

Localizing Digital Government: Rethinking Global and Context-Aware Metrics

Gopala, Miron^{1,*}, Maria Alexandra, Cunha¹

¹Fundação Getúlio Vargas's Sao Paulo School of Business Administration (FGV EAESP), 9 de Julho avenue, 2029, Bela Vista, São Paulo, Brazil.

Abstract

This paper presents an ongoing research project that examines how global metrics—such as those associated with the Sustainable Development Goals (SDGs) and the Local Online Services Index (LOSI)—can become more responsive to the specific realities of the Global South's digital transformation. Based on a qualitative case study, we analyze interviews with high-level public officials involved in municipal digital transformation efforts in a typical city in the Global South. Using a coding framework grounded in the 17 SDGs, we identified over forty digital initiatives. Our findings highlight key principles driving these efforts, including simplifying citizen interaction, fostering innovation through local knowledge, and maintaining physical access alongside digital services to prevent exclusion. These practices diverge from conventional models of digital governance and illustrate how Global South cities are actively shaping their own development trajectories. In the next phase of this research, we will analyze these findings in relation to the LOSI framework, exploring how effectively global indicators capture locally embedded digital government practices.

Keywords

Digital government, Sustainable Development Goals, Global South, LOSI

1. Introduction

In many regions, local governments are adopting new information and communication technologies (ICTs) in an effort to keep pace with global technological advancements. These efforts are often framed as a means to align with internationally recognized standards and benchmarks, such as the Sustainable Development Goals (SDGs) or the Online Service Index. However, the implementation of such technologies frequently overlooks local socio-technical and historical contexts. As a result, these initiatives risk reinforcing existing inequalities, excluding marginalized populations, and disregarding context-specific innovations that could more effectively address public challenges in developing regions.

Scholars have increasingly highlighted the unintended consequences that can arise when local contexts are overlooked in digital transformation initiatives. For example, facial recognition systems—often introduced to enhance public security and urban efficiency—have, in practice, reinforced racial and social biases in countries like Brazil [1, 2]. Similarly, digital platforms aimed at promoting citizen participation and inclusive governance have struggled in settings marked by low connectivity and digital illiteracy, often excluding marginalized voices [3]. The digitalization of public services has also introduced new barriers to accessing fundamental rights. Digital payment systems for social benefits, such as Aadhaar in India and emergency aid programs in Brazil, have excluded those without access to mobile devices or reliable digital infrastructure, thereby limiting the reach of poverty alleviation policies [4, 5]. In striving to meet global targets, cities and countries in the Global South may unintentionally sideline local knowledge and practices [6]. Without careful adaptation to local realities, efforts to align with international metrics risk deepening exclusion and inequality, rather than promoting meaningful inclusion and sustainable development.

While global metrics can play a role in correcting the misapplication of technologies, cities in the Global South often face public challenges that remain less visible or prioritized in international agendas.

EGOV 2025, September 01–04, 2025, Krems, Austria

*Corresponding author.

✉ gopala.assis@fgv.br (G. Miron); alexandra.cunha@fgv.br (M. A. Cunha)

id 0009-0003-9528-8966 (G. Miron); 0000-0002-2022-0030 (M. A. Cunha)



© 2025 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

These issues—characteristic of so-called *developing* regions—are frequently addressed without formal recognition, which limits the possibility of building shared understandings or coordinated responses. We argue that innovative and contextualized IT practices emerging from these contexts deserve greater attention as potential foundations for a more inclusive framework of problem-solution mappings. The lack of such a shared foundation not only risks erasing alternative realities but also constrains public sector innovation and the advancement of open science toward sustainable development. Updating the scope of global metrics to reflect the realities of countries considered “underdeveloped” could guide socio-economic transformations more effectively. By aligning with local dynamics, infrastructures, and socio-technical knowledge, these revised indicators could enable more efficient use of public resources and external investments. This, however, requires a deeper understanding of the specific contexts in which Global South cities operate—especially those that are already leveraging technology to pursue sustainable development. At the same time, studying innovative technological applications from the Global South—digital public infrastructures, such as the payment systems in India and Brazil, social currencies, or blockchain for carbon certification—can also inspire and inform policy and practice in the Global North.

Therefore, this study examines the 17 Sustainable Development Goals (SDGs) and their 169 targets to explore how digital government technologies are being used to advance the 2030 Agenda from an empirical, grounded perspective in the Global South. This raises a central question: **How can global metrics related to digital government and sustainable development become more attuned to the specific contexts and realities of the Global South?** We approach this question through the case of Recife, a city in northeastern Brazil. Recife’s unique combination of socio-economic dynamics, technological capacity, international cooperation, and a politically active municipal environment makes it a particularly relevant setting for examining how digital transformation unfolds in practice.

