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DATA QUALITY ASSESSMENT: A CASE STUDY ON ASSET VALUATION COMPARISON DATA

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Abstract—*To realize a data-driven organization, good data quality is needed as a foundation for solving various problems related to data management. The case study used in this research is asset valuation comparison data. The purpose of this research is to define dimensions, measure and analyze data quality on asset valuation comparison data. There are three dimensions used in measuring data quality in this study which are adjusted based on existing regulations at Ministry X, namely accuracy, completeness, and validity. This research uses the stages in the Total Data Quality Management (TDQM) framework to measure data quality. The results of measuring all dimensions, 29 out of 58 business rules cannot be fulfilled completely. The business rules that can be fulfilled in each dimension are 47.06% in the completeness dimension, 60% in the validity dimension, and 44.44% in the accuracy dimension. The main factor causing the existence of data attributes that have not met the data quality business rules is because the asset valuation comparison data comes from various data sources. In addition, there are methods or standards for recording data from data source units that are not uniform, so an evaluation of the uniformity of data standardization and the implementation of data governance is needed. The results of this study can be used as material for organizational consideration to be more aware of the current state of data quality. In addition, it can be used by organizations to design strategies and steps to improve data quality so that it can support leaders in making the right decisions.*

Keywords*: asset valuation, data dimension, data quality assessment, data quality.*

Intisari—Untuk mewujudkan *data-driven organization*, diperlukan kualitas data yang baik sebagai fondasi penyelesaian berbagai permasalahan terkait pengelolaan data. Studi kasus yang digunakan dalam penelitian ini adalah data pembanding penilaian aset. Tujuan dari penelitian ini untuk mendefinisikan dimensi, mengukur dan menganalisis kualitas data pada data pembanding penilaian aset. Terdapat tiga dimensi yang digunakan dalam mengukur kualitas data pada penelitian ini yang disesuaikan berdasarkan peraturan yang ada di Kementerian X, yaitu *accuracy*, *completeness*, dan *validity*. Penelitian ini menggunakan tahapan pada kerangka kerja *Total Data Quality Management* (TDQM) untuk mengukur kualitas data. Hasil pengukuran seluruh dimensi, 29 dari 58 aturan bisnis belum dapat dipenuhi secara tuntas. Aturan bisnis yang dapat dipenuhi pada masing-masing dimensi adalah sebesar 47.06% pada dimensi *completeness*, 60% pada dimensi *validity*, dan 44.44% pada dimensi *accuracy*. Faktor utama penyebab adanya atribut data yang belum memenuhi aturan bisnis kualitas data adalah karena data pembanding penilaian aset berasal dari berbagai sumber data. Selain itu, terdapat metode atau standar perekaman data dari unit sumber data yang tidak seragam, sehingga diperlukan evaluasi terhadap penyeragaman standardisasi data dan pelaksanaan tata kelola data. Hasil penelitian ini dapat digunakan sebagai bahan pertimbangan organisasi untuk lebih menyadari kondisi kualitas data saat ini. Selain itu dapat digunakan oleh organisasi untuk merancang strategi dan langkah-langkah perbaikan kualitas data sehingga dapat mendukung pimpinan dalam mengambil keputusan yang tepat.

Kata Kunci*: penilaian aset, dimensi data, penilaian kualitas data, kualitas data.*

INTRODUCTION

Currently, Data Quality Management (DQM) has emerged as a critical issue garnering significant attention from both academics and industry [1]. Data has become one of the most valuable assets for organizations [2]. Companies or organizations that have low data quality may cause fatal mistakes [3].

This has an impact on losses for the organization due to wastage of resources, a negative impact on service performance, and leads to bad decision-making [4]. In addition, research conducted by IBM in 2016 estimated in the United States (US), the impact of poor data quality causes the total annual costs generated can reach more than three trillion US dollars [5].

Data is referred to as "a new oil" because it is considered to provide benefits to the organization in the future [6]. The importance of data quality was also conveyed by the President of the Republic of Indonesia, Joko Widodo, in his state of the nation speech. He said that data is a new type of wealth and valid data is one of the keys to development. Valid data is needed by organizations in planning, preparing budgets/finances, and making policies to execute these policies for effective results [7].

