A REVIEW OF MATURITY FRAMEWORKS FOR DATA DRIVEN SOCIO-DEMOGRAPHIC POLICY MANAGEMENT

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Abstract: *This paper reviews maturity and readiness frameworks that can inform data-driven socio-demographic policy management in the Republic of Moldova. The review is motivated by Moldova's demographic decline, population ageing, migration, labour-market pressures and growing demand for social services, all of which require more anticipatory and evidence-informed policy processes. Although governments now produce and store increasing volumes of statistical, administrative and digital data, data availability does not by itself improve policy decisions. The paper examines selected frameworks from data governance, open data, digital government, artificial intelligence readiness and data-driven decision-making, including OECD, World Bank, Global Data Barometer, Open Data Maturity, DAMA/IBM-type models, DECAS and evidence-informed policymaking approaches. The review shows that these frameworks offer useful building blocks, such as data stewardship, data quality, interoperability, openness, leadership, analytical capacity, ethical safeguards and user orientation. However, most remain partial: some focus on data assets, some on digital readiness, others on openness or AI preparedness, while few assess how evidence is used across the full socio-demographic policy cycle. The paper concludes that future research should develop and empirically test an integrated maturity framework that links technical, institutional, ethical and policy-cycle dimensions before it is used as a diagnostic instrument for public institutions.*

Key words: *data-driven policy management; socio-demographic policy; maturity frameworks; data governance; digital government; evidence-informed decision-making.*

JEL: H83, J11, O33.

Introduction

The Republic of Moldova is facing a profound socio-demographic transformation that directly affects the sustainability of public services, labour markets, social protection, education, healthcare, territorial development and fiscal planning. The results of the 2024 Population and Housing Census provide an updated statistical baseline for understanding population distribution and structural demographic change, with the usually resident population estimated at 2.409 million persons as of 8 April 2024 (National Bureau of Statistics of the Republic of Moldova, 2026). The available analyses describe Moldova's demographic situation as one of the most serious challenges to the country's long-term development prospects. Całus (2025) presents the scale of depopulation and migration pressures as a strategic concern, while Gagauz (2023) highlights the expected economic and social implications of depopulation and demographic ageing by 2040. The European Commission's 2025 report on the Republic of Moldova also underlines the importance of administrative capacity, evidence-informed policymaking and the broader reform agenda linked to European integration (European Commission, 2025). In this context, socio-demographic policy management must become more data-driven, cross-sectoral and capable of using digital evidence for both strategic planning and operational decisions.

At the same time, the global public sector is undergoing a transition from digitized and digitalized administration to data-driven governance. The OECD (2019) argues that a data-driven public sector depends not only on data availability, but also on governance, leadership, skills, infrastructure and ethical safeguards. The World Development Report 2021 similarly stresses that data can create

development value only when supported by trust, safeguards and institutional capacity (World Bank, 2021). Digital transformation therefore creates an opportunity for the public institutions in Moldova, but it also raises an important question: how can public institutions ensure that data and digital systems influence policy choices, implementation monitoring and institutional learning?!

This question is especially relevant because digitalization does not automatically produce better public management. Public institutions may collect large volumes of administrative and statistical data without integrating them into problem diagnosis, policy option appraisal, budgeting, targeting, service delivery or evaluation. They may also introduce artificial intelligence (AI) or advanced analytics before data quality, interoperability, stewardship, accountability and human oversight are sufficiently mature. As Charles, Rana and Carter (2022) note, AI can strengthen governance and decision-making in public affairs, but it requires institutional arrangements that ensure responsible use, transparency and public value.

The research problem addressed in this paper is therefore the gap between the growing availability of demographic, administrative and digital data and the institutional maturity required to use such data systematically throughout the socio-demographic policy cycle. This gap is particularly important in policy fields shaped by long-term demographic change, because decisions on ageing, migration, family policy, youth, labour-market participation, territorial development and social protection require cross-sectoral evidence, forecasting capacity and institutional coordination.

The central research question is how do existing maturity and readiness frameworks address the institutional conditions required for data-driven socio-demographic policy management, and what are their main contributions and limitations.

