



Data Maturity Assessment of the Trade Administrative Data

Department of Revenue and Customs, Ministry of Finance

National Statistics Bureau

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1. Introduction

1.1. Background

Bhutan's data ecosystem plays a pivotal role in enhancing governance, planning, and the delivery of citizen services. The Department of Revenue and Customs (DRC) under the Ministry of Finance manages the Electronic Customs Management System (ECMS), a core national database that supports trade monitoring, revenue collection, and economic planning. Through the ECMS, the DRC maintains and manages import/export data, including trade values and quantities, as well as related administrative functions.

These datasets are essential not only for maintaining accurate trade records but also for informing policy formulation and supporting national priorities. Recognizing the strategic importance of data, the National Data Governance Framework (NDGF), 2025 mandates periodic Data Maturity Assessments (DMA) to strengthen institutional capacities and ensure a coordinated national approach to data management. According to the 2024 Baseline Report, about 41% of agencies still lack structured data coordination (GovTech Agency & UN DESA, 2024), underscoring the need for standardized assessment and capacity development across the public sector.

1.2. Purpose of the Assessment

This Data Maturity Assessment evaluates the maturity of DRC's ECMS data management practices using the Data Maturity Assessment Framework (DMAF), developed by the National Statistics Bureau (NSB). The assessment provides a structured analysis of the department's performance across four key dimensions: Institutional Arrangements, Data Collection and Processing, Data Quality and Metadata, and Data Sharing and Dissemination. The primary aim is to establish a baseline maturity index for DRC, identify key strengths and improvement areas across the data lifecycle, and recommend actions that align with the Bhutan Statistical Quality Assurance Framework (BSQAF), 2020 and NDGF 2025. Through this process, DRC can better plan strategic interventions, enhance interoperability, and foster a culture of evidence-based decision-making.

1.3. Scope

The scope of this assessment is confined to import/export trade data maintained within the ECMS. The data are administrative in nature, with trade statistics published annually. The assessment employs the DMAF, which consists of four dimensions and twelve categories, each rated on a 0–4 maturity scale ranging from Initial to Optimized. The evaluation is based on a self-assessment approach, supported by justifications for each score.

2. Methodology

2.1. 2.1 Framework Overview

The assessment of ECMS data maturity was conducted using the Bhutan DMAF, developed by NSB. This framework is based on globally recognized models, including the Capability Maturity Model Integration (CMMI), Data Management Maturity (DMM), and DAMA-DMBOK (Data Management Body of Knowledge). It evaluates an organization's data practices across the entire data lifecycle and consists of four dimensions and twelve categories:

- Institutional Arrangements – Governance, leadership, capacity, collaboration, and compliance/ethics.
- Data Collection and Processing – Data mandate, standardization, digitization, integration, processing, and storage.
- Data Quality and Metadata – Quality management, validation, cleansing, metadata management, and reference data.
- Data Sharing and Dissemination – Data access, dissemination, interoperability, user engagement, and privacy. Each category is scored on a 0–4 maturity scale:

Each category is scored on a 0–4 maturity scale:

- Initial (0): No formal processes or documentation.
 - Developing (1): Practices exist but are ad hoc and inconsistent.
 - Defined (2): Processes are documented but applied inconsistently.
 - Managed (3): Processes are systematically applied with monitoring mechanisms.
 - Optimized (4): Continuous improvement is embedded into processes and practices.
- This framework provides a structured, repeatable, and standardized method to assess data maturity and identify areas for improvement across the ECMS data lifecycle.

2.2. Scoring and Analysis

Each of the twelve categories was evaluated using a 0–4 scale, where 0 represents the absence of formal processes and 4 denotes optimized practices with continuous improvement. Narrative justifications were provided for each score to explain the rationale and evidence supporting the rating. All dimensions and categories were assigned equal weights in calculating the overall maturity index, ensuring equal importance is given to each category. Dimension indices were computed as the average of their respective category scores, while the overall maturity index was derived as the average of all four dimension indices. This approach provides a consistent and interpretable measure of data maturity, maintaining clarity in reporting strengths, gaps, and opportunities for improvement across the ECMS data lifecycle.

