coordination. For instance, individual school districts have a high degree of autonomy for spending on teaching aids and ICT, meaning that the availability and use of online teaching platforms and tools are not consistent.[112] Given their comparatively high level of coordination and focus on whole-of-government digitization, productivity and value creation for end-users, the Danish and Estonian approaches to cross-governmental cooperation were highlighted by interviewees as examples from which Sweden could learn.[113] Interviewees emphasised the potential benefits of a stronger central government role to provide direction and practical guidance on both the digitization of services and for a strategic focus on children.[114]

- **Lack of coordinated strategy implementation:** Interviewees raised the issue of un-aligned central and sectoral digitization strategies as a hindrance to coherent digital service delivery. In Ghana, while the National Information Technology Agency (NITA)

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The principle of inclusion of children and parents in the design and roll-out of relevant digital services is widely recognised
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is mandated to support the digital transformation of government ministries, ministries have sometimes opted to launch their digitization processes — covering the digitization of information, transactional services and not least paper-based data sources — without early coordination with NITA.[115] This has the potential to result in incompatible systems for integrated services and data sharing. Further, interviews shed light on challenges arising from discontinuity in the development of digital services, for example, when services piloted by specialized digitization agencies are not continued or scaled by sectoral agencies once they are handed over.[116] Lack of coordination and issues with sharing between different tiers of government and/or different sectors were also raised in Timor-Leste,[117] Brazil[118] and Sweden.[119] Interviewees commented that donor-funded initiatives can be uncoordinated at times, leading to duplication or gaps in digital service development, and challenges in sustaining funding for digital services.[120]

User engagement: The principle of inclusion of children and parents in the design and roll-out of relevant digital services is widely recognised, and interviews identified several relevant national initiatives. For example, in Bangladesh, children and parents are included in the planning and design of digital education interfaces.[121] In Brazil, a federal department for user experience was recently launched, demonstrating consideration of the need for inclusive and user-specific service design.[122] However, this principle does not broadly translate into inclusive design practices. In Sweden, public sector websites and online services are user-tested. However, end users are rarely involved in their initial design, as local governments tend to procure existing service solutions from private developers, leaving little room for co-design.[123] In larger authorities, services are tailored based on city and user data, such as Stockholm's *Jamfor*, a comparative service-universe for day care, school enrolment and other social services.[124] In Brazil, the majority of digital government services that may be relevant to children and families are developed without active consultation.[125] Interviewees pointed to a dearth of data to inform service design. While initiatives such as Brazil's ICT Kids Online help to produce data on how the internet is accessed and used by citizens, these are often not directly connected with the design, production and implementation of digital services for children.[126]

Conclusions

From this exploration, it is possible to identify several general patterns, gaps and opportunities in the digital transformation of government services relevant to children and families:

Digital services are driven by 'whole-of-society' and efficiency concerns, not child beneficiary needs. Indeed, Brazilian interviewees commented that when governments and companies think about digital transformation, children are not usually considered.[127] This is a lost opportunity to focus on effective, personalised and user-centric service delivery.[128] However, as digitized social services have become a prominent feature of responses to the COVID-19 global pandemic, there is potential for a shift in the coming years towards a user-centred approach. Education continuity planning has seen the introduction or expansion of digital learning platforms[129] and acceleration of school internet connectivity initiatives.[130] Further, the immediate economic impacts of the pandemic have led to the increased use of social welfare digital payment platforms in countries such as Australia and Ireland, matching countries such as Sweden in which access to benefits was almost exclusively digital before the pandemic.[131] The crisis has accelerated digitization of the social sector, which may, in turn, be an opportunity to bring the specific needs of children and families to the heart of digital services.

> The difficulty in sourcing statistics on children was noted as a hurdle to effective design and targeting of digital services for children and families

There is insufficient data to get a clear picture of child use of digital services or their impact. The study identified a lack of disaggregated data on children within e-government and internet statistics. Therefore, there is little understanding of child internet access, skills or online behaviour. The difficulty in sourcing statistics on children was noted as a hurdle to effective design and targeting of digital services for children and families. We also note that information and data on the digital transformation of public services are significantly more available in high-income northern hemisphere countries.

