Data - A New Emerging Type of Intangibles
--- How Can Accounting Standards Face this Challenge?

ABSTRACT

In the digital economy era, the role of data resources in corporate development is increasingly prominent. The accounting treatment of corporate data resources is an urgent issue to be studied. Based on the economic value creation characteristics of corporate data resources in the digital economy, we propose that qualified corporate data resources could be classified into internal-used data assets, tradable data assets and strategic value data resources. We propose recognising the first two types of data assets in the financial statements using the conditional recognition method, and a mixed measurement model could be adopted in the subsequent measurement period. We propose to enhance the disclosure of strategic value data resources. More granular information about this type of data resource can be disclosed in a separate narrative report. The reporting entity is encouraged to disclose more information about the characteristics of data assets, the value-creation path of data assets, and risks related to data assets. Moreover, it is essential to build support mechanisms to facilitate the accounting treatment of corporate data assets, such as data assets cost input ledger booking system, data asset external evaluation services, data asset audit service and data trusteeship services. Our study intends to establish a coherent set of data asset accounting standards and is helpful for IASB to revise its intangible assets accounting standards (IAS 38).

Keywords: *Intangible asset standards; IAS 38; Data Resource; Digital economy.*

1. Introduction

In the contemporary digital era, the digital economy plays an increasingly pivotal role in the socio-economic development of the global community. A specific category of corporate intangibles[1], corporate "DATA resources" play an important role in formulating corporate value. This type of intangibles is often a critical driver of corporate performance and a significant contribution to corporate value in the digital era. However, it is not reflected as an individual accounting line item in the financial statements, particularly for internally generated corporate DATA.

Traditionally, the accounting treatments of intangibles predominantly encompass how to recognise expenditures on patents, intellectual capital (copyrights), research and development, customer relations, marketing, brand and reputation, and human capital. However, with the rise of the digital economy, value creation models driven by DATA resources are on the increase, and corporations with data-driven business models are playing more important roles in the economy. Various surveys and research endeavours[2] show the escalating interest of primary users of financial reports in obtaining information and insights into the value of corporate intangibles, including DATA resources. In essence, existing studies also suggest that the current accounting treatment of data is facing significant challenges alongside developments in digital economies; nonetheless, due to the complexity of the mechanisms yielding economic benefits, and ownership (control rights), and the challenges in reliably measuring their value, it is challenging to recognise internally generated intangibles, including DATA resources, as assets in financial statements.

[1] We follow the FRC (2019) working definition of 'intangibles': Intangibles are intangible factors that are important to an entity in its value creation, whether or not they are secured by legal means and whether or not they meet the current definition of 'assets'.

[2] See the Literature review part for a more detailed review of relevant research papers.

To strike a balance between the accounting principles of *value relevance* and *measurement reliability* (also referred to as *faithful representation*) with respect to the accounting treatment of intangibles, one group of views advocates the principle of "*Enhanced Disclosure*" to address these challenges. The argument posits that the inherent uncertainty of their ownership rights, the uncertainty of their measurement reliability, and the uncertainty of their economic value creation process render their accounting recognition unfeasible under current standards. They propose that, for the accounting treatment of corporate intangibles, it is realistic to provide more disclosure, such as using a narrative report, rather than to recognise them as (intangible) assets in the financial statementss (FRC, 2021; AASB, 2022). Primary users of the financial reports can leverage relevant disclosure to better value the entity. The IASB, in its Practice Statement Management Commentary (IASB, 2021), also recommends that management teams disclose their business models, value creation strategies, and significant economic resources in the management commentary section to enhance the value relevance of financial reporting.

Another group of views supports applying the "*Enhanced Recognition*" principle to address these challenges. This perspective proposes amendments to existing accounting standards, primarily IAS 38, to allow more internally generated intangibles to be recognised on the financial statements. Advocates for the enhanced recognition approach posit that, in the context of the rapid global development of the digital economy, intangibles (such as data resources) have become key production factors for corporations, essential bases for the business decision-making process, and crucial constituents of corporate value. Accounting practices should respond more proactively to these challenges. By recognising more internally generated assets, including DATA, in the financial statements, reporting

entities can strengthen the objective of financial statements to reflect the corporation's economic nature and, more importantly, enhance the value relevance of financial reports.