3. Findings

3.1. Summary Findings

The Data Maturity Assessment for the DRC reveals an overall maturity index of 2.4, which corresponds to the “Defined” level of maturity. As shown in the Figure 1, the DRC demonstrates a Defined level of data maturity across all four dimensions.

Figure 1: Data Maturity Profile

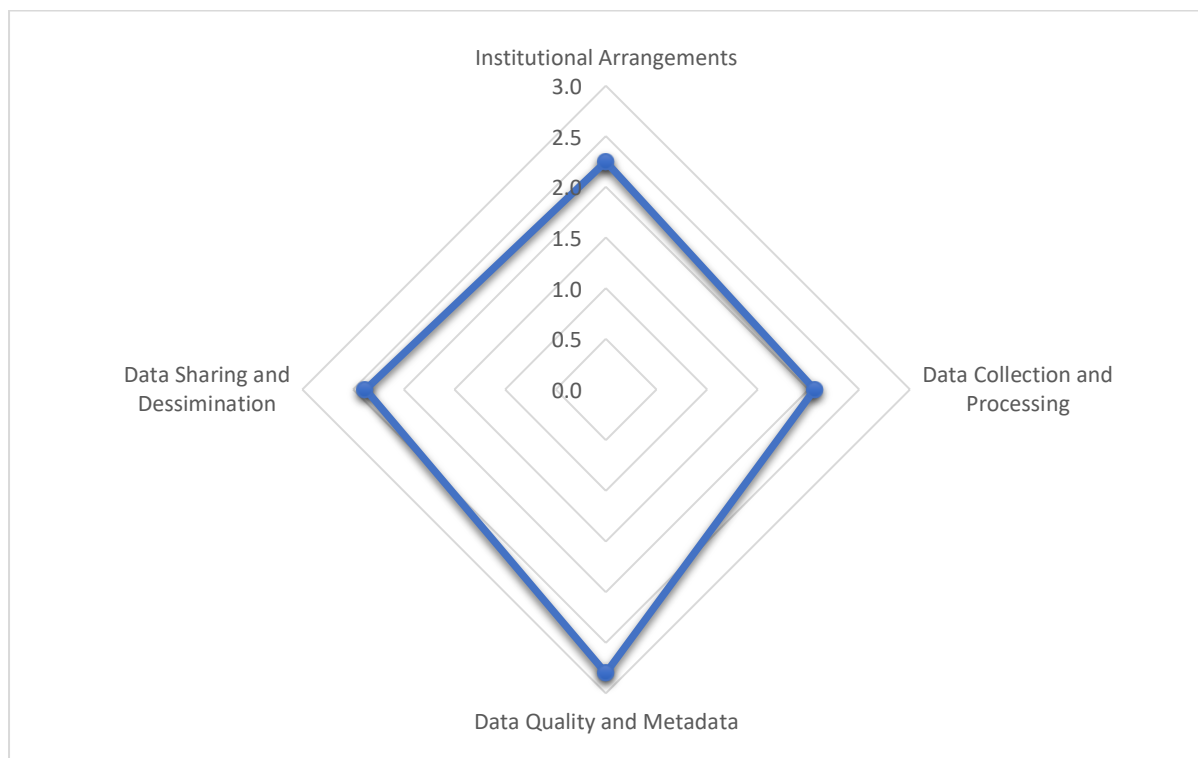
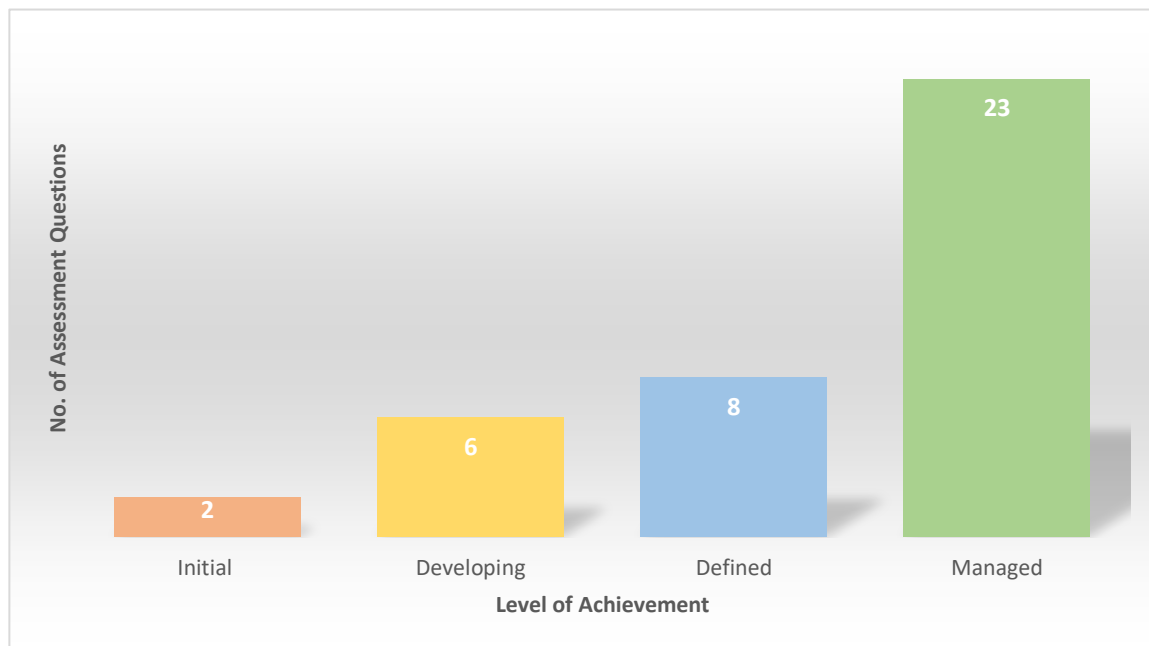