The objective of the paper is not to present or validate a new maturity model. Instead, the paper critically reviews selected conceptual and policy frameworks that can inform the future development of a more comprehensive maturity or diagnostics framework for socio-demographic policy management. The contribution of the paper is threefold. First, it clarifies why socio-demographic policy management requires more than data availability. Second, it identifies the value and limitations of existing frameworks in the fields of data governance, open data, digital government, AI readiness and data-driven decision-making. Third, it outlines the key elements that could inform a future integrated maturity framework tailored to public institutions responsible for socio-demographic policies.

Review of relevant maturity frameworks

Methodological approach: structured desk review

The paper is based on a structured desk review of academic and policy literature relevant to data-driven socio-demographic policy management. The current review is not a systematic literature review in the strict sense, because it does not apply a complete database search protocol, formal screening procedure or bibliometric analysis. Instead, it is designed as a conceptual review that maps the main categories of maturity and readiness frameworks relevant to the research problem.

The review covers the following groups of literature and policy frameworks: (i) data-driven decision-making and decision theory; (ii) data governance and data management maturity; (iii) digital government maturity and data-driven public sector frameworks; (iv) open data, data availability and open data readiness frameworks; and (v) AI readiness and responsible digital transformation. The selection of frameworks was guided by their relevance for public institutions that need to transform demographic, administrative and digital data into policy decisions, implementation routines and learning mechanisms.

The analytical reading of the literature was organized around four questions: *What does the framework primarily measure or explain? What value does it offer for socio-demographic policy management? What are its limitations? Which elements could inform a future integrated maturity framework?*

This approach allows the paper to compare frameworks that were developed for different purposes while avoiding the premature claim that any single model can already assess the full maturity of data-driven socio-demographic policy management.

Why socio-demographic policy requires data-driven policy management

Socio-demographic policies are difficult to design and manage because they deal with gradual structural changes while also requiring concrete decisions in the short and medium term. Population decline, ageing, migration, labour shortages, changing family patterns and territorial inequalities cut across several areas of government. They influence education, social protection, healthcare, employment, housing, local development and public finance at the same time. As a result, no single institution can address them in isolation. When data systems, responsibilities and decision-making processes remain fragmented, policy responses also risk becoming fragmented.

Data-driven policy management is the institutionalized use of high-quality, interoperable, and ethically governed data, together with analysis, deliberation, and learning, to steer the full policy cycle from problem definition and targeting through option appraisal, implementation, monitoring, evaluation, and adaptation. In socio-demographic policy management, it requires cross-sector integration of population, territorial, service, and administrative data so that governments can coordinate action on complex and sensitive issues while protecting rights, trust, and equity (OECD 2020). Thus, data-driven management is broader than the production of statistics or dashboards. It concerns the institutional routines through which evidence becomes part of managerial processes, strategic planning, resource allocation, service design and accountability.

The literature on data-driven decision-making (DDDM) is useful because it stresses that data must be interpreted and translated into decisions. Mandinach (2006) describes DDDM as a cognitive and iterative process in which actors move from data to information and knowledge through collecting, organizing, analysing, summarizing, synthesizing and prioritizing. This view is valuable because it recognizes that data use depends on skills, interpretation and context. However, in public administration, cognitive data use by individuals is insufficient unless it is embedded in organizational routines, formal responsibilities, review mechanisms.

Decision analysis demonstrates that structured, data-driven processes consistently outperform intuition in complex policy settings (Borgonovo et al. 2026). Keeney's (1992) Value-Focused Thinking reveals a common flaw in institutional practice: decision-makers fixate on existing alternatives instead of clarifying the underlying values that should shape data collection and policy goals. For socio-demographic policies, this means maturity frameworks must evaluate not just data systems but whether data efforts align with outcomes that matter to citizens. The Value of Information principle (Howard 1966; Borgonovo et al. 2026) further supports prioritizing investments in data maturity, since better information cuts uncertainty and leads to more effective decisions.

Elragal and Elgendy (2024) propose a DDDM readiness assessment model grounded in the DECAS theory: a five-pillar framework encompassing the decision-maker, the decision, the decision-making process, data, and analytics. Their empirical application in a Swedish food manufacturer reveals a pattern that is likely to recur in public institutions: readiness in process and human capacity does not automatically translate into readiness in data infrastructure and analytics. This asymmetry is significant. An institution may have well-defined procedures and trained staff yet remain unable to act on data because the underlying data systems are fragmented or immature. The DECAS framework, however, was designed for corporate environments where the primary objective is firm performance. Applying it to socio-demographic policy institutions requires a fundamental reorientation from competitive advantage to public value, from customer data to population data, and from operational efficiency to policy equity and evidence-based governance.