Our analysis draws on interviews with public servants in Recife, whose reflections on digital government initiatives were coded using ATLAS.ti and organized in relation to the 17 SDGs. This ongoing research will be further enriched through a cross-analysis with the indicators from Local Online Service Index (LOSI) [7], allowing us to compare the reasoning under which those metrics are developed and their ability to improve Global South’s digital and sustainable development.

2. Global Metrics: Critiques from the Global South

The advancement of digital government has been widely discussed as a catalyst in accelerating the implementation of the 2030 Agenda. However, existing literature and metrics often reflect Global North perspectives, overlooking specific challenges that Global South contexts face [8]. A significant gap remains in addressing local contexts, particularly in integrating perspectives and contexts coming from the Global South.

The literature on digital government and the Sustainable Development Goals (SDGs) has expanded significantly in recent years [9], driven by the digitalization of public administration and advancements in information and communication technologies (ICTs). Nevertheless, it also reveals a misalignment between approaches from the Global North and the Global South. One of the predominant trends in literature is the emphasis on digital solutions as tools to achieve the Sustainable Development Goals [?], without considering the structural conditions of countries in the Global South. E-government and smart city initiatives are frequently evaluated using metrics based on Northern models, disregarding the political, social, and cultural differences in the South [6].

While digital government in the Global North is often presented as a universal solution for enhancing transparency, efficiency, and inclusion, the Global South faces structural challenges that limit its straightforward applicability, such as digital access gaps, socioeconomic inequality, and unstable political structures. Studies concerned with sustainable development that draw on decolonial and post-development perspectives point to alternative pathways for aligning digital policies with local realities, thereby promoting sustainable development without reinforcing structural inequalities. Inspired by approaches such as *Buen Vivir* [10] and Energy Sovereignty [11], these perspectives argue

that attending to local contexts and ecological concerns can offer new conceptual foundations—already well established in development studies—that invite critical reflection on how digital government and sustainable development are currently measured and practiced. When cultural and social specificities are meaningfully integrated into development efforts, digital solutions can become more responsive, inclusive, and effective. A practical illustration of this potential comes from the Sierra Nevada region in Mexico, where local communities leveraged geospatial technologies to establish a green belt aimed at mitigating pollution from Mexico City [12]. Such initiatives demonstrate how technology, when guided by local knowledge and context-sensitive approaches, can serve as a tool for place-based, sustainable transformation.

Global sustainable development metrics, such as the SDG indicators, provide an important framework for guiding and evaluating progress. However, their current formulation often reflects assumptions, data sources, and reference points predominantly shaped by experiences in the Global North [13, 14]. As a result, these metrics may not fully capture the diverse realities of the Global South, particularly when it comes to assessing the impacts of digital government initiatives. This gap can lead to partial or skewed interpretations of progress, especially in contexts where countries face structural barriers such as limited digital infrastructure and unequal access to information and communication technologies [15]. Enhancing the sensitivity of global metrics to these contextual factors would support more inclusive and accurate assessments, ultimately helping to strengthen the design and implementation of digital public policies across varied development landscapes.

Taking local perspectives into account in a way that allows local knowledge, with its own practices and logic, can inspire a process of intercultural exchange [16]. This approach can spark new ways of integrating knowledge, practices, and principles into the digital transformation. Onyango & Ondiek [17], in their study of Kenya, and Cordella et al. [18], who focus on the United Kingdom, highlight the importance of culture when adopting and implementing technologies in public administration as a strategy to achieve the Sustainable Development Goals. Although they do not directly engage with Global South critical literature, which emphasizes the importance of local perspectives and interculturality as key frameworks, the authors demonstrate that cultural factors and digital skills are crucial in either hindering or advancing the adoption of ICTs in government.

For addressing the relationship between digital government and environmental sustainability, Global South literature also emphasizes the need to consider every dimension that has historically been subjected to domination by humankind: nature, women [19], and non-white populations [20]. Therefore, considering that digital transformation necessitates examining the environmental impacts of ICT infrastructure, such as rare mineral extraction and the energy consumption of digital platforms and their associated effects [11, 21]. Thinking about transformation from a Global South perspective requires centering the emancipation and empowerment of women and non-white people, based on their own needs and visions. Digital strategies that fail to consider these aspects risk exacerbating environmental problems rather than contributing to sustainable solutions.

Integrating the Global South's critical perspectives on development can suggest several pathways for more effective integration between digital government and sustainable development. Adopting Global Souths' epistemologies in digital policy formulation could offer more inclusive and sustainable alternatives by decolonizing digital government practices and acknowledging the diversity of perspectives on development [22] could ensure that technological solutions serve diverse realities.

3. Methodology

To conduct empirical research, we sought a city where the local government had successfully led a digital transformation initiative within a Global South context. In this sense, we chose Recife that presents a good environment for examining government's technological commitment and the empirical use of ICT for development.

The first reason for selecting Recife as a case study relates to the municipal government's technological transformation process, which emerged in response to the challenges posed by the COVID-19 pandemic.