In support of the President's goals, Ministry X began to focus on improving data quality in the organization. There is a book 'Building a Data Culture', by Ministry X which guides organizations in placing data as part of a work culture and is open to change. There are many data sets produced by Ministry X and this is a new mine that must be processed and utilized optimally to be used as a basis for decision making. Therefore, to produce the right data analysis results, good data quality is the foundation that can solve various problems related to data and information management [8].

However, in reality, the regulation regarding data quality in Ministry X is currently still general, meaning that the authority to improve data quality still exists in the Data Producer unit and there is no compelling mechanism to improve data quality. From the results of the gap analysis of Ministry X's data service system, it was found that gaps in the form of governance and data management did not include data quality [9]. Based on the results of an internal survey on technology readiness at Ministry X in the implementation of big data, data quality metrics obtained a score of 1 (one) out of a scale of 5 (five). This low score indicates that Ministry X must immediately make significant improvements in the process of maintaining data quality.

Because data is a crucial asset in an organization and Ministry X policies demand data quality improvement, it is necessary to measure data quality in the existing system at Ministry X. In the implementation of data management, it is necessary to pay attention to data quality which at least includes accuracy, completeness, consistency, reasonability, timeliness, uniqueness, and validity [10].

Valuation is the main supporting process in state property management, management of state receivables, and asset revaluation [11]. Assets valuation is the process of activities to provide an opinion of value on an object of assessment at a certain time. This study measured the quality of assets comparison data in the Valuation Information System. This is a system that supports Directorate valuation in carrying out tasks in the field of assessment [12]. One of the data processed and inputted in the system is comparison object data following the valuation report. Asset comparison object data is very important in the valuation process because it becomes input as analysis material by the valuer team to determine the price or value of an object. Measurement of data quality in asset valuation comparison data is an important thing to do to minimize errors in estimating valuation results.

The purpose of this study is to measure the quality of asset valuation comparison and define dimensions, assessment, and analyze data quality on assets valuation comparison data. This research was conducted to find out what dimensions are used to measure the quality of asset valuation comparison data and to analyze the measurement results to develop recommendations for improving data quality.

There have been several previous studies related to data quality measurement. In papers [13] and [14], the method used for data quality measurement is Total Data Quality Management (TDQM) which involves the dimensions of completeness, validity, and accuracy. On paper [15] Data measurement using a questionnaire distribution method based on a framework for Data Quality Improvement consisting of 8 dimensions, namely 1) data quality expectation, 2) data quality dimensions, 3) policies, 4) data quality protocols, 5) governance, 6) data standards, 7) technology, and 8) performance management. Research [16] performed data quality assessment of the condition monitoring data of power equipment using analytic hierarchy process using four dimensions such as integrity, accuracy, consistency, and uniqueness. Research [17] identifies factors affecting data quality and data quality challenges with PRISMA methods, to further confirm and complement the results of literature reviews with survey and FGD methods.

Based on existing literature studies, several organizations have carried out data quality measurements using various methods and data quality dimensions. Directorate General Y has never carried out a data quality assessment of the data it manages. This shows that there is no research related to assessing the quality of data on state asset object data, especially for asset valuation comparison data.

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This research contributes to providing additional knowledge of data quality or for parties involved in carrying out data quality management. The results of this research provide an overview of the stages in measuring data quality. For organizations, this research provides information on the current condition of asset assessment comparative data quality so that organizations can determine what strategies need to be implemented to improve data quality. Directorate General Y is a government agency that has a large organizational scale, so the results of this study can describe the condition of data quality in the current government and are expected to be useful for organizations that have relevant problems.

This research paper consists of several parts, namely the first part presents the introduction to the research; The second part provides a review of related literature studies; The third section describes the research methodology; The fourth part presents an analysis and recommendations on the results of the study; The last part is the conclusion of the results of the study.

MATERIALS AND METHODS

This research uses three stages of methodology from Total Data Quality Methodology (TDQM), such as definition, measurement, and analysis [18]. The fourth stage of improvement cannot be done because the improvement process needs a further design process and approval from policymakers. This study's stages in managing data quality also adopt steps from [14]. An overview of the methodology used in this study is described in Figure 1.