However, a lack of independent corresponding accounting standards for corporate data resources presents significant challenges for reporting entities attempting to recognise data resources as an accounting “asset” in financial reports. If financial reporting is to be have as high a level of decision usefulness as possible in the context of the rapid evolution of the digital economy and, it is important to undertake comprehensive research on the accounting treatment of corporate data resources. In this paper, we aim to address the following research questions:

1) How can DATA resources yield economic benefits for reporting entities?

2) Why is information concerning corporate DATA resources necessary/material for primary users of financial reports?

3) In balancing the relevance and reliability criteria, should reporting entities recognise internally generated DATA resources as intangible assets or provide more comprehensive disclosure instead?

4) How do reporting entities currently present and disclose relevant information on DATA resources in their financial reports?

5) What challenges do accounting standards confront in better reflecting the economic essence of these intangibles, and what prospective amendments should be considered for accounting standards in the future?

The remainder of this paper is organised as follows. Section 2 discusses related literature. Section 3 analyses the current accounting treatment of corporate data resources and challenges for current accounting standards considering the unique nature of data assets and develops our research

questions. Section 4 provides a comprehensive framework for the accounting treatment of DATA assets, including classification, recognition, measurement, presentation, and disclosure of corporate data resources. Section 5 discusses potential future research directions, and Section 6 concludes the paper.

2. Literature Review

Academic research in accounting shows that the value relevance of traditional accounting information in the new economy is gradually deteriorating. The correlation between stock prices (returns) and critical financial information (such as earnings, asset, and cash flow information) is declining, indicating that the explanatory power of financial statements for corporate value is gradually deteriorating (Beyer et al., 2010; Srivastava, 2014; Lev & Gu, 2016). Quite often, the market capitalisation of new economic entities is much higher than their book value, partly because current GAAP does not allow the recognition of many internally generated intangible assets.

Beyer et al. (2010) find that numerical (quantitative) information on financial statements explains only 28% of quarterly stock return variability. Srivastava (2014) shows that due to the increase in the proportion of intangible assets of newly listed companies, the ability of earnings information to predict future performance is declining. Lev and Gu (2016) find that as expenditures on intangible assets increased yearly, the correlation between the corporate market value and accounting book values continued to decrease.

Academics propose two main reasons for the decline in the value relevance of financial reports (Lev, 2018, 2019; Hoogervorst, 2017). First, since existing accounting standards do not allow the recognition of a large number of intangibles generated within the corporation as assets, financial reporting does not fully recognise some important economic resources on the balance sheet, which are vital to the entity’s value-creation process, for example, some of the internally generated intangibles.

Therefore, the value relevance of accounting information is facing severe challenges. Secondly, the assets and liabilities measured by the fair value method encompass more management estimates and judgments, which might result in errors and noises in the measurement of earnings and asset values in financial reports, reducing the value relevance of financial information.

Research studies are mainly conducted in two areas to improve the value relevance of financial reporting on users' decision-making processes. One group of studies focuses on improving the general presentation of financial statements; they try to boost the amendments to accounting standards, especially the revision of the "Asset" concept in the balance sheet. For example, they argue that in the context of the rapid development of the digital economy and the rapid accumulation of data within the entity, it becomes an urgent theoretical and practical issue to study how to recognise DATA in the financial statements.

On the other hand, the other group of studies focuses on improving information disclosure in financial reports. IASB and US SEC require companies to disclose more information about value-driving (?) economic resources, business models, business relationships, and potential risks (IASB, 2021; SEC, 2003). A relevant report, "Better Information Disclosure on Intangible Assets" (EFRAG, 2021), shows that significant information asymmetry concerning specific types of intangible assets between financial report preparers and users may affect the market value of the entity, resulting in inefficient allocation of capital and making it difficult for management to perform fiduciary duties.

