

Data Governance

The University of Texas at Austin

August 2021



The University of Texas at Austin
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August 18, 2021

President Jay C. Hartwell
The University of Texas at Austin
Office of the President
P.O. Box T
Austin, Texas 78713

Dear President Hartzell,

We have completed our audit of Data Governance at The University of Texas at Austin (UT Austin) as part of our Fiscal Year 2021 Audit Plan. The objective of this audit was to evaluate the current state of data governance and data management practices, and whether controls and processes adhere to best practice frameworks for data governance and data management.

The strategy and expectations across campus for data governance and data management are informally managed by Colleges, Schools, and Units. The lack of a campus-level expectation for data governance and data management has resulted in data quality issues and challenges aligning data with the objectives of UT Austin. Opportunities have been identified for UT Austin to more effectively manage data related to financial, talent management, and student information.

Please let me know if you have questions or comments regarding this audit.

Sincerely,

A handwritten signature in blue ink that reads "Sandy Jansen".

Sandy Jansen, CIA, CCSA, CRMA
Chief Audit Executive

cc: Mr. Darrell Bazzell, Senior Vice President and Chief Financial Officer
Mr. Cameron Beasley, Chief Information Security Officer
Ms. Monica Horvat, Director of Administration for the President
Mr. Trice Humpert, Assistant VP for Information Technology Services
Ms. Melissa Loe, Interim Chief of Staff, Financial and Administrative Services
Dr. Larry D. Singell, Senior Vice Provost of Resource Management
Dr. Catherine A. Stacy, Chief of Staff, Office of the Executive VP and Provost
Dr. Sharon Wood, Executive Vice President and Provost



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Executive Summary

Data Governance

Project Number: 21.005

Audit Objective

The objective of this audit was to evaluate the current state of data governance and data management practices, and whether controls and processes adhere to best practice frameworks for data governance and data management.

Conclusion

There are opportunities for The University of Texas at Austin (UT Austin) administration to enhance its strategic and technical objectives to more effectively manage data related to financial, talent management, and student information.

Audit Observations¹

Recommendation	Risk Level	Estimated Implementation Date
Governance Over Data Management	High	Appointment of Responsible Individual: September 2021
Strategy Over Data Management	High	
Data Quality Monitoring	High	
Data Integration and Interoperability	High	Development of Implementation Plan: September 2022
Metadata Centralization	High	

Engagement Team²

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 Mr. Robert Taboada, CISA, CIPM, IT Audit Staff

¹ Each observation has been ranked according to The University of Texas System Administration (UT System) Audit Risk Ranking guidelines. Please see the last page of the report for ranking definitions.

² Internal Audits partnered with Postlethwaite & Netterville to conduct this engagement.



Audit Results

UT Austin is in the process of developing a data governance program to define roles, responsibilities, and authorities for the University's data assets. Data governance is critical to develop the ownership, stewardship, and operational structure of data, and to ensure proper alignment between the University's objectives and data management capabilities. An effective campus-wide data management strategy provides more accurate, complete, and timely data to inform decisions, and as a result, UT Austin should be able to more effectively achieve organizational goals and objectives.

Furthermore, without a campus-wide data strategy and defined expectations for data management, UT Austin is not able to effectively leverage metadata³ related to student and financial information, and is experiencing data quality and data integration challenges. Currently, UT Austin relies on resources from Colleges, Schools, and Units (CSUs) to govern data and to coordinate data management efforts. CSUs cannot manage data in a manner to ensure the strategic plan and initiatives of UT Austin are met without having defined expectations for data governance.

Based on benchmarking with an agreed-upon maturity model⁴, UT Austin's current maturity is *Level 1: Performed* (see the chart on the next page). Five key categories were considered for benchmarking, as follows:

- Data Management Strategy—Defines the vision, goals, and objectives for the data management program and aligns stakeholders' priorities.
- Governance Management—Develops the ownership, stewardship, and operational structure to manage critical university data.
- Metadata Management—Establishes the processes and infrastructure for specifying and extending clear and organized information about the structured and unstructured data assets under management.
- Data Quality Strategy—Defines an integrated, organization-wide strategy to achieve and maintain the level of data quality required to support the business goals and objectives.
- Data Integration—Reduces the need to obtain data from multiple sources and improves data availability for university processes that require data consolidation and aggregation, such as analytics.

The observations⁵ included in this report highlight opportunities to assist leadership with improving campus-wide data management maturity.