Concerned with enforcing social distancing measures, reducing service queues, and streamlining medical appointment scheduling—particularly for vaccinations. As an example, through Conecta Recife app, 100% of the city’s population received the first dose of the vaccine. The digitalization of public health services catalyzed the city’s broader technological infrastructure transformation. Today, the Conecta Recife app has become a comprehensive digital governance hub, with 80% of public services digitized. The second reason is that Recife reflects the social inequality conditions faced by many municipalities in the Global South. In 2021, it was classified as the second most unequal metropolis in Brazil according to the Gini Index. One of the key indicators of social inequality is the reliance on income transfer programs. As of March 2024, 146,273 families—equivalent to 19% of Recife’s population—received benefits from Bolsa Família, a federal government cash transfer program aimed at households in situations of extreme vulnerability. The average monthly benefit per family is approximately \$110 USD. Besides that, the city’s territorial conditions pose significant challenges to its resilience, necessitating innovations in climate change mitigation. Recife is intersected by major rivers, such as the Beberibe, Capibaribe, and Tejipió, and is situated along the coastline, making it highly susceptible to rainfall cycles and tidal movements. Additionally, 67% of the city is in hilly areas, rendering these regions particularly prone to landslides, especially during episodes of torrential rain. These geographical and environmental vulnerabilities underscore the urgent need for adaptive urban policies and technological solutions to enhance the city’s resilience. Recife is also among the few cities in the Global South that have received international investments exceeding 300 million dollars over the past five years to strengthen their climate resilience. Furthermore, the local political context holds national significance. João Campos secured one of the highest percentage of votes in mayoral elections among all more than 5,000 municipalities in Brazil. He was re-elected with 78% of the vote for the 2025–2029 term, demonstrating substantial popularity and indicating that his previous administration was perceived as effective.

This article investigates how global metrics related to digital government and sustainable development might become more attuned to the specific contexts and realities of the Global South. To address this question, we focused on the case of Recife, a city in northeastern Brazil that exemplifies many of the structural challenges commonly found in the Global South—such as social inequality, infrastructural limitations, and institutional fragmentation—while simultaneously undergoing significant internal and external digital transformation processes. Rather than aiming to develop a general theory, this study seeks to generate an in-depth understanding of Recife’s local experience, using it as an empirical lens to reflect critically on global indicators such as the SDGs and LOSI[7].

To capture the perspectives of key actors involved in Recife’s digital transformation, we conducted twelve semi-structured interviews with municipal secretaries and executive officials. The interviews were carried out in November 2024, less than 30 days after the municipal elections that resulted in the reelection of the incumbent mayor. The interview protocol was guided by Patton’s [23] recommendations, combining predefined thematic prompts with flexibility to accommodate the interviewees’ diverse institutional roles and professional backgrounds.

In total, approximately eight hours of interviews were recorded, transcribed, and analyzed using the qualitative analysis software Atlas.TI. The content was deductively coded according to a pre-defined conceptual framework [24], with the Sustainable Development Goals (SDGs) serving as the primary coding axis. This enabled us to map which technological initiatives mentioned by the interviewees aligned with each of the 17 goals. At the same time, we remained attentive to emergent themes in the material. This iterative reading process led to the creation of two additional categories: “Challenges” and “Principles and vision of digital transformation.”

As this is an ongoing research project, the next step involves cross-analyzing the findings from the SDG-coded interviews with Recife’s performance on the Local Online Services Index (LOSI)[7]. This forthcoming phase will allow us to assess the extent to which globally applied digital government metrics reflect, amplify, or overlook the priorities and practices expressed by municipal actors in the Global South. The goal is to identify not only alignments but also potential blind spots within global evaluation frameworks when applied to cities like Recife. To ensure the rigor and credibility of our findings, we intend to carry out a process of member checking by returning the final results to the interviewees. This step will allow us to verify whether our interpretations accurately reflect their

perspectives and experiences, strengthening the validity of the research through dialogical engagement.

4. Results: Digital Government Initiatives in a Local Context

The overarching principle guiding Recife's digital transformation efforts was "simplifying the citizen's interaction with public services"—a guiding idea that emerged in at least five of the twelve interviews conducted. This principle anchored a citizen-centered approach to digitalization, in which approximately 80% of efforts were directed toward improving access to public services, while only 20% focused on internal governmental processes. Central to this strategy was the development of the *Conecta Recife* platform, designed to consolidate services and ensure that citizens could access them in "three clicks" or fewer—with the aspirational goal of reaching "zero clicks" by proactively delivering services without requiring user initiation.