Figure 2 shows the number of assessment questions by the achievement level. Of the 39 assessment questions, 2 were responded as Initial, 6 Developing, 8 Defined, and 23 Managed, indicating moderate level of data maturity. However, there are notable gaps in digitization and collaboration as most of the assessment questions are rated maturity level Defined and below.

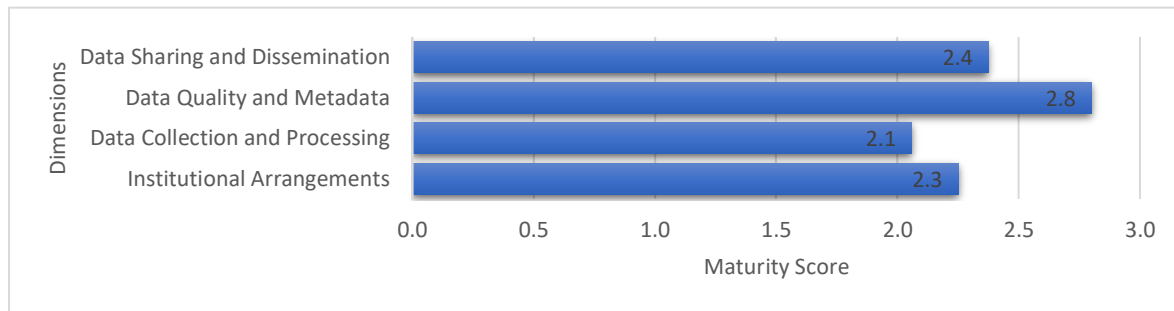
Figure 2: Number of Achievement by Level