Improving accounting treatment for intangibles is on the agenda of IASB's work plans between 2022 and 2026. In 2022, after IASB completed its third agenda consultation, the revision of IAS 38 is considered one of the most important research projects in the next five years. Attention to intangible asset accounting issues from standard setters is increasing. Various standard-setting bodies and

research institutions are also strengthening their research on issues related to intangibles; they have put forward some preliminary proposals for future discussion. The European Financial Reporting Advisory Group (EFRAG), Australia Accounting Standard Board (AASB), Korean Accounting Standard Board (KASB), FRC (Financial Reporting Council), and the UK Endorsement Board (UKEB) are undertaking research projects on this topic to contribute to the debate.

Some research actively proposes to improve the disclosure of the specific intangible assets generated within the corporation. Korean Accounting Standards Board (KASB, 2019), the UK Financial Reporting Council (FRC, 2019), the European Financial Reporting Advisory Group (EFRAG, 2021), and the Australian Accounting Standards Board (AASB, 2022) have carried out some pioneering explorations in this regard. KASB (2019) recommends that, to disclose better intangible assets, which are the main drivers of a corporation's value, the reporting entity could provide a separate description of "core intangible assets" in the notes to the financial statements.

The UK Financial Reporting Council (FRC, 2019) discusses why intangible assets cannot be sufficiently reflected in financial statements. It argues that the measurement of internally generated intangible assets using fair value models may increase noise in the financial statements, as well as audit risk. The UK FRC recommends that reporting entities provide information on expenditures not recognised as intangibles. FRC also recommends disclosing intangible assets outside financial reports, such as via narrative reporting. The EFRAG, in its discussion paper, "Intangible Resources Reporting Literature Review" (EFRAG, 2020), states that "there is substantial evidence that the macroeconomic phenomenon of intangible asset investment has become quite prominent, marking the arrival of a new phase of "capitalism without capital", that a corporate's market value tends to be increasingly driven by the intangible assets it generates rather than tangible assets, but the value relevance of financial

statements is declining as financial statements reflect a significant lack of information about intangible assets.”

In the EFRAG discussion paper, “Better Information on Intangible Assets” (EFRAG, 2021), EFRAG proposes to divide intangible assets into three categories: the first category includes intangible assets controlled by the reporting entity with relatively clear ownership and can be bought and sold, including marketing-related intangible assets and technology-based intangible assets; The second category includes intangible assets controlled by a reporting entity, but its well-defined and legally protected ownership may not exist, and the trading market in which the asset locates is imperfect or non-existent; The third category includes intangible assets with little control from the entity and no trading market, including intangible assets related to specific personnel and intangible assets related to customer relationships. Different options for recognising internally generated intangible assets are also evaluated in this report.

The Australian Accounting Standards Board's “Intangible Assets: Reducing Financial Statement Information Gaps through Improved Disclosure” (AASB, 2022) focuses on improving the disclosure of various unrecognised internally generated intangible assets critical to achieving corporate strategic objectives. It emphasises that the objective of the disclosure is to provide principal users of financial statements with information to evaluate the current and expected financial impact of material intangible assets on management’s fiduciary responsibilities. Possible ways of disclosures are also discussed in this discussion paper. On August 21, 2023, China’s MOF issued the “Provisions on Accounting Treatment of Corporate Data Resources (trial version)”, which tentatively allows Chinese firms to follow IAS 2 (Inventory) and IAS (intangibles) to recognise and disclose corporate DATA resources in their financial statements from the year 2024

In conclusion, in the context of the digital economy, properly presenting data assets in financial statements and adequate information disclosure might help financial report users better understand the corporate value creation model and evaluate corporate value better. However, whether the accounting treatment of corporate data resources in financial statements should be based on the principle of enhanced disclosure or enhanced recognition is still open to debate. There will be ongoing debates over the "measurement reliability" and "value relevance" of intangibles, and research in this field needs to be accelerated.

3. Challenges in Accounting Treatment of DATA and Research Questions Development

3.1 Challenges in Accounting Treatments of DATA Resources

To analyse the complexities involved in the related accounting treatments, our research starts from the accounting perspective, looking at potential issues from the accounting concepts outlined in the IFRS conceptual framework (2018).