During the interviews, public officials expressed a sentiment of innovation, promoting a cultural shift in public employment and emphasizing the value of individual capabilities. A recurring theme in the interviews is the IBO – *Índice de Brilho nos Olhos* (Sparkle in the Eyes Index). This concept captures the internal shift toward recognizing and fostering individual capabilities as a catalyst for digital transformation. The IBO serves as a recruitment strategy for technology-related roles in the city, prioritizing not only academic and professional backgrounds but also a willingness to learn and drive change. Throughout the interviews, it becomes evident that digital transformation has been driven not only by the commitment of individuals seeking solutions to everyday challenges but also by the overarching principle of simplifying citizens' interactions with public policies—a framework referred to as SPC: Simplify, Promote, and Care. This approach ensures that the primary beneficiary of any digital transformation policy is the citizen.

In tables 1, 2, 3 and 4, we outline key technological initiatives and practices identified in the interviews, categorized according to the relevant Sustainable Development Goals. For this on going research, we will focus on three SDGs that are intrinsically related to the realities of the Global South: SDG 1 (No Poverty), SDG 3 (Good Health and Well-Being), and SDG 4 (Quality Education) in greater depth. However, all digital government initiatives related to the remaining SDGs are described in Table 4.

Therefore, the first local technology applications analyzed—outlined in Table 1—contribute to sustainable development and the eradication of poverty (SDG 1). These include the integration of databases, such as the Unified Registry for Social Programs with the state energy concessionaire and other government systems, to identify economically vulnerable individuals who have not yet applied for social benefits like the Gas Assistance Program and the Social Tariff for electricity. The municipality proactively contacts eligible individuals to guide them through the application process. Beneficiaries receive notifications on their mobile phones—most commonly via WhatsApp, a widely used messaging platform in Brazil—informing them of their eligibility and assisting them in registering for support.

Table 1

Local use of technology: No Poverty

SDG 1 - No Poverty
Unification of Databases: Identifying citizens eligible for financial aid/subsidies who have not applied for benefits, such as Gas Assistance and the Social Tariff on electricity bills.
Digitization of Social Assistance Service Waiting-Queues: For services such as housing, Bolsa Família, and other social benefits.
Digitization of Internal Processes at CRAS: Streamlining administrative procedures in Social Assistance Reference Centers.
Digitization of CRAS Data: Enhancing Social Assistance policies through data-driven decision-making.

Technology-mediated poverty eradication initiative involves using artificial intelligence to manage online queues for social assistance services and automate scheduling and appointment reminders. This

approach has eliminated physical lines for social assistance and increased the availability of in-person service slots. As a result, it has effectively ended the widespread practice of individuals sleeping in queues (literally, spending the night in lines, arriving early or previous evening) to secure access to public services, particularly in social welfare and healthcare. This process also accelerated the internal digitalization of all social assistance services, increasing the number of appointments and providing more reliable data to support public policies and decision-making.

The second SDG analysed, Good Health and Well-being (Table 2), shows that technological applications in healthcare are numerous as they have played a pioneering role in Recife's digitalization process. The development of Tele-Health services and public health campaigns sent directly to mobile phones has fostered greater public engagement. In Recife, artificial intelligence in healthcare can be observed both in direct applications for citizens—such as inquiries made through the government's digital platform—and in internal medical processes through Integra.AI. This tool was developed within the open innovation cycle called EITA! Recife—it enables the rapid and error-free inclusion of patient information.

Table 2

Local use of technology: Good Health and Well-being

SDG 3 - Good Health and Well-being
Direct Use of AI: Answering health-related questions. Example: "Can I already take the dengue vaccine?"
Zero Click Campaigns: Automated public health messages and vaccination reminders via WhatsApp.
Digitization of Internal Processes: Computerization of internal processes in physical healthcare service points (Hospitals, Primary Healthcare Units, Pharmacies, Clinical Analysis Laboratories).
Telehealth: Hybrid networked healthcare management offering online medical consultations for specific types of care.
My Connected Health: Medical history available on the Conecta Recife platform.
Digitization of the Prenatal Care Cycle: Digital tracking of maternity care, from prenatal consultations to follow-ups.
Digitization of the Medical Record for Exams and Clinical Diagnoses: Storing patients' medical history in any healthcare unit.
Conecta Saúde: Digitalization of medical protocols and AI assistants for filling out electronic medical records.
Use of AI: Identifying breast cancer outside the standard care age range (40 to 49 years) through markers in blood tests.
Encouraging Sports Practice: Promoting physical activity by exchanging Digital Currencies (Capiba)

Using technological tools that facilitate direct access to medical services is also an innovation in public health. The My Health Team and Pregnancy Care Service platforms enable patients to stay in touch with their medical team, including nurses and doctors, and direct them to the appropriate medical services, thereby reducing queues and overcrowding. However, this initiative also has a particularly practical impact, especially for pregnant women or those in labor: preventing unnecessary long trips, often on public transportation. With the Pregnancy Care Service, if women experience contractions, they can access the service and monitor whether they are experiencing true labor contractions or a false alarm.