3.2. Achievement Across the Dimension

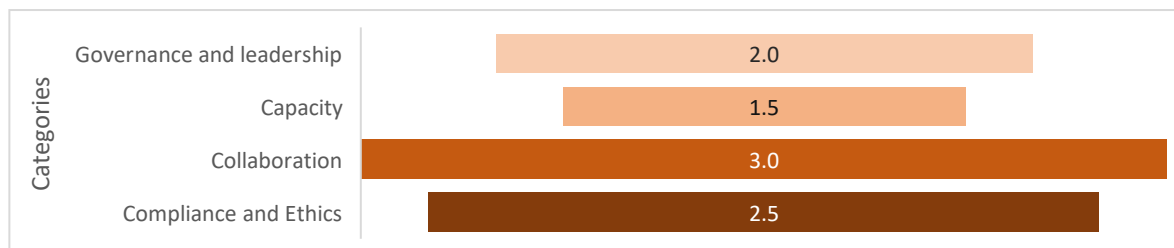
The Data Maturity Profile reveals an uneven distribution of progress across the four assessed dimensions. As shown in Figure 3, Data Quality and Metadata stands out with the highest score (2.8), indicating strong systems for maintaining data accuracy, completeness, and documentation. Data Sharing and Dissemination follows closely (2.4), reflecting solid interoperability and active user engagement. In contrast, Institutional Arrangement (2.3) shows moderate progress, with notable gaps in governance structures and coordination mechanisms. The lowest maturity is observed in Data Collection and Processing, indicating limited capacity and inconsistencies in data management practices.

Figure 3: Maturity Score by Dimensions



Institutional Arrangements (Index: 2.3 – Defined): The DRC demonstrates moderate maturity in institutional arrangements, with strong performance in collaboration and compliance. As illustrated in Figure 4, the department scored 3.0 in Collaboration, 1.5 in Capacity, 2.5 in Compliance and Ethics, and 2.0 in Governance and Leadership. The overall maturity index, calculated as the average of these four categories, stands at 2.3, corresponding to the “*Defined*” level of maturity. The DRC has a well-established governance framework and clearly defined leadership roles for ECMS management. Capacity is developing, with designated staff but limited access to training opportunities. Collaboration is facilitated through Memoranda of Understanding (MoUs) with the Anti-Corruption Commission (ACC), however, external data sharing remains limited.

Figure 4: Maturity Score by Category under Institutional Arrangements



Data Collection and Processing (Index: 2.1 – Defined): The DRC demonstrates moderate maturity in data collection and processing, with particular strengths in Digitization. As illustrated in Figure 5, the department scored 2.3 in Data Collection and Standardization, 3.0 in Digitization, 0.5 in Data Integration, and 2.4 in Processing and Storage. The overall maturity index, calculated as the average of these four categories, stands at 2.1, corresponding to the “*Defined*” level of maturity. The ECMS provides digitized workflows for trade data collection, supported by standard protocols that ensure consistency and reliability. Data Collection and

Standardization processes are defined, and storage systems include regular backups to preserve historical data.

Figure 5: *Maturity Score by Category under Data Collection and Processing*

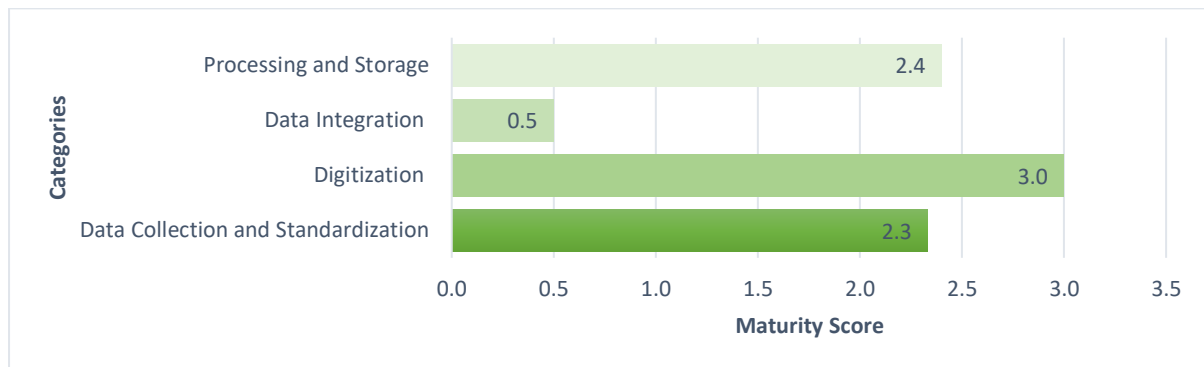
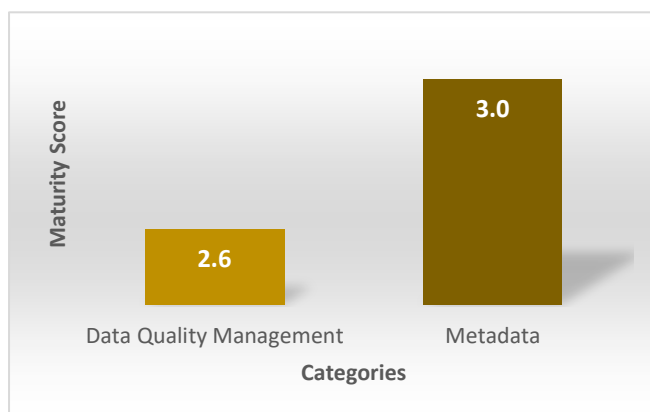