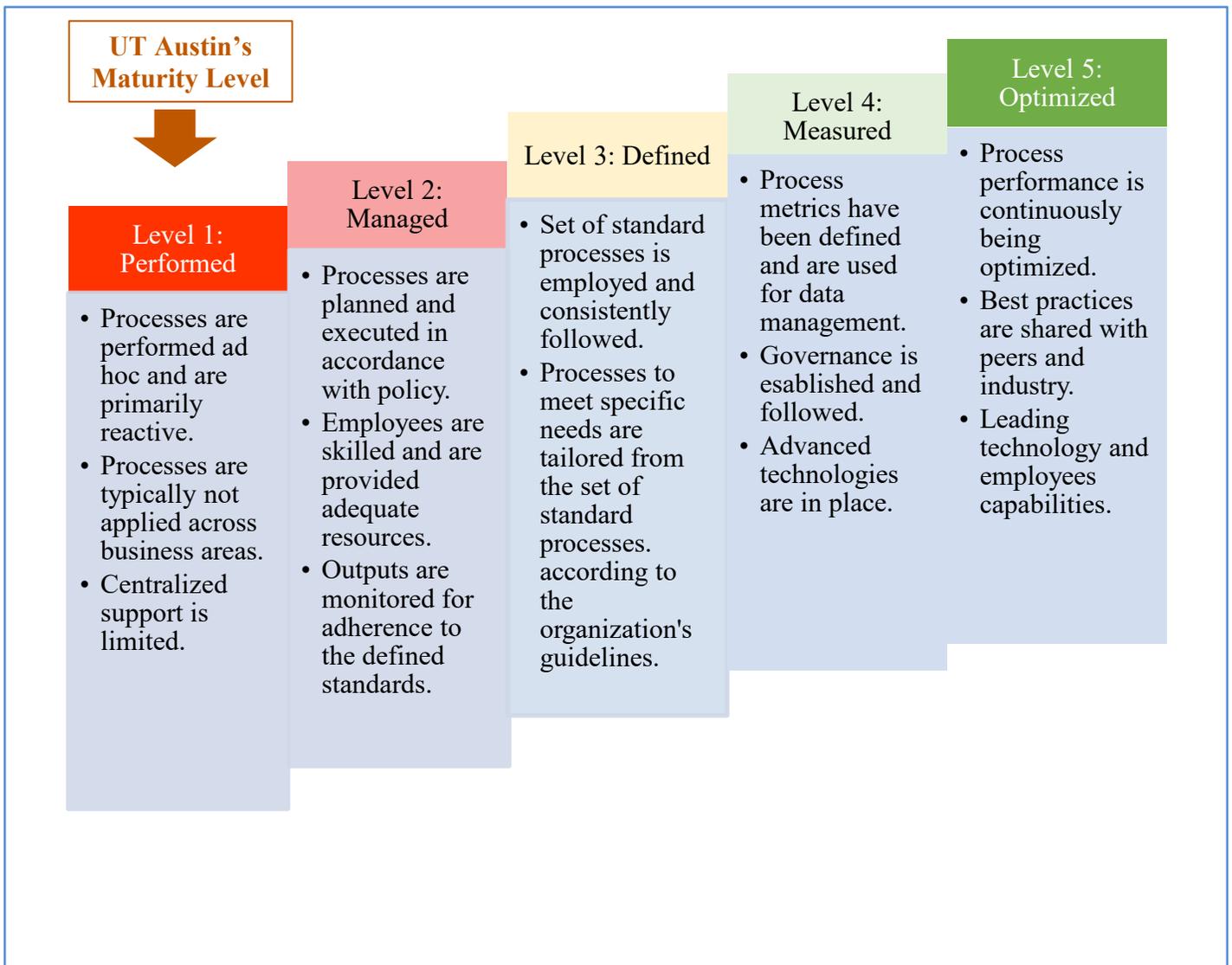
³ Metadata is definitional detail about data. Typical metadata includes title and description, tags and categories, creation and modification details, and retention dates.

⁴ CMMI (Capability Maturity Model Integration) Data Management Maturity (DMM) Model—additional information on the maturity model is at <https://cmmiinstitute.com/dmm>

⁵ Expanded details for all observations were separately provided to senior leadership to assist with implementation of best practices and improving data management maturity.