Brazil is globally recognized for its Unified Health System (SUS) and vaccination campaigns [25]. In Recife, an innovation has been introduced: citizens receive vaccination schedules directly on their mobile phones. Families with babies and young children receive monthly reminders notifying them of upcoming vaccines and the nearest healthcare center for administration. Similarly, public health campaigns are sent to all citizens, regardless of whether they are registered on the Conecta Recife platform. By engaging in sports at public facilities, citizens registered on Conecta Recife earn Capibas, Recife's social currency. This initiative promotes physical activity, enhances well-being, combats

sedentary lifestyles, and helps prevent disease.

Throughout the interviews, technology in education emerged primarily as a means of learning about the use of technology at different levels, as shown in Table 3. This ranges from access to higher education in technology-related fields to digital literacy for the elderly.

Table 3

Local use of technology: Quality Education

SDG 4 - Quality Education
School Pre-Enrollment: Guardians can digitally select their preferred school.
Digital Boarding: Funding for higher education in technology-related fields.
Robotics Course at COMPAZ: Offering robotics education in community peace centers.
Entrepreneurial Education: Remote courses and knowledge snippets sent via WhatsApp to enhance the value of service providers.
Online Courses for Academic Support: Curriculum-based online courses for primary school students and online preparatory classes for the ENEM exam.

One of the cases is related to mobile caravans in the city, particularly in areas of socioeconomic vulnerability. This program teaches the basics of how to use smartphones and computers. One of the interviewees was responsible for developing one of the first courses to introduce Conecta Recife to individuals assisted by Pro-Living. The instructor named the course "How Conecta Can Change Your Life." During the interview, the public servant explained that she had been prepared to showcase the app's structure and how to access public services. However, when she arrived, she realized that people didn't even know what Wi-Fi was or how to connect to it. At that moment, she understood she had approached it all wrong and decided to shift to a digital literacy lesson using everyday language. In the interview, she said:

"I forgot everything I had prepared to say. I realized the approach had to be different. The language had to change. So I said: 'Eita, look at this, how cool! Who here prefers sending voice messages on WhatsApp? Who's part of the audio crew?' And they responded, 'Oh, I love sending audios!' Then I said, 'Great! Did you know you can send voice messages on Conecta too? For example, let's say you need something—tell me one thing.' Someone mentioned fixing a pothole in their street. So I said, 'Perfect! Let's test it now. Click here on the microphone, just like on WhatsApp, say fix the pothole on my street, and look—it appears as the first service option!'"

This is a good example of how the educational process can facilitate access to technology, but also of how a policy that understands the citizen can have a significant impact. Low levels of literacy and digital literacy can pose significant barriers to accessing digital services. However, the use of technologies equipped with audio features can enhance platform accessibility, helping to overcome these obstacles and promote greater inclusion. The digital school pre-enrollment system allows guardians of school-age children to select the school where they wish to enroll their children. Beyond this function, the system also identifies children who have not been enrolled. In collaboration with community health agents, the municipality can then locate the guardians and inform them of schools with available spots and the nearest school to prevent dropouts.

Next, in Table 4 we organized all digitally mediated solutions in Recife, organized by Sustainable Development Goals.

5. Discussion

The case of Recife illustrates how cities in the Global South are creatively reshaping digital government trajectories by centering efforts on citizen needs from the outset. The principle of "simplifying the citizen's interaction with public services" demonstrates a deliberate choice to prioritize public accessibility over internal bureaucratic modernization. This principle, was central to the design of the Conecta Recife platform. The logic of simplifying citizens' interactions with public services—based on the premise of