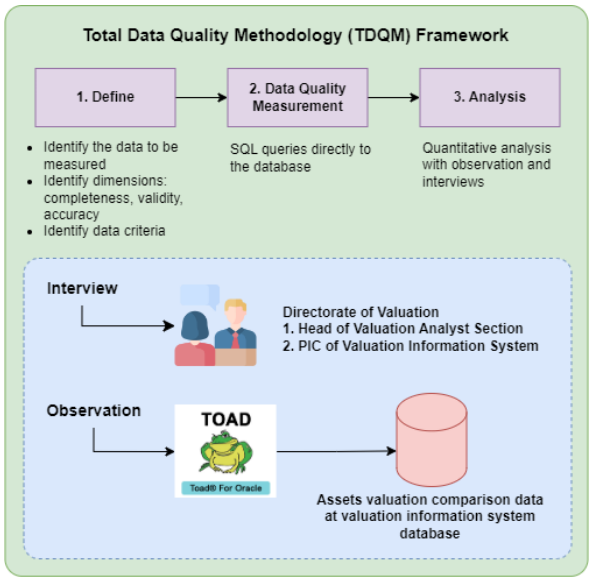

Figure 1. Research Materials and Methods Diagram

The stages carried out in this research are as follows:

1. The first step is to define where identification is made of the data you want to measure, the dimensions that will be used to measure data quality, and the criteria used in each dimension. The measured data is transaction data that moves in the database of asset valuation comparison data. The dimensions used to measure data quality are three dimensions, namely completeness, validity, and accuracy, which refer to the provisions of Ministry X's data governance [10]. Furthermore, this stage is carried out through interviews with data owners and observation of the comparison data valuation information system database.
   Interviews were conducted with data owners from the Directorate of Valuation, namely the Head of the Assessment Analyst Section and the staff of the Assessment Analyst Section as the PIC responsible for the use of the asset valuation comparison data application. The interview was conducted semi-structured with open-ended questions to get more depth information [19] to the dimensions studied based on the data available in the comparison data valuation information system. Based on the results of the interview, a list of business rules on each dimension will be measured in the next stage. The list of defined business rules and the results of their analysis are described in more detail in the next section. In addition, observations were also made to the information system database to find out the table structure and attribute details in the assets valuation comparison database.
2. The second step is the measurement of data quality by querying directly based on criteria defined on each dimension. Measurement of the quality of asset valuation comparison data is carried out by querying directly using Structured Query Language (SQL) on the information system production database using the help of the TOAD for Oracle application. This valuation information system is a web-based application that uses Oracle databases. Based on the identification results in the previous stage, the data processed are auction comparison data, Regional Government comparison data, and National Land Agency comparison data in 2020 – 2022 in the Valuation Information System.
3. The third step is analysis. Data quality measurement results are analyzed to determine the cause of anomalies in the data stored in the database. Analysis of the causes of

data quality problems is carried out by observing the database and interviewing IT staff who are responsible for the valuation information system. Analysis of data quality measurement is carried out through quantitative methods based on the results of the query in the previous stage by comparing the amount of data that does not meet the business rules with the total rows present in the attribute.

RESULTS AND DISCUSSION

Based on the identification results by conducting interviews with data owners and observations to the system database, three entities were used in this study. The three entities measured are entities that have moving transaction data, namely auction comparison data, Regional Government comparison data, and National Land Agency comparison data.

The dimensions used to measure data quality are three dimensions, namely completeness, validity, and accuracy, which refer to the provisions of Ministry X's data governance [10]. Based on the dimensions that have been determined, business terms are described Then the measurement of data quality used is to run a query using the Toad for Oracle application which is directly connected to the information system database. The number of entities used in the measurement is three entities out of the 16 entities available on the Valuation Information System database.

Comparison Data in the Valuation Information System is used by the Directorate of Valuation, Directorate General Y, as the data owner and data user to store comparison object data in the assessment process. Comparison object data becomes input for analysis material by the valuer team in determining the price or value of an object.

This measurement is done by seeing whether the data stored in the valuation information system meets the business rules of each specified dimension or has not met the specified rules. From the measurement results in this study, it can be seen that there are business rule criteria that can be met, and there are some criteria that cannot be met, as described in the summary of data quality calculation results in Table 1.

Table 1. Summary of Data Quality Calculation Results

Dimension	Business rules are met		Business rules are not met	
	Total	%	Total	%
Completeness	16	47.06	18	52.94
Validity	9	60	6	40
Accuracy	4	44.44	5	55.56

Based on Table 1, it can be seen that in the completeness dimension, the business rules that can meet the conditions are 47.06%. In the dimension of validity, the business limit that can be fulfilled is 60%. In the accuracy dimension, the business rules that can be met are 44.44%. The results of calculating data quality in each dimension and analyzing the problems encountered are discussed in more detail in the next section.