CMMI Data Management Maturity Model



Observation #1 Governance over Data Management

A centralized data governance management plan or program to support the University's data assets has not been instituted. Because different groups own the responsibility for providing access to different data sets, requests for reports or data from campus-wide applications used to make business decisions are time consuming. In addition, linking data from multiple systems to perform analysis is inefficient, and many data or report requests become one-off requests that require the same outreach and manual effort to replicate. In addition, a formal governance framework to ensure that access to data is appropriately restricted is not in place, and for many



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systems, access is ad-hoc and not role based. Ownership⁶ and stewardship⁷ of data is not formally defined at UT Austin, leaving data stewards to act as data owners in many cases. Processes are established to govern data of certain assets such as financial data, talent management data, and student information. However, data stewards' processes for provisioning access, managing change, documenting definitions, and monitoring outcomes is inconsistent across functions. While committees have been created to address inconsistencies, the committee charters are narrow, and a committee's authority is limited to activities directly within its purview. Existing committees for managing and governing data do not have the authority to approve an enterprise data strategy, policies, standards, or approve and fund data management projects.

Recommendation: Management should formalize a data governance program and appoint an individual to initiate and manage the following activities across campus:

- Define Data Governance for the Organization
- Perform Discovery and Business Alignment
- Develop Organizational Touch Points
- Define the Data Governance Operating Framework
- Develop Goals, Principles, and Policies
- Underwrite Data Management Projects
- Engage Change Management
- Engage in Issue Management
- Assess Regulatory Compliance Requirements
- Sponsor Data Standards and Procedures
- Develop a Business Glossary
- Coordinate with Architecture Groups
- Sponsor Data Asset Valuation
- Embed Data Governance within Key Functions

Management's Corrective Action Plan: Data governance implementation is a multi-year process. To begin implementation, the Executive Vice President and Provost and the Senior Vice President and CFO will work together to appoint and support an individual to develop an implementation plan.

Auditor's Comment: We agree that implementation of data governance and the related recommendations is a multi-year effort. Our office will follow up on the development of the implementation plan to demonstrate these issues are being addressed. Once the plan is developed, we will informally monitor progress (e.g., through committee service and/or meetings with senior leadership). After UT Austin has had time to implement a data governance plan, we will conduct a separate project to determine the effectiveness of implementation.

⁶ The data owner is the responsible party for a business data asset, typically the individual who is in charge of a business process or application data store.

⁷ The data steward is the individual who accepts responsibility for a data set of business terms, attributes, and data elements. The data steward is responsible for ensuring that the meaning, usage, and representations of the data set are according to business purpose and conform the organization's standards.



Responsible Person: Executive Vice President and Provost, Senior Vice President and CFO

Planned Implementation Date: Appointment: September 2021, Implementation Plan: September 2022

Risk Level: High

Observation #2 Strategy over Data Management

The University has not developed an overarching strategy for managing data assets. The current system is designed as a federated model with different CSUs owning or stewarding data with limited guidance on how that data should be organized, categorized, or accessed by users. UT Austin does not have a documented set of data management objectives and priorities tied to the broader University goals and objectives to help enable the achievement of the University's strategy.

Lack of a formal data management strategy that incorporates objectives and relevance to the overall strategy of the University can lead to a lack of "buy-in" on how to handle data from stakeholders at the CSUs. Significant stakeholder involvement is needed to develop the long-term commitments required to achieve organization-wide cohesion for data management and to bring value to the University. Achieving alignment between data management strategy and the broader goals and objectives of the University, such as student enrollment, procurement, finance, and talent management, can improve outcomes in these areas through the use of more relevant and timely data.

Recommendation: Management should develop and document a data management strategy that aligns with the broader strategic initiatives at UT Austin such as student enrollment, procurement, finance, and talent management.

While developing the strategy, UT Austin should consider how effective data governance and data management can enable the achievement of broader goals which have buy-in from a variety of stakeholders across CSUs. Additionally, UT Austin should consider developing the following in creation of the data management strategy:

- A Data Management Charter
- A Data Management Scope Statement
- A Data Management Implementation Roadmap

Management's Corrective Action Plan: The implementation plan (discussed in observation #1) will include an approach to strategy implementation.