According to the IFRS Conceptual Framework (2018), the definition of "Asset" includes the following conditions:

1) "An asset is a present economic resource controlled by the entity as a result of past events."

2) "An economic resource is a right that has the potential to produce economic benefits."

3) "An entity controls an economic resource if it has the present ability to direct the use of the economic resource and obtain the economic benefits that may flow from it."

4) "Intangible assets refer to identifiable nonmonetary assets without physical form owned or controlled by an entity."

Hence, for assets to be recognised on the reporting entity's balance sheet, they should be "resources formed by past transactions or events of a corporation, owned or controlled by an entity, and expected

to bring economic benefits to the entity". The IASB further defines the nonphysical resources of an entity outside the scope of recognition of existing intangible assets as "specific intangible assets". Since corporate DATA are nonmonetary and lack physical form, it is reasonable to categorise them as specific intangible assets if they meet the asset definition and are recognised in the financial statements.[3]

Under the accounting definition of assets, for intangibles to be recognised as assets, they must fulfil specific conditions: (1) the economic benefits related to the intangibles are likely to flow into the entity in the future; (2) the reporting entity must possess controlling rights over the intangibles; and (3) the value (costs) of the intangibles must be reliably measurable. Only when intangibles meet these principles of *identifiability*, *controllability*, and *measurability* simultaneously can they be recognised as intangible assets on the balance sheet.[4]

Corporate data resources present distinctive challenges for their accounting treatment due to their unique characteristics. Challenges manifest primarily in three areas: (1) the complexity of their mechanism to create economic value; (2) the complexity of their legal ownership (especially ownership rights); and (3) the complexity of their value measurement (especially the reliability of valuation models). In the next section, we discuss and provide insights into these challenges.

3 Suppose the corporation's objective in holding relevant data resources is to sell them to external entities, constituting a routine business activity. In that case, these data resources should be recognised as part of the corporate's inventory when meeting the definition and recognition conditions of inventory. However, as previously mentioned (have they been?), such business activities to sell data resources are uncommon for the time being, due to regulatory or technological constraints, and this accounting treatment will not be delved into in detail in this report.

4 On August 21, 2023, China's Ministry of Finance (MOF) issued the "Provisions on Accounting Treatments of Corporate Data Resources (trial version)", which allows and instructs Chinese corporations to use IAS 2 (Inventory) and IAS 38 (intangibles) standards to present and disclose corporate DATA resources in their financial statements from the year 2024.

3.2 How can DATA Resources Create Economic Benefits for Reporting Entities?

Regarding the first challenge, under the IASB's "Conceptual Framework for Financial Reporting" (2018), IASB no longer requires a high probability of obtaining potential economic benefits for asset recognition. With the development of the digital economy, corporations can derive economic benefits from data resources through two broad value creation models: "*industrial digitisation"* and "*digital industrialisation"*.

In the context of "*industrial digitisation*", traditional industries leverage digital elements, such as data and digital technologies, to enhance future economic benefits and improve competitiveness—a model referred to as a "*Data Enhanced Model."* Under this model, the inflow of economic benefits from data is primarily manifested in utilising data resources, in conjunction with other resources, to enhance operational efficiency, support product productions, optimise operational or management activities, increase revenue, reduce costs, strengthen relationships with stakeholders, and improve the quality of existing products, among other aspects. The following examples illustrate potential mechanisms for corporations to attain economic benefits through "*industrial digitisation*."

1) Mechanism 1: Improve Operating Efficiency and Productivity

Data-driven decision-making processes can enhance operating efficiency by providing real-time, more accurate, and detailed information on operational processes. This approach assists corporations in optimising cost structures or increasing productivity through informed decision-making.

Illustrative Example 1: During the routine operation of a power grid for many years, corporation A accumulates and forms the relevant database of user corporates' electricity consumption and creates a data analysis tool of electricity consumption, which can form more accurate forecasts of future electricity consumption trends through the historical analysis of electricity consumption in different

seasons, different periods, different geographical areas and other dimensions. The database and analysis tool can be used for its operation and management activities, such as setting up new power facilities and scheduling power distribution networks more reasonably, which is conducive to improving the operation efficiency of corporation A.