Table 4

Local use of technology: Remaining Sustainable Development Goals

SDG 5 - Gender Equality
Unification of Databases: Direct policies toward supporting and protecting women.
SDG 8 – Decent Work and Economic Growth
<p>a) GO Recife: A platform for job opportunities, professional qualifications, and a centralized employment database;</p> <p>b) Cred Pop: Microcredit ranging from R\$500 to R\$6,000 (US\$100 to US\$1200), provided as cash or essential work kits for survival jobs;</p> <p>c) Simplified Business Registration: 1) Automatic exemption for 830 medium-risk business classifications (CNAEs); 2) CNAE Simulator to identify necessary licenses;</p> <p>d) Recife Economic Observatory: A database containing economic information at the city, state, and national levels to support research and decision-making;</p> <p>e) Gestor: A business management and entrepreneurial training platform, free of charge;</p> <p>f) GO MEI: A platform dedicated to creating opportunities for small individual entrepreneurs.</p>
SDG 9 – Industry, Innovation and Infrastructure
<p>a) EITA! Recife: Open Innovation and Transformation Squad – A program to identify challenges in Recife and create connections to implement solutions.</p> <p>b) Integration of Federal Government Databases: Linking the B-Cadastro with the Cadastro Único to identify family units.</p> <p>c) Integration of Urban and Housing Databases (Esig): Centralizing and cross-referencing data to improve urban and housing policies.</p>
SDG 10 – Reduced Inequalities
<p>a) Zero Click: Digital task forces via Whatsapp for debt renegotiation under the federal Desenrola program;</p> <p>b) Creation of Personas on the City Hall Website: Improving access to public services by tailoring information to different user profiles;</p> <p>c) Smart Search Engines on the City Hall Website: Implementing voice search and synonym recognition for easier navigation.</p>
SDG 11 – Sustainable Cities and Communities
<p>a) Disaster Alert Communication: Sending notifications about socio-environmental disasters and support services;</p> <p>b) Unified and Open Urban Data Bank: Centralizing information on urban conditions, including ESIG and municipal rain gauges;</p> <p>c) Zero Click: On their 60th birthday, senior citizens automatically receive authorization for free parking on their mobile devices;</p> <p>d) Waste Collection with Social Currency Exchange (Capiba): Encouraging recycling by allowing residents to exchange collected waste for digital social currency.</p>
SDG 16 – Peace, Justice and Strong Institutions
<p>a) Service Access Policy in Three Clicks: Ensuring that public services can be accessed within three clicks for greater efficiency and usability;</p> <p>b) Implementation of Peace Culture Centers (COMPAZ): Establishing centers in high-violence and socioeconomically vulnerable areas, supported by urban data analysis;</p> <p>c) Ouvidoria 4.0: A next-generation citizen feedback system for evaluating public services, particularly in healthcare and social assistance.</p>
SDG 17 – Partnerships for the Goals
<p>a) EITA Recife: A program that identifies challenges in Recife and fosters connections to implement innovative solutions;</p> <p>b) City Operations Center: Utilizing urban data to enhance city management and response strategies;</p> <p>c) Unification of Databases: Integrating various data sources to improve decision-making and streamline public services.</p>
Without SDG
Adota Pet: A matchmaking platform that connects stray animals (such as cats and dogs) with families interested in adoption.

digitizing 80% of citizen-facing services and only 20% of internal operations—aligns with the digital government evolution model described by Janowski [15]. Recife has reached the Contextualization stage, without necessarily progressing through the earlier phases—“hacking” the conventional trajectory of digital transformation. Rather than first digitizing internal operations and achieving a foundational level of service digitization, Recife’s government prioritized creating better conditions for citizens. Internal systems were transformed only to the extent necessary to enable digital services for the public or to implement changes that would significantly improve internal processes with direct benefits for the population, such as the digitization of CRAS (Social Assistance Reference Centers), as described under SDG 1.

Innovation in Recife is not only technological but also epistemological. The concept of the “Índice de Brilho nos Olhos” (IBO) and the example of the Adota Pet platform show how local knowledge, lived experience, and informal expertise are actively shaping public policy and digital transformation. These alternative forms of recruiting individuals—deeply connected to the city’s lived reality and driven by a sense of purpose that goes beyond formal qualifications or technical training—may be considered innovative insofar as they introduce different forms of knowledge into the design and implementation of public policies [12, 16]. Such approaches tend to result in policies that are more attuned and responsive to the challenges faced by segments of the population who have not had access to vocational training or higher education yet possess an intimate understanding of the city through lived experience. This kind of cultural shift within the public sector could serve as a successful model for other contexts in the Global South, resonating with the cultural resistance described by Onyango & Ondiek [17] in Kenya. It also aligns with the “missing link” identified by Cordella et al. [18] in the UK context, suggesting that, beyond digital skills, there may be a need to value diverse forms of knowledge to foster a more sustainable and contextually grounded digital transformation within public services.

The outcomes of this alternative mode of knowledge exchange for policy creation are evident in the development of digital government policies that do not directly align with any single Sustainable Development Goal (SDG) yet contribute meaningfully to public innovation. In Table 4, there is an initiative that does not align directly with a specific SDG but instead addresses a common challenge faced by cities in the Global South: stray animals living on the streets. Stray animals pose public health risks as potential disease vectors. The veterinarian identified this problem and, in response, developed the Adota Pet platform. The initiative involved registering all dogs housed in municipal surveillance centers, providing them with grooming and medical care to enhance their adoption prospects, and uploading their profiles with high-quality photos. Within days, all the dogs listed on the platform had been adopted. The initiative not only improved public health outcomes but also strengthened the humane treatment of animals. This case exemplifies the typical challenge faced by Global South cities, which remain largely absent from global policy frameworks, as discussed. However, it was identified and effectively addressed through localized digital government strategies that utilized technology.