Figure 6: *Maturity Score by Category under Data Quality and Metadata*



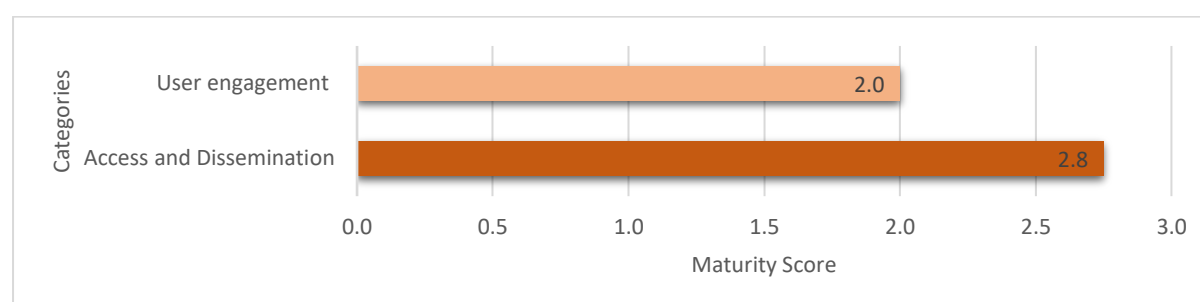
Data Quality and Metadata (Index: 2.8

– Managed): The DRC demonstrates strong performance in data quality and metadata management, supported by regular monitoring and the use of standardized metadata. As shown in Figure 6, the department scored 2.6 in Data Quality Management and 3.0 in

Metadata, resulting in an overall maturity index of 2.8 for this dimension. Reference datasets are managed effectively, with comprehensive documentation and systematic sharing through the ECMS, ensuring data accuracy, consistency, and accessibility.

Data Sharing and Dissemination (Index: 2.4 – Defined): The DRC demonstrates moderate maturity in data sharing and dissemination, reflecting notable progress in data access and dissemination but persisting gaps in user engagement. As illustrated in Figure 7, the department scored 2.8 in Access and Dissemination and 2.0 in User Engagement, resulting in an overall maturity index of 2.4. Data sharing processes are defined for selected stakeholders, and periodic reports are published on the DRC/MoF website. User engagement mechanisms are still developing and remain largely ad hoc, with limited structured feedback channels.

Figure 7: Maturity Score by Category under Data Sharing and Dissemination



4. Recommendations

4.1. Category Specific Recommendations

This Recommendation Matrix summarizes the key priority actions based on the DRC's ECMS Data Maturity Assessment. It highlights the current maturity scores, target achievements, and recommended actions for short- and medium-term implementation.

Dimension / Category	Current Score	Target Score	Key Recommendations / Actions	Timeline (Priority)
Governance & Leadership	2	3	Periodically review and update Standard Operating Procedures (SoPs), data policies, and accountability mechanisms in line with NDGF	Short-Term (Ongoing)
Capacity	1.5	3+	Strengthen technical capacity through regular training on analytics, integration, and reporting. Create dedicated data management roles within DRC divisions.	2026–2027
Collaboration	3.0	4.0	Expand MoUs for API-based data integration. Develop a collaboration framework to enhance trade data sharing.	2026–2027
Compliance & Ethics	2.5	3.5+	Introduce dataset sensitivity classification for trade data.	2026–2027
Collection & Standardization	2.3	3.5	Standardize code definitions and trade data protocols across customs offices. Align data collection with Bhutan Standard Statistical Code	2026–2027