Table 2. Completeness Dimension Calculation Results

Attribute Code	Total Row	Incomplete Row	% Incompleteness
C1	196140	0	0.00
C2	196140	0	0.00
C3	196140	0	0.00
C4	196140	0	0.00
C5	196140	0	0.00
C6	196140	0	0.00
C7	196140	123523	62.98
C8	196140	0	0.00
C9	196140	1280	0.65
C10	2601847	0	0.00
C11	2601847	0	0.00
C12	2601847	0	0.00
C13	2601847	1852330	71.19
C14	2601847	0	0.00
C15	2601847	163	0.01
C16	2601847	35741	1.37
C17	2601847	548	0.02
C18	2601847	101	0.00
C19	2601847	877620	33.73
C20	2601847	877620	33.73
C21	2601847	0	0.00
C22	6758	0	0.00
C23	6758	3920	58.01
C24	6758	0	0.00
C25	6758	0	0.00
C26	6758	0	0.00
C27	6758	237	3.51
C28	6758	855	12.65
C29	6758	855	12.65
C30	6758	855	12.65
C31	6758	855	12.65
C32	6758	13	0.19
C33	6758	12	0.18
C34	6758	6449	95.43

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A. Calculation on the Completeness Dimension

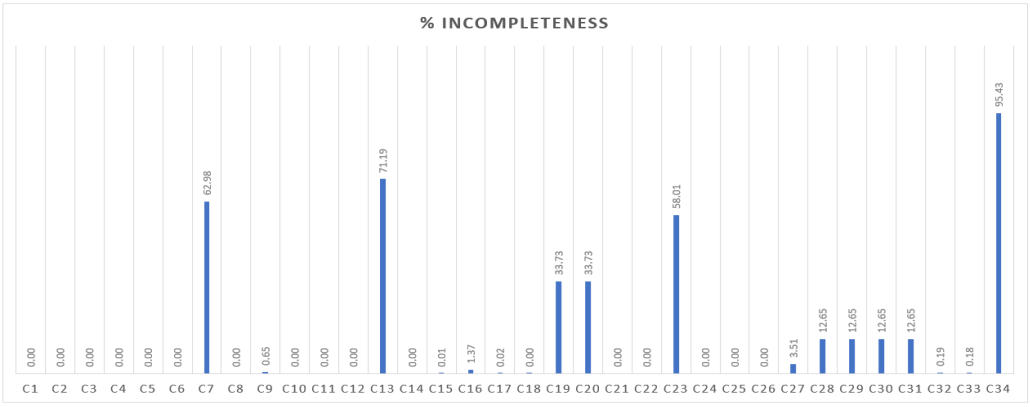

Figure 2. Graph of Percentage Incompleteness Attribute in Assets Valuation Comparison Data

The calculation of the completeness dimension in this study aims to determine the existence of data anomalies in the form of attributes that are expected to exist in the asset valuation comparison data. In this study, there were 34 mandatory attributes recorded in the system database. If the attribute is empty and contains nulls or spaces, it is grouped into attributes that do not meet the conditions.

These mandatory attributes are collected based on observations in asset valuation comparison data tables and interview results to find out what attributes are following business needs. The three groups of data used include comparison data derived from the Indonesian Auction application, Regional Government comparison data, and National Land Agency comparison data. Mandatory attributes in the auction comparison data such as item type, auction category, auction type, regional unit, province, district, limit price, selling price, and description. Attributes in the regional government comparison data such as object type, land area, building area, year of procurement, address, province, district, subdistrict, urban village, price, price per meter, and certificate. Examples of attributes in National Land Agency comparison data such as land office, address, sub-district, output, area, deed value, deed date, transaction year, transaction type, type of right, latitude, and longitude.

Based on the results of data quality calculations for the completeness dimension as shown in Figure 1, out of 34 mandatory attributes, 16 attributes (47.06%) meet the criteria for completeness. These attributes include Item Type, Auction Type, KPKNL, Province, City, Limit Price, Auction Date, Land Office Name, Subdistrict, Kelurahan, Right Type Name, Deed Date, Data Year, Object Type, Land Area, and Procurement Year. A recapitulation of the results of the completeness dimension calculation can be seen in the graphic image of **Error! Reference source not found.**. Based on the figure, 18 data attribute attributes do not meet the completeness dimension criteria. The higher the percentage number, the more incomplete the data you have. If the calculation of the data on the attribute is filled in completely, then the data displayed on the graph is 0%. If the data on an attribute is increasingly incomplete or even empty, then the graph will display a higher percentage value up to 0% if the attribute data is empty.