While digital tools have improved service access and reduced the burden on citizens, Recife’s government acknowledges the risk of reinforcing exclusion in a highly unequal society. Previously, citizens lined up at dawn—or the night before—outside CRAS units to secure public assistance. Digital queuing and automated scheduling have ended this practice and increased in-person appointment availability. However, fully digitizing services without alternatives could create a new cycle of exclusion. The digitalization of internal processes has enabled the expansion of service availability. Meanwhile, the introduction of digital queuing has significantly improved the experience of waiting for services. With the new system, waiting times have decreased, and physical queuing is no longer necessary. However, fully digitizing all processes risks excluding many individuals from essential services, thereby creating a new cycle of social exclusion [3]. To address this challenge, another guiding principle of the city’s digital transformation strategy has been the phygital approach, which combines physical and digital elements. In practice, this means that no public service should exist solely in the digital realm. Instead, all services must have both physical and digital access points. This hybrid approach reduces congestion at physical service locations, shortens queues, and ensures that those requiring in-person assistance receive better support.

The previously mentioned digital literacy event in local communities—where a public official had

to adjust her discourse to align with the audience's needs—serves as a metaphor for Recife's broader approach to digital governance. The city follows a structured yet iterative process: first, a prototype is developed, tested, and refined based on public feedback. This continuous cycle of evaluation and adjustment improves technological structures, making them more efficient and responsive to the overarching goal of simplifying citizens' interactions with public services. This goes beyond user-centered design—it embodies a pedagogy of digital transformation that is participatory, respectful of woman and marginalized people [19, 20], and responsive to feedback. These practices align with post-development and decolonial principles such as *Buen Vivir*[10], which emphasize community engagement and epistemic justice.

This research identified over 40 local digital initiatives that contribute to the 2030 Agenda, many of which are directly aligned with SDGs such as poverty eradication, healthcare, and education. For example, under SDG 1, Recife used integrated databases and AI to identify eligible beneficiaries for federal subsidies and to eliminate the need for physical queues in social assistance. Under SDG 3, digital innovations such as telehealth and prenatal tracking systems addressed public health access, particularly for vulnerable groups. Under SDG 4, education programs included online courses, digital enrollment systems, and mobile caravans promoting digital literacy.

However, several initiatives—like Adota Pet—do not fit within existing SDG frameworks, despite their public relevance. This reveals a limitation in current global metrics. The next phase of this research will involve comparing these local innovations with Recife's performance in the Local Online Service Index (LOSI)[7]. Our expectation is that such a comparison will reveal both misalignments and opportunities to evolve LOSI toward a more context-sensitive framework. The way digital transformation policies were designed and implemented highlights the importance of considering local contexts and perspectives throughout the policymaking process. This includes identifying the most effective access channels, and adopting clear and accessible language. Incorporating multiple types of knowledge in digital transformation design to address and create transformative policies.

6. Conclusion

In this article, we identified more than forty digital government initiatives developed in Recife and mapped them against the Sustainable Development Goals (SDGs). These initiatives ranged from proactive social assistance and digital health innovations to digital literacy programs and platforms for economic inclusion. Through qualitative analysis of interviews with public officials, we uncovered a digital transformation strategy shaped by local principles—such as simplifying citizen interactions, valuing experiential knowledge, and balancing digital and physical service delivery. These findings illustrate how Recife's digital government practices both reflect and respond to the structural challenges of the Global South, while proposing innovative, citizen-centered alternatives to mainstream models.

The case of Recife reveals how cities in the Global South are not merely adapting to global digital transformation trends, but actively shaping their own trajectories—rooted in local needs, social realities, and institutional creativity. Rather than following a linear model of digitization, Recife has embraced a citizen-centered and context-driven approach, combining technological innovation with inclusive design, local knowledge, and iterative learning. These practices challenge the assumptions embedded in global evaluation frameworks, such as the SDGs and the Local Online Services Index (LOSI)[7], which often overlook place-based responses and hybrid strategies that do not fit neatly into standardized categories.

This study argues that global digital governance metrics must evolve to better reflect the complexity and plurality of these alternative development paths. It is not only a matter of what is being measured, but also how and for whom digital solutions are built. Recognizing the value of localized innovation, cultural adaptability, and community-rooted practices can help build more accurate, equitable, and globally relevant assessment frameworks.

Acknowledgments

This research was supported by the National Council for Scientific and Technological Development (CNPq).

Declaration on Generative AI

Portions of this article were originally written in Portuguese and translated into English with the assistance of ChatGPT (OpenAI). Grammarly was employed to support grammar and style revision. All content, arguments, and interpretations remain the sole responsibility of the author.