Review of maturity and readiness frameworks

The reviewed frameworks provide important building blocks for understanding maturity, but they differ significantly in scope, level of analysis and policy relevance. Table 1 summarizes their main value and limitations for data-driven socio-demographic policy management and extract elements which could potentially inform a future integrated maturity framework.

Table 1. Analytical value and limitations of selected frameworks relevant for data-driven socio-demographic policy management

Framework / family of frameworks	What does the framework primarily measure or explain?	What value does it offer for socio-demographic policy management?	What are its limitations?	Which elements could inform a future integrated maturity framework?
DDDM and decision-theory frameworks (Simon, Mandinach et al., DECAS)	How data, decision-makers, analytics and decision processes interact.	Useful for understanding how evidence enters decision-making and why data availability is not enough.	Often not sufficiently institutionalized for public-sector policy cycles, accountability and cross-sectoral governance.	(1) a public accountability dimension measuring whether data use is transparent, auditable, and aligned with legal mandates; and (2) a cross-sectoral integration dimension assessing whether data flows across the fragmented institutional landscape typical of socio-demographic policy (social protection, health, education, labour, local development).
Data governance and data management maturity models (DAMA, IBM-type models.)	Data stewardship, quality, standards, metadata, lifecycle, security, policy and roles.	Strong foundation for ensuring that demographic and administrative data are trustworthy, reusable and managed responsibly.	Often enterprise-oriented and focused on data assets rather than policy choices, public value and democratic accountability.	Reoriented towards public data assets (population registers, administrative records, social protection databases) rather than commercial data products. A policy relevance dimension must be added: data must not only be well-managed, but actively linked to the policy questions it is meant to answer and the citizens it describes.
OECD data-driven public sector and digital government frameworks	Whole-of-government digital maturity, data as a strategic asset, government as a platform, open by default, user-driven and proactive services.	Highly relevant for national reform agendas and for aligning digital transformation with public-sector modernization.	Broad and macro-level; less precise for assessing whether socio-demographic policy decisions actually use evidence across the full cycle.	The "data as a strategic asset" principle informs a dimension assessing whether socio-demographic data is formally governed and resourced, not treated as an administrative by-product. The whole-of-government maturity logic offers a multi-level structure (national, sectoral, institutional) replicable for fragmented demographic policy governance. The "open by default" and interoperability concepts inform a cross-institutional data flow dimension. The distinction between digital readiness and digital adoption is directly applicable: institutions may have tools but lack the culture or capacity to use them, a gap the framework must diagnose.

Framework / family of frameworks	What does the framework primarily measure or explain?	What value does it offer for socio-demographic policy management?	What are its limitations?	Which elements could inform a future integrated maturity framework?
World Bank Open Data Readiness Assessment (ODRA)	Readiness to design and implement open data initiatives, including leadership, legal framework, institutional capacity, data demand and supply.	Useful for assessing whether public-sector data can be opened, reused and connected to external demand.	Primarily focused on open data ecosystems, not on internal policy management, implementation monitoring or learning routines.	The eight assessment dimensions (leadership, policy/legal framework, institutional capacity, data demand, financing, technology, data supply, partnerships) offer a replicable diagnostic structure adaptable to socio-demographic policy institutions. The legal and regulatory readiness dimension directly informs a normative compliance layer: a future framework should assess whether institutions operate within a clear legal mandate for data collection, sharing, and use. The institutional capacity dimension, covering human resources, skills, and organisational culture, is directly transferable as a maturity sub-dimension. The focus on data demand introduces a user-side perspective often absent from technical frameworks: a future model should assess whether policy decision-makers actively request and use data, not only whether data is produced.
Global Data Barometer and Open Data Maturity assessments	Benchmarking governance, capability, availability, use and impact of data and open data across countries and sectors.	Helpful for comparative benchmarking and for identifying gaps in data availability, use and public value.	Use and impact indicators remain difficult to measure; they do not fully capture how data changes policy decisions.	The five-pillar benchmarking structure (governance, capability, availability, use, impact) provides a ready-made dimensional architecture that a future integrated framework could adopt and contextualise for socio-demographic policy institutions. The distinction between data availability and data use directly motivates a dedicated dimension in a future framework: institutions may score well on supply-side indicators while remaining at early maturity stages in evidence-based policy practice.
AI readiness and responsible AI frameworks	Preparedness for AI adoption, including data, infrastructure, skills, governance, ethics and risk management.	Relevant because advanced analytics and AI can support forecasting, targeting and anticipatory governance.	Risk of focusing on technology adoption before foundational data governance, human oversight and policy accountability are mature.	The governance, ethics and risk management dimensions inform a responsible data use layer in a future framework: maturity should include whether institutions have oversight mechanisms, accountability structures, and safeguards against algorithmic bias in policy decisions.