Digitization	3	Maintain	Continue ECMS optimization with automated error-flagging for real-time anomaly detection.	Ongoing
Data Integration	0.5	3.5	Expand interoperability via secure APIs. Develop a data integration roadmap in collaboration with GovTech Agency.	2026–2028
Processing & Storage	2.4	3.5	Develop SoPs for trade data processing, analysis, and visualization. Implement archiving and retention policy for historical ECMS data.	2026–2027
Data Quality Management	2.6	3.5	Expand automated validations for trade data entry. Create real-time data quality monitoring dashboards and institutionalize periodic reviews.	2026–2027
Metadata & Reference Data	3	Maintain	Continue maintaining comprehensive metadata for ECMS datasets. Enhance metadata and share with the data users.	Ongoing
Access & Dissemination	2.8	3.5	Develop public-facing dashboards on DRC/MoF website to enhance trade data dissemination. Expand secure data access to additional stakeholders with enhanced sharing mechanisms.	2026–2027
User Engagement	2	3.5	Monitor API usage and organize inter-agency engagement sessions to understand data needs.	2026–2027
Cross-Cutting	2.4	3.5+	Align actions with BSQAF 2020 and NDGF 2025 for interoperability and quality. Conduct periodic reassessments using the DMA tool to track progress.	2026–2027

4.2. General Recommendations

To accelerate progress toward a Managed maturity level (Index ≥ 3.5), DRC should prioritize a set of strategic initiatives designed to strengthen data governance, interoperability, quality, and user engagement:

1. **Develop dataset sensitivity classification and formalize data dissemination protocols:** Implement a structured framework to categorize datasets based on sensitivity, confidentiality, and regulatory requirements. This will guide secure access, sharing, and usage of data, ensuring compliance with privacy standards and reducing the risk of unauthorized disclosures.
2. **Expand API-based interoperability with key agencies through secure integration agreements:** Establish secure, standardized APIs to enable seamless data exchange with partner institutions. Formal integration agreements will clarify roles, responsibilities, and security protocols, improving timeliness and accuracy of shared information while supporting cross-agency analytics and reporting.
3. **Establish data quality monitoring dashboards and real-time validation systems:** Deploy automated dashboards and validation tools to continuously monitor the completeness, consistency, and accuracy of datasets. Real-time alerts and analytics will allow for rapid identification and correction of data issues, enhancing trust and reliability of the information.
4. **Conduct targeted capacity-building programs for technical and operational staff on data analytics, governance, and ethics:** Deliver training programs tailored to strengthen skills in data management, analytical techniques, ethical handling of sensitive information, and governance best practices. Investing in staff capacity will build institutional expertise and sustain long-term improvements in data maturity.

5. Conclusion

The Data Maturity Assessment of the DRC highlights both strengths and areas for improvement across the data lifecycle. The department demonstrates strong performance in Data Quality and Metadata (Index: 2.8) and well-defined Data Sharing and Dissemination mechanisms (Index: 2.4), indicating established access systems but limited user engagement and feedback processes. Institutional Arrangements (Index: 2.3) reflect effective governance structures, compliance with standards, and sound quality management practices. The lowest maturity is observed in Data Collection and Processing (Index: 2.1), indicating limited data integration, visualization, and processing capacity within the department.

Overall, the assessment suggests that while foundational systems and quality assurance mechanisms are largely in place, targeted efforts are required to strengthen data sharing, interoperability, and analytical capacity. Prioritizing these areas will enable the DRC to progress toward a fully managed level of data maturity, thereby enhancing the reliability, accessibility, and impact of its data for both operational and policy purposes.

6. References

- GovTech Agency & United Nations Department of Economic and Social Affairs. (2024). *Bhutan National Data Governance Baseline Report 2024* [PDF]. <https://tech.gov.bt/wp-content/uploads/2025/03/Bhutan-National-Data-Governance-Baseline-Report-2024-FINAL.pdf>
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7. Annexures

Annexure II: Achievement Level by Number of Questionnaires in Each Category