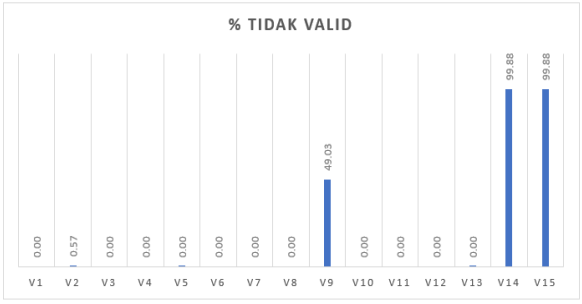

Figure 3. Graph of Percentage of Validity Attribute in Assets Valuation Comparison Data

B. Calculation on the Validity Dimension

The calculation of data quality on the validity dimension aims to find out whether there is anomalous data that is inconsistent with the domain value that has been determined. The business rules used to calculate this dimension are as many as 15 criteria. Here are some examples of criteria used in dimension validity calculations:

1. The Auction Item Type is one of Movable, Immovable and Combined
2. The value of the selling price is more than the value of the limit price
3. The area of the land or building must be numeric, must not contain foreign letters or characters

4. If the object is Land, then the land area must be greater than 0
5. If the object is Land and Buildings, then the land area and building area must be greater than 0
6. Transaction year should not be more than 2023
7. Types of Rights must be Right to Use, Right of Ownership, Right of Unit of Flats, Right of Use, Right to Land, Right of Endowment, Right to Build
8. Latitude and Longitude values using a point separator (.)

Details of the validity dimension calculation results are described in Table 3. For graphs, the results of measuring data validity based on these criteria are depicted in Figure 3.

From the graph shown in Figure 3, it can be seen that of the 15 calculation criteria specified in this dimension, 6 (40%) criteria do not meet the criteria of the validity dimension. The higher the percentage, the more data does not fit the validity criteria. These attributes are Auction Type, Auction Date, Object Type, Rights Number Format, Latitude value format, and Longitude value. Of the 6 criteria, there are three dimensional criteria that have a significant percentage, and the other three criteria tend to be very small and the value is below 1%.

Table 3. Validity Dimension Calculation Results

Code	Validity Rule	Total Row	Invalid Row	% Invalid
V1	Type of object (immovable, movable, combined)	196140	0	0.00
V2	Types of Auctions (Compulsory Non-Execution Auctions of Property, State/Region, Compulsory Non-Execution Auctions Other Than State/Regional Property, Execution Auctions Other Than Seized Goods for the State, Voluntary Non-Execution Auctions, Execution Auctions of Seized Goods for the State)	196140	1119	0.57
V3	The Auction Sale Price Value must be greater than the Auction limit price Value	196140	0	0.00
V4	The Limit Price and Sell Price must be numeric	196140	0	0.00
V5	The Auction Date must not be later than May of 2023	196140	1	0.00
V6	Years and months should not be more than May 2023	6758	0	0.00
V7	Land and Building Area must be numeric	6758	0	0.00
V8	Price per meter and Gain must be Numerical	6758	0	0.00
V9	If the object is Land or Land and Building, the certificate types are SHGB, SHM, and SPJB	5548	2720	49.03
V10	Transaction year should not be more than 2023	2601847	0	0.00
V11	Types of Rights must be Right to Use, Right of Ownership, Right of Unit of Flats, Right of Use, Right to Land, Right of Endowment, Right to Build	2601847	0	0.00
V12	The area must be numeric	2601847	0	0.00
V13	The Rights Number consists of 14 digits in numeric form	2601847	3	0.00
V14	The Latitude (Y) value should use '.' as the separator	1727076	1725012	99.88
V15	The Longitude value (X) should use '.' as the separator	1727076	1725012	99.88

The criteria that have high invalidity data are for latitude value format (V14) and longitude value format (V15) because currently the format used to store data is in the form of characters. This causes many decimal separators to use the comma symbol (,), whereas in the business rules for the decimal format, the separator used is a period (.). A detailed description of data anomalies against specified criteria is described in Table 4.