Illustrative Example 2: During the past production process of a chemical product, chemical corporation B has accumulated data about raw material inputs, the chemical reaction process and the product refining process under a specific production process and further processed the data to create a data model which can be used to optimise its production and increase production efficiency significantly.

2) Mechanism 2: Better Understand Customers' Needs

Analysing customer-related data enables corporations to uncover hidden patterns, trends, and correlations, facilitating a better understanding of customer needs. This data-driven model helps corporations adjust to market trends, develop new products and services, and gain a competitive edge in product or service innovations.

Illustrative Example 3: E-commerce corporation C collects and analyses users' APP browsing behaviour (after informing users and obtaining users' authorisation). In combination with the external purchase of auxiliary data such as consumption levels and trends in some regions, it integrates and forms an intelligent recommendation algorithm tool, which is used to personalise product recommendations in line with the corporation's interests and users' preferences, and data, together with the algorithm tools, significantly improve the level of refinement and personalisation of the recommendation. As a result, it significantly increases corporate sales volume.

In the context of "*digital industrialisation*," which pertains to new-economy industries, corporations base their strategies on data and new digital technologies, such as artificial intelligence, cloud computing, and big data algorithms. For corporations operating under "*digital industrialisation*," the value creation processes of data become a core element of their business strategy and an essential constituent of their business model—a model referred to as a "*Data Enabled Model*." The following examples illustrate potential mechanisms for corporations to derive economic benefits through "*digital industrialisation."*

3) Mechanism 3: Data as a Value-added Service/Product

Corporations utilise data resources to provide unique services to other entities. In this case, Data becomes an indispensable resource to their business model and contributes additional sources of income to corporations.

Illustrative Example 4: Credit rating corporation D generates its core product, the credit rating (score), based on data collected along various dimensions and combined with the proprietary data algorithms developed by the corporation. Their corporate strategic *value depends entirely on the data they collected and the continuous updating of related algorithms.*

*Illustrative Example 5**:** Corporation E mainly engages in APP marketing push services. Due to the industry's high real-time requirements for online user data, Corporation E analyses online data and uses them to provide marketing services based on customers' online behaviours, preferences for similar products and other factors.*

Illustrative Example 6: Corporation F is engaged in data services in commodity trading. Based on the data collected and compiled by itself and purchased externally, they undertake necessary procedures to increase the data quality, such as data cleaning, data labelling, integration and analysis;

after that, corporation F creates a database to provide external query services. Other commodity trading corporates could subscribe to the database and use historical transaction data and market supply and demand data as the reference benchmark for transactions and their settlement basis. Industry regulatory associations can also subscribe to the database as the information source for industry monitoring.

4) Mechanism 4: Direct Sale of Data or Data Products

Corporations engage in the direct sale of raw data, processed data, or trade data products they have developed, thereby realising economic benefits associated with their data resources by transferring the data (or data products) to external users. It is essential to note that due to the constraints imposed by data-related laws and regulations, corporations exercise caution in directly transferring relevant raw data, and such business models are relatively uncommon in practice.

Illustrative Example 7: The main business activity of technology corporation G is to collect, clean, label, process data and sell datasets to other corporations. Aiming to develop an AI technology-based coaching system, customer X intends to purchase image-data analysis products related to basketball sports from Corporation G. Both parties agree that, in compliance with relevant standards of data quality and quantity, Corporation G shall provide data analysis products and deliver the corresponding data products upon fulfilling contractual considerations. After delivery, Corporation G commits to completely deleting the original raw and derivative data, refraining from transferring or authorising other parties to use them. Unless regulatory authorities mandate otherwise, Corporation G shall not disclose information on the source, scale, or quality of the original data or the modified data products; failure to adhere to this agreement would result in a breach of contract.

Illustrative Example 8: Corporation H specialises in collecting and analysing online textual data and language corpora. After collecting and processing these data, Corporation H sells them to other technology corporations. Based on the judgment of the market demand in the field of artificial intelligence, Corporation H takes the initiative to collect the voice data of different age groups, genders, regions, and life and work scenarios of a small language, forming a unique dataset ready for future sale to relevant corporate customers.