Responsible Person: Executive Vice President and Provost, Senior Vice President and CFO

Planned Implementation Date: September 2022

Risk Level: High



Observation #3 Data Quality Monitoring

Data stewards at CSUs informally manage data quality for campus-wide systems, and the University does not have a data quality strategy to define the goals, objectives, and plans for improving data integrity, including quality standards and key performance indicators (KPIs). Because of disparate systems and architectural challenges with the data sources (such as the mainframe), data quality monitoring is of elevated importance to mitigate risks associated with data integrity. The following data quality trends were observed:

- Mainframe data inputs have been configured, where available, to have input checks and rules to restrict data entry. Specific fields have been configured to only accept data input that meet certain parameters or specifications. These criteria are updated as needed, based on new mainframe projects or evolutions in the understanding of how data must be restricted.
- Workday provides input restrictions similar to the mainframe, with rules set on specific areas of input. These input restrictions do not extend to systems that Workday imports data from. One area of concern for Workday's business users and IT support is the quality of data being imported and processed by Workday.
- The Enterprise Business Information Technology Solutions (eBITS) team, in conjunction with business functions, has implemented processes to verify that data being provided out of Workday meets the intended purpose of the request. These processes consider factors such as data regulatory requirements, institution rules, fairness of disclosure, safety, interpretation risk, reputational risk, and other related policies.
- UT Austin does not have a process to monitor and track data quality trends or KPIs.

Recommendation: Management should develop a strategy and mechanisms to improve and monitor data quality. A data quality strategy is the blueprint used to achieve a perspective of shared responsibility for the quality of data. The adoption of a data quality strategy enables stakeholders to understand the correspondence between organizational objectives, and the benefits of quality data, such as enhanced analytics, more accurate risk management, and improved operations.

The objective of data quality strategy is to ensure that data is fit for purpose and meets the University's needs. The data quality strategy should be designed to facilitate moving from the current state to the target state; it should explicitly align with the University's objectives and drivers and the overall data management strategy.

At a minimum, a data quality strategy should include the components below:

- Define high quality data
- Define a data quality strategy
- Identify critical data and business rules
- Perform an initial data quality assessment
- Identify and prioritize potential improvements



- Define goals for data quality improvements
- Develop and deploy data quality operations

It should also include guidelines related to data profiling, expectations, and rules that help guide data cleansing projects.

Management's Corrective Action Plan: The implementation plan (discussed in observation #1) will include plans for data monitoring.

Responsible Person: Executive Vice President and Provost, Senior Vice President and CFO

Planned Implementation Date: September 2022

Risk Level: High

Observation #4 Data Integration and Interoperability

Data integration and interoperability between systems is performed on an ad-hoc basis. Data integration projects are performed on local data sets without standard data definitions and integration scripts, which limits the ability to achieve repeatable interoperability between systems. Effective data integration addresses data transport and processing (connecting, combining, de-duplication, etc.) from multiple sources into a destination environment. Data integration challenges at UT Austin include diverse data representations from multiple sources, rationalizing business meaning, and the complexity of transformation logic between mainframe systems and more modern systems, such as Workday. Additionally, there is not a common method of data classification used by all CSUs, resulting in misclassification of data across campus. This lack of common definition has resulted in data owners and stewards limiting access to other CSUs out of concern that their data will be misrepresented.

The Information Quest (IQ) UT Data Hub project was created to help centrally manage federated data that is considered critical for reporting purposes. The Data Hub provides business units a platform to build data relations among many different sources of data. IQ does not currently have the number of staff necessary to support integration between data sets, and instead is focusing its efforts on building a repository where data can be managed and interrelated by individual business units.

Cognos reporting tools are utilized for reporting on data from Mainframe Applications. Cognos also utilizes a limited amount of Workday data provided by eBITS. Although this may be considered a form of data integration, the data provided out of Workday is intentionally selected and highly curated by eBITS. The goal of implementing a data integration strategy is to reduce the need for the business to obtain and translate data from multiple sources, and to improve data availability for business processes that require data consolidation and aggregation, such as analytics. Data integration enables source data optimization, the realization of cost savings through centralization, and improved data quality.



Recommendation: Management should develop and follow a standard set of practices and rules for performing data integration activities. Data integration plans should be documented and approved by relevant data owners and include the following:

- Defining Data Integration and Lifecycle Requirements
- Performing Data Discovery
- Documenting Data Lineage
- Profiling Data
- Collecting Business Rules
- Designing Data Integration Architecture
- Designing Data Services or Exchange Patterns
- Modeling Data Hubs, Interfaces, Messages, and Data Services
- Mapping Data Sources to Targets
- Designing Data Orchestration
- Developing Data Services
- Developing Data Flows
- Developing Data Migration Approach
- Developing a Publication Approach
- Developing Complex Event Processing Flows
- Implementing and Monitoring Integrity of Integrations

Management's Corrective Action Plan: The implementation plan (discussed in observation #1) will include plans for integration and interoperability.