References

- [1] P. Nunes, Novas ferramentas, velhas práticas: reconhecimento facial e policiamento no Brasil, *Retratos da Violência—cinco meses de monitoramento, análises e descobertas* (2019) 67–70. URL: <https://scholar.google.com/scholar?cluster=187045103606679393&hl=en&oi=scholar>.
- [2] T. Silva, *Racismo algorítmico: inteligência artificial e discriminação nas redes digitais*, Edições Sesc SP, 2022.
- [3] B. Andrade de Figueiredo, E. Przybilovicz, M. A. Cunha, Smart Participation in Unequal Contexts: A Theoretical Approach for Smart Urban Governance, CEUR-WS.org, 2024. URL: <https://collections.unu.edu/view/UNU:10047>.
- [4] P. Arora, Benign dataveillance? Examining novel data-driven governance systems in India and China, *First Monday* (2019). doi:10.5210/fm.v24i4.9840.
- [5] C. E. Melchiori, B. Sanches, M. Cortez da Cunha Cruz, E. H. Diniz, M. A. Cunha, Digital welfare and vulnerable citizens: A literature review (2023).
- [6] E. Przybilovicz, M. A. Cunha, M. M. Ribeiro, Decolonizing e-government benchmarking, in: D. D. Cid, N. Sabatini, L. Hagen, H.-c. Liao (Eds.), *Proceedings of the 24th Annual International Conference on Digital Government Research*, Association for Computing Machinery (ACM), New York, NY, USA, 2023, pp. 570–582. doi:10.1145/3598469.3598534.
- [7] United Nations Department of Economic and Social Affairs (UN DESA), E-government survey 2024: Accelerating digital transformation for sustainable development, 2024. URL: <https://publicadministration.un.org/en/Research/UN-e-Government-Surveys>, published: United Nations, New York. ISBN PDF: 978-92-1-106728-6.
- [8] L. Schelenz, M. Pawelec, Information and Communication Technologies for Development (ICT4D) critique, *Information Technology for Development* 28 (2022) 165–188. URL: <https://www.tandfonline.com/doi/full/10.1080/02681102.2021.1937473>. doi:10.1080/02681102.2021.1937473.
- [9] A. Sanina, E. Styryn, E. Vigoda-Gadot, M. Yudina, A. Semenova, Digital Government Transformation and Sustainable Development Goals: To What Extent Are They Interconnected? *Bibliometric Analysis Results*, *Sustainability* 16 (2024) 9761. doi:10.3390/su16229761.
- [10] A. Acosta, *O Bem Viver*, Editora Elefante, 2016.
- [11] D. Del Bene, J. P. Soler, T. Roa, Energy Sovereignty, in: *Pluriverse - A Post-Development Dictionary*, Tulika Books, 2019, pp. 178 – 181.
- [12] M. Pozzebon, N. Delgado, Participatory Geography Information Systems in Sierra Nevada, Mexico, *The International Journal of Case Studies in Management* (2012).
- [13] J. B. Carant, Unheard voices: a critical discourse analysis of the Millennium Development Goals' evolution into the Sustainable Development Goals, *Third World Quarterly* 38 (2017) 16–41. URL: <https://ideas.repec.org/a/taf/ctwqxx/v38y2017i1p16-41.html>.
- [14] M. Van Der Velden, Digitalisation and the UN Sustainable development Goals: What role for design, *Interaction Design and Architecture(s)* (2018) 160–174. URL: https://ixdea.org/37_8/. doi:10.55612/s-5002-037-008.

- [15] T. Janowski, Implementing Sustainable Development Goals with Digital Government – Aspiration-capacity gap, *Government Information Quarterly* 33 (????) 603–613. URL: <http://www.sciencedirect.com/science/article/pii/S0740624X16302866>. doi:10.1016/j.giq.2016.12.001.
- [16] B. d. S. Santos, Epistemologies of the South and the future, *From the European South* (2016) 17 – 29.
- [17] G. Onyango, J. Otieno Ondiek, Digitalization and integration of sustainable development goals (SGDs) in public organizations in Kenya, *Public Organization Review* 21 (????) 511–526. doi:10.1007/s11115-020-00504-2.
- [18] A. Cordella, F. Gualdi, M. van de Laar, Digital skills within the Public Sector: A missing link to achieve the Sustainable Development Goals (SDGs), *Information Polity* 29 (2024) 13–33. doi:10.3233/IP-230008.
- [19] V. Shiva, *Women in Nature*, in: *Space, Gender, Knowledge: Feminist Readings*, Routledge, 1997.
- [20] S. Hall, *The West and the Rest: Discourse and Power*, in: *Formations of Modernity*, Polity Press, 1992, pp. 185–227.
- [21] A. Meijer, Perspectives on the twin transition: Instrumental and institutional linkages between the digital and sustainability transitions, *Information Polity* 29 (2024) 35–51. doi:10.3233/IP-230015.
- [22] A. Kothari, A. Salleh, A. Escobar, F. Demaria, A. Acosta, *Pluriverse - A Post-Development Dictionary*, Tulika Books, 2019.
- [23] M. Q. Patton, *Qualitative Evaluation and Research Methods.*, 3rd ed., SAGE Publications, 2002.
- [24] M. B. Miles, A. M. Huberman, J. Saldana, *Qualitative Data Analysis*, SAGE, 2014.
- [25] J. Paim, C. Travassos, C. Almeida, L. Bahia, J. Macinko, *Saúde no Brasil 1 O sistema de saúde brasileiro: história, avanços e desafios* (2011).