Table 4. Description of Data Anomalies in the Validity Dimension

Code	Description of Data Anomaly
V2	It does not contain auction-type data
V5	There is one line where the auction date of the auction is more than the date of execution of the *query*
V9	Data contains characters or words other than those specified
V13	The Right Number is not exactly 13 digits
V14	Data using a comma separator (,) at the decimal value of latitude coordinates
V15	Data using a comma separator (,) at the decimal value of *the longitude coordinate*

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C. Calculation on the Accuracy Dimension

The accuracy dimension is used to ensure that data stored on the system has precise, consistent, and unambiguous values. To find out the quality of this dimension is to compare existing data with predetermined rules. The rules used in this study amounted to 9 criteria provisions taken from document analysis. The criteria for this dimension measurement include the following:

1. Year no later than 2023
2. If the Object Category is Car or Motorcycle, then the type of item is Movable goods
3. If the type of 'Immovable' item is land/building, then there must be an Area
4. If the type of goods is 'Moving' a motorcycle, then there must be details of the name of the item, proof of ownership of BPKB, year
5. If the Object is Land, then the Land Area must be greater than 0
6. If the Object is Land and Buildings, then the land area and building area must be greater than 0
7. The 9th digit of the Entitlement Number must be between 1,2,3,4,7,8
8. The Latitude value must be between -90 to 90
9. Longitude values should be between -180 to 180

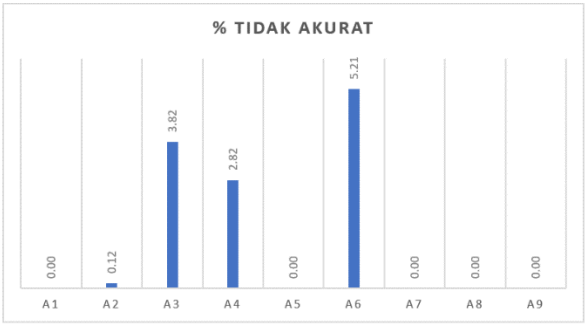

Figure 4. Accuracy Attribute Percentage Graph on Asset Valuation Comparison Data

The calculation results on the accuracy dimension are shown in Figure 3. Of the 9 criteria calculated on the accuracy dimension, there are 4 (44.44%) criteria that have met the provisions on the accuracy dimension. The four criteria are the land area of the land object, the provision of digits on the right number, and the provision of latitude value and longitude value.

Table 5. Accuracy Dimension Calculation Results

Code	Accuracy Rule	Total Row	In-accurate	% In-accurate
A1	The year of input should not be more than 2023	196140	1	0.00
A2	If the Object Category is Car or Motorcycle, then the type of item is Movable goods	42152	51	0.12
A3	If the type of 'non-moving' object is land/building, then there must be an Area	110729	4227	3.82
A4	If the type of goods is 'Moving' a motorcycle, then there must be details of the name of the goods, proof of ownership of BPKB, year	42152	1188	2.82
A5	If the Object is Land, then the Land Area must be greater than 0	5548	0	0.00
A6	If the Object is Land and Buildings, then the land area and building area must be greater than 0	1209	63	5.21
A7	The 9th digit of the Entitlement Number must be between 1,2,3,4,7,8	2612042	0	0.00
A8	The Latitude value must be between -90 to 90	2064	0	0.00
A9	Longitude values should be between -180 to 180	5	0	0.00

Data anomalies that occur in this dimension tend to be small with the highest percentage of anomalies being in criterion A6 with a value of 5.21%. The results of a detailed explanation related to anomalies in the accuracy dimension are described in Table 6.

Table 6. Description of Data Anomalies on the Accuracy Dimension

Code	Description of Data Anomaly
A1	Input year above 2023
A2	There is a data mismatch between the object category and the type of item. For example, object data with auction lot id 397902 has a value of the type of immovable goods, but in the object category is a car
A3	Area data is not listed in the object description data
A4	Proof of ownership data is not listed in the object description
A6	Building area data 0, there may be errors when selecting object types

D. The Causes of Data Quality Issues Analysis

The cause of the problem is done by tracing back to the source of the data flow [14]. Analysis of this problem was carried out by observing the database and conducting interviews with data

owners and computer institutions from the Directorate of Transformation and Information Systems as the developer of the valuation information system. Based on the results of the analysis, the causes that affect the quality problems of this asset valuation comparison data include:

1. Asset valuation comparison data comes from various sources, for example, some are sourced from the Indonesian Auction application, and data from the Regional Government and the National Land Agency. This leads to differences in data structures. For example, in the Auction data, the object's location is described in the Description column, but in the National Land Agency data, the auction location has its column.
2. Because of the different data sources, this also causes the stored data standards to have different formats. In Auction comparison data and regional government comparison data, there is no data standard for storing the coordinates of an object. However, National Land Agency data has standard longitude and latitude coordinates. The format of this coordinate data is also not uniform, some use the comma symbol (,) as a separator, and some use the dot symbol (.).
3. There are differences in the data collection process of data sources [20]. Auction comparison data and National Land Agency data are obtained by integrating directly with the relevant data provider APIs. Meanwhile, in the regional government comparison data, the data is manually inputted by the user as the person in charge of the regional government from all over Indonesia inputs the data to Ms. Excel and sent to the Directorate General Y head office. The person in charge at the Directorate General Y head office inputs the data into the system based on Ms. Excel data provided by the regional government. This causes the data field format in the column to be non-uniform, especially in inputting object address data. In addition, 9 out of 13 attributes of regional government comparison data do not meet the completeness requirements. This is due to the absence of mandatory attribute verification because the user manually inputs it.
4. Longitude and Latitude coordinate data in National Land Agency comparison data are stored in character format. This causes a difference in the use of separators in storing coordinate values.

E. Research Implication

Based on the results of data quality calculations from predetermined dimensions, this research has theoretical implications in the field of data management, especially in the field of data quality. Some of the theoretical implications of the results of this study include::

1. Data quality measurement using stages in the TDQM method can provide information about how many data attributes do not meet the data quality rules in asset valuation comparison data. This information can be used as material for organizations to develop strategies to improve data quality.
2. Data obtained from different sources causes differences in the structure and format of data storage. Differences in the data collection process also cause a non-uniform data file format.
3. Data types that do not follow the provisions cause differences in data values that can affect the reporting and analysis process at a later stage.

In addition, the practical implications arising from this research are that it can generate input for organizations to develop strategies to improve data quality on data attributes that have not met data quality rules through several recommendations as follows:

1. Create and equalize standardized data formats for each attribute [9], especially for object location data and object coordinates.
2. Monitoring and cleansing data regularly.
3. Evaluate the flow to get data from the Regional Government because currently, it is still sending data in Ms. Excel and .pdf formats. We recommend adding a data recording form feature to the comparison data assessment information system along with input validation on the form.
4. Evaluate data governance activities regularly to support continuous improvement of data quality [9].

CONCLUSION

This research uses three stages of TDQM methodology, namely defining, measuring, and analyzing the quality of assets valuation comparison data. Based on the provisions on data governance of Ministry X, The dimensions used in this study are completeness, validity, and accuracy. Based on the calculation of data quality results carried out on the assets valuation comparison data, on the completeness dimension, 16 out of 34 (47.06%) met the data completeness requirements. On the validity dimension, 9 out of 15 (60%) rules are met. In the accuracy dimension, 4 out of 9 (44.44%) provisions are following the specified rules. Several problems affect the quality of asset valuation comparison data based on the results of calculations in this study.

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These problems include that there are still some mandatory attributes that have empty data values, invalid data, and there are some data that do not follow the provisions.

From the results of the analysis of these problems, there are root causes, such as no standard provisions in determining the format of data and the data collected coming from various sources, there is no special PIC that monitors data management that can have an impact on the quality assets valuation comparison data. This research is expected to provide benefits for organizations to find out the current condition of data quality of assets valuation comparison data. With the corrective steps taken by the organization, the quality of data can be improved so that the organization in the future can get better benefits and support Ministry X in realizing an organization that runs based on data.

The data quality assessment conducted in this research was limited to comparative data on asset assessments in the assessment information system for the last five-year period. Several data entities in the assessment information system have not been assessed due to time constraints and permission to use the data from the organization.

For future research, the researcher can use the fourth stage (improvement) in TDQM methodology to make a strategy for data quality improvement. Not only limited to asset valuation comparison data, because currently Directorat General Y stores and produces data from various business processes in it. In addition, further research can use more dimensions, following the provisions set by Ministry X to be able to conduct deeper analysis and produce better data quality improvement strategies.

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