5) Mechanism 5: Establish Internet Platform to Generate (or Exchange) Data Contents:

Illustrative Example 9: An internet Corporation, J, establishes an internet platform and provides digital technologies to assist users in generating valuable user-generated content (UGC), such as photos or videos. Users can share these UGCs based on digital technologies provided by J. DATA, which are generated and accumulated through interactions between corporations and users and among users, constitute a continuous value co-creation process.

In conclusion, under the model of *digital industrialisation*, corporations are more inclined to adopt a value-creation business model directly through data-based products or services.

3.3 Comparisons of DATA with Other Intangibles – Issues with Ownership Uncertainties

Regarding the *controllability* condition with respect to the asset definition, it is essential to recognise that controlling rights related to data are diverse. These rights encompass data collection rights, data usage rights, data processing rights, data trading rights, and data product income rights. Controllability, in an accounting context, does not exclusively pertain to legal ownership rights. Therefore, it becomes crucial to ascertain which economic rights of data are controlled by the reporting entity and whether these rights align with the definition of "controllability" under accounting concepts. In cases where determining legal ownership rights is challenging, it is vital to evaluate whether the

reporting entity possesses other rights to the data and is entitled to generate economic benefits related to those rights.

The entire value-creation process of data involves generation/collection, recording, cleaning, pre-processing, storage, analysis, and utilisation (see Section 6 for a more detailed illustration). As the actual controller of the data, the reporting entity dominates this data utilisation process. To realise the value of the data, the entity often makes corresponding investments in the data resources and bears corresponding costs, and ultimately, the entity is in possession of the processed data or data products developed. The economic rights of the data may be rightfully attributed to the controller, aligning with the principles of "controllability" and "inflow of economic benefits" in accounting concepts.

Notably, in China's recently issued regulatory document - "*The Opinions on Building Fundamental Systems to Better Play the Role of Data Elements*", there is a proposal to define legal rights based on data source and data generation characteristics, establishing separate property right systems for *legal ownership of data, processing rights of data, and management rights of data products*.

3.4 Comparisons of DATA with Other Intangibles – Issues with Measurement Uncertainties

For data resources to be recognised as accounting assets, they must also satisfy the measurability condition - their value must be reliably measurable. Given the various types and forms of data, an effective evaluation of the value of data assets necessitates comprehensive consideration of multiple aspects/factors influencing their value.

On the one hand, compared with financial instruments on an active trading market, the external trading market of data assets is still in its early stage of development, and the market-based pricing mechanisms of data are relatively immature. On the other hand, valuation models are more complex

and could be less reliable; measuring data assets' value based on appraised models might bring “noise” to the balance sheet, conflicting with the “faithful representation” principle of financial reports. If reporting entities wish to present the fair value of data assets, they could engage external appraisal service providers to establish an evaluation model, which might incur potential costs and face scrutiny during auditing processes.

4. Proposed Accounting Treatment of DATA

This section presents our suggestions for the accounting treatment of corporate data resources under existing accounting standards. The proposed framework covers the classification, recognition, measurement, presentation, and disclosure of data assets. Additionally, we introduce relevant approaches recommended in the China MOF’s “Provisions on Accounting Treatment of Corporate Data Resources (trial version)”.

4.1 Classification of Data Assets

Based on the examples illustrated in Section 2, we show that economic values created by DATA are diverse under different mechanisms. We advocate against a broad categorisation of data assets. Instead, we recommend classifying corporate data resources based on their value-creation mechanisms. This includes *internal-used data assets, tradable data assets, strategic value data resources, and other data resources*. By considering the source of the data resources, we can further distinguish between internally generated data resources and externally acquired data assets.

1) Internal-Used Data Assets

This data asset type is characterised as controllable, measurable, and capable of generating future economic benefits for the reporting entity. They include data assets used exclusively within the entity, either purchased or internally generated through corporate activities. It shows the following

characteristics: (1) they are only used within the reporting entity; and (2) they are of meagre value to external entities, so they cannot be traded externally. These assets can be listed as a separate line item as “intangible assets - internal-used data assets” on the balance sheet if recognition conditions are met.