Framework / family of frameworks	What does the framework primarily measure or explain?	What value does it offer for socio-demographic policy management?	What are its limitations?	Which elements could inform a future integrated maturity framework?
				The skills and human oversight components reinforce the need for a capacity dimension that goes beyond technical infrastructure, assessing whether staff can critically evaluate, interpret, and challenge data-driven outputs. The anticipatory governance concept, using data and models to forecast demographic trends and design proactive policy responses, can serve as the defining characteristic of the highest maturity level in a socio-demographic policy framework.
Evidence-informed policymaking and science-for-policy frameworks (Based on: Sempé, L., Pande, S., Kelly, C. et al. (2025).	Institutional capacity to mobilize, interpret and use evidence in policy processes.	Important for connecting administrative data, research, evaluation and expert knowledge to public decisions.	Often less operational on data infrastructure, interoperability, analytics capability and digital governance.	The four pathways of change: capabilities, relationships and networks, structures and processes, and evidence culture, offer a multi-dimensional diagnostic architecture directly transferable to a maturity framework: each pathway can be assessed at graduated levels, from absent to institutionalized. The four outcome domains (conceptual, attitudinal/behavioural, procedural, and content outcomes) provide a graduated results framework: a future maturity model should assess whether data use is changing how policymakers think, behave, design processes, and ultimately shape policy content.

Source: Author's synthesis based on reviewed literature and policy frameworks.

Conclusions

The review of maturity and readiness frameworks presented in this paper leads to three main conclusions.

First, no single existing framework is sufficient for assessing the institutional maturity required for data-driven socio-demographic policy management. Each framework reviewed offers genuine value: DAMA-type models provide rigorous data stewardship standards; OECD frameworks establish the normative case for data as a strategic public asset; the World Bank ODRA offers a replicable diagnostic structure; the Global Data Barometer enables cross-country benchmarking; AI readiness frameworks introduce ethical governance and anticipatory logic; and EIPM frameworks foreground the cultural and political conditions for evidence use. Yet each also has a significant limitation, they are either enterprise-oriented, macro-level, supply-side focused, or insufficiently attentive to the full socio-demographic policy cycle. The gap between data availability and institutionalized data use in policy decisions remains poorly addressed by any single framework.

Second, the elements identified across these frameworks collectively point toward the architecture of a future integrated maturity framework. Such a framework would need to combine at minimum: a data governance and quality dimension; a legal and normative compliance dimension; an institutional capacity and culture dimension; a cross-sectoral interoperability dimension; a policy-cycle integration dimension, assessing whether data enters problem diagnosis, option appraisal, implementation, monitoring and learning; and an accountability and public value dimension. The sequencing principle from AI readiness frameworks is also relevant: advanced analytics and anticipatory governance should be assessed as characteristics of higher maturity levels, not as preconditions for beginning the maturity journey.

Third, the development of such a framework requires empirical validation before it can serve as a reliable diagnostic instrument. The desk review conducted in this paper establishes the conceptual rationale and the building blocks. The next step is to design and test a measurement instrument with public institutions responsible for socio-demographic policies, beginning with the institutional context of the Republic of Moldova, where the normative mandate for data-driven governance is already reflected in laws and government decisions, but where the institutional capacity to fulfil that mandate remains at an early stage of development. This emerging context requires building institutions that know how to ask the right policy questions, identify relevant data, assess quality, interpret evidence, compare policy options, monitor implementation and learn from results. In this sense, maturity should be understood not as technological advancement alone, but as the capacity of public institutions to use data responsibly and systematically in the service of public value, social resilience and long-term demographic sustainability.

This research agenda is the subject of the author's ongoing doctoral work.

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