Government awareness of 'facilitators' of child-sensitive digital services is high, but progress is needed to turn principles into practice. There is awareness of the benefits of including children in public service design — for example, ensuring the suitability of services for use by children and families — but this is not yet standard practice. Further, proper analogue and digital identity management are recognised as essential for efficient, effective and inclusive public service delivery. Still, a range of implementation and resourcing challenges mean that ID management presents a hurdle at every stage of e-government roll-out. There is an important role for donors, norm-setting institutions, mandated agencies and civil society to drive the digitization of government services towards results for children and young people. These in turn require prioritisation of consultative approaches to digital service development. Finally, while privacy and security considerations for digital public services relevant to children are well recognised, there are still few child-specific standards to draw on.

General implementation challenges of the digital transformation of government present a hurdle to effective development and delivery of digital services for children and families. Countries are understandably at different stages of their digital transformation. The range and scale of digital service offerings is subsequently varied. Yet at every stage, the effective development and delivery of digital services require coordinated intragovernmental implementation efforts towards the eventual scaling and integration of government services. While the role of central digital transformation strategies and agencies is vital for compatible service development, the sectoral digitization of health, education and social services were regularly found to be unaligned. Further, the consistent roll-out of digital public services, particularly social services, depends on the capacities of subnational authorities, which are often weaker than at the national level. Finally, in more donor-dependent countries, practitioner comments shed light on issues of sustainability and national ownership of donor-funded digital service initiatives and highlight the importance of coordinating donor and national digital transformation planning.

Barriers persist for the uptake of digital government services by children and families. There is much still to be done to ensure that digital services do not worsen service exclusion for children and parents. Barriers to digital service use are already widespread, including lack of internet or ICT access, affordability, literacy, digital skills, user-centric service design, and, not least, the development of services for children.

Recommendations

Looking forward, the following recommendations may support approaches to the digital transformation of services that promote the needs and rights of children.

1. **Governments must make efforts towards better coordinated digital service initiatives**, particularly for eventual scaling and integration of government services. Where relevant, donors also have a responsibility to coordinate efforts to close service gaps and/or avoid duplication. Increased focus on subnational capacity is required within national and sectoral digital transformation planning, budgeting and training.

2. **Privacy and security considerations must continue to be the foundation of any initiative of digital services that may directly or indirectly involve children.** Governments must ensure that adequate legal and regulatory frameworks are in place to protect privacy and data, and to ensure compliance with these. Authorities, parents and teachers must ensure that children, and particularly adolescents and young adults, are aware of their rights and personal responsibilities in terms of privacy and data protection.

3. **Legal and regulatory frameworks to ensure unique and recognised physical and electronic identities at birth must be implemented** as regulated in the UN Convention on the Rights of the Child. Resources such as the World Bank's Principles on Identification for Sustainable Development: Toward the Digital Age[132] provide essential guidance on inclusion through ID management amidst the digital divide. For digital public services, governments must also ensure that minors are given digital identities with relevant legal rights, particularly as they enter adolescence and later become young adults. Adequate resources must be allocated to this process alongside the management and maintenance of both analogue and digital identities to avoid digital exclusion of children and parents. Only in this way can digital services contribute to the achievement of the Sustainable Development Goal and abide by the principle to leave no one behind.

4. **Governments should seek to engage with children and their parents during digital services development**, to design accessible, inclusive and user-friendly services. Engagement can be either indirectly through stakeholder representatives, NGOs, user statistics and surveys, or directly through focus groups, design sessions and testing. Service standards and design systems — of which there are many suitable examples — should be based on a whole-of-government approach to ensure recognition and ease of use, especially for traditionally disadvantaged communities or individuals with limited educational attainment.

5. **Whole-of-government collaborative approaches must become the norm**, as it is a key facilitator of improved public sector productivity, more cost-efficient procurement, as well as more personal and proactive approaches to service design and delivery. The public sector should actively pursue partnerships and engagement with the private sector and civil society where this is mutually beneficial or is of value to child-orientated service delivery. Cross-governmental collaboration must be accompanied with initiatives to strengthen capacities across government.

6. While there are inevitable difficulties in the collection of statistics on minors, **regular global and national data collection activities could drive efforts to systematically collect statistics on age- and gender-based indicators.** Finally, greater investigation of understudied regions should be strongly encouraged.

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Acknowledgments

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