Responsible Person: Executive Vice President and Provost, Senior Vice President and CFO

Planned Implementation Date: September 2022

Risk Level: High

Observation #5 Metadata Centralization

UT Austin's federated IT model and inconsistent data management strategy across CSUs has limited metadata management capabilities related to financial, talent management, and student information. Effective metadata enables retrieval, usage, and management of these assets from a variety of sources when housed in a central repository. Metadata management has historically been the responsibility of the various data stewards and deemed an optional activity.

As an example, during the Workday HR and Payroll implementation, the metadata management tool, Data Cookbook, was purchased. The project to document and define the data within Workday using Data Cookbook was discontinued over the course of implementation. Business units utilizing Workday, in collaboration eBITS, have been developing documentation on specific types of data. This documentation includes definitions for types of data in Workday and detailed instructions on the interpretation of data within reports; however, this data is not centrally managed and is designed for specific purposes.



Data stewards and stakeholders acknowledge the need for a central metadata repository that would be accessible and editable by the data subject matter experts. Business stakeholder involvement would help ensure that metadata clearly describes information required for end users and supports the performance of critical processes in the data lifecycle, such as:

- Data sourcing
- Data movement
- Targeting and classification
- Usage (e.g., for reporting and within the system development life cycle (SDLC))
- Governance and control

Recommendation: As part of the overall data management strategy, UT Austin should define a standard process for performing steps in the metadata lifecycle (i.e., create, update, and delete), including the following:

- Identification of relevant stakeholders and their roles
- Definition of data concepts, approved by the business
- Determination of required metadata components and categories
- Selection or building of a common repository for storage, maintenance, and retrieval
- Configuration management and maintenance rules and criteria
- Definition of the metadata strategy
- Understanding metadata requirements
- Definition of metadata architecture
- Application of metadata standards
- Management of metadata stores
- Integration of metadata
- Distribution and delivery of metadata
- Querying, reporting, and analyzing metadata

Management's Corrective Action Plan: The implementation plan (discussed in observation #1) will include plans for metadata centralization.

Responsible Person: Executive Vice President and Provost, Senior Vice President and CFO

Planned Implementation Date: September 2022

Risk Level: High

Scope, Objectives, and Methodology

The scope of this audit included the data governance and data management practices related to financial, talent management, and student information. Procedures performed included walkthrough discussions with key stakeholders, review of available documentation, and limited testing of data governance and control practices. The CMMI Data Management Maturity Model was used in evaluating data governance practices for select CSUs included in scope.



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The objective of the audit was to analyze the following data management principles, and benchmark UT Austin’s processes to those described by best practice data governance frameworks:

- Data Management Strategy—Defines the vision, goals, and objectives for the data management program and aligns stakeholders’ priorities.
- Governance Management—Develops the ownership, stewardship, and operational structure to manage critical university data.
- Metadata Management—Establishes the processes and infrastructure for specifying and extending clear and organized information about the structured and unstructured data assets under management.
- Data Quality Strategy—Defines an integrated, organization-wide strategy to achieve and maintain the level of data quality required to support the business goals and objectives.
- Data Integration—Reduces the need to obtain data from multiple sources and improves data availability for university processes that require data consolidation and aggregation, such as analytics.



Observation Risk Ranking

Audit observations are ranked according to the following definitions, consistent with UT System Audit Office guidance.

Risk Level	Definition
Priority	If not addressed immediately, has a high probability to directly impact achievement of a strategic or important operational objective of UT Austin or the UT System as a whole.
High	Considered to have a medium to high probability of adverse effects to UT Austin either as a whole or to a significant college/school/unit level.
Medium	Considered to have a low to medium probability of adverse effects to UT Austin either as a whole or to a college/school/unit level.
Low	Considered to have minimal probability of adverse effects to UT Austin either as a whole or to a college/school/unit level.

In accordance with directives from UT System Board of Regents, Internal Audits will perform follow-up procedures to confirm that audit recommendations have been implemented.

Report Distribution

- The University of Texas at Austin Institutional Audit Committee
 - Mr. Darrell Bazzell, Senior Vice President and Chief Financial Officer
 - Mr. Cameron Beasley, Chief Information Security Officer
 - Mr. James Davis, Vice President for Legal Affairs
 - Mr. Jeffery Graves, Chief Compliance Officer, University Compliance Services
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