2) Tradable Data Assets

This data asset type is characterised as controllable, measurable, tradable and able to generate future economic benefits for the reporting entity. Unlike internal-used data assets, tradable data assets have value beyond the reporting entity. They can be monetised in the market and traded through transactions to other entities (including transfer of ownership rights or grant of usage licenses). The different application scenarios largely determine the value of such data assets. This type of data asset might show significantly different values in different entities. Such data assets can be listed as a separate line item, such as “intangible assets - tradable data assets” on the balance sheet. Here are some additional examples of tradable data assets.

Illustrative Example: Corporation X collects data from different online sources and undertakes relevant processing approaches to these data. By performing data summary and analysis, corporation X creates a new database, a credit ratings database, and it provides query and verification services to other entities using the database via the API interface.

Illustrative Example: A power grid corporation Y collects the power consumption data of their corporate users. After excluding information involving corporate privacy and sensitive business secrets, corporation Y desensitises the data and profoundly analyses the power consumption data. Corporation Y forms a set of evaluation indicators and creates a database that outsider entities can use. A Bank Z approaches Corporation Y to obtain evaluation results of its potential borrowing clients (with clients' authorisation). Based on the information on the client's electricity consumption

behaviour, payment situation, electricity consumption level and trend, bank Z improves its "client profiling" and enhances its business competitiveness related to anti-fraud, auxiliary credit scoring, and post-loan warnings. It pays Y according to the number of queries they requested from Y.

Illustrative Example: Telecommunication corporation Z creates a database of clients' monthly call costs, payment amounts, arrears status, and other related operation data and creates client portrait products using internal data resources. Telecom Corporation Z then provides credit investigation support services for financial institutions. Potential loan clients may authorise financial institutions to query their historical transaction data from Z, and financial institutions pay Z according to the number of queries they request from Z.

3) Strategic Value Data Resources

This type of data resource is characterised as being controllable, able to generate future economic benefits for the entity, and an irreversible core element of the corporate business model. Although not easily separable or tradable, they are indispensable to the entity's business strategy. Based on our survey conducted in Shenzhen, China, data resources show substantial concentrations among sectors/entities referred to as "*Data-Rich*" entities. For example, data resources are primarily concentrated in internet corporations, hi-tech, pharmaceuticals, credit scoring/rating, software development, financial institutions and other key industries. Using data and other resources can bring significant economic benefits to the entity. For "*Data-Rich*" corporations, their market value is significantly correlated to the strategic value of the data resources they possess. Hence, they are more willing to invest in data resources.

However, such data assets cannot be transferred to other entities for various reasons, such as a lack of market demand, information asymmetry between entities, data privacy protection, or other legal

issues. The measurement reliability of strategic value data resources is also relatively lacking, so it might be challenging to recognise them directly as intangible assets in the financial statements. However, since these resources are closely related to corporate strategy, entities can apply the materiality criteria when preparing the financial reporting and disclose more about these resources in management commentary or a narrative report.

4) Other Data Resources

Entities routinely generate or collect various data types from operations or business activities, backing them up without planning to invest or expecting future economic benefits. Using the materiality judgment, principal users of financial reports might not need related information about these resources. As a result, these are under the category of other data resources, and their accounting treatment is not detailed in this report.

4.2 Recognition of Data Assets

1) Recognition of Externally Acquired Data Assets

Considering the source of data resources, reporting entities can categorise them as externally acquired data assets or internally generated data resources. Like other externally acquired intangibles, externally acquired data assets can be directly recognised on the balance sheet and measured based on their trading value—agreed upon in contracts or market transactions. However, as business activities involving the purchase of data assets from external entities or direct trading of corporate data on data exchanges are still uncommon, this paper focuses on the accounting treatment of internally generated data assets.

2) Recognition of Internally Generated Data Assets

For internally-used data assets, to strengthen the principle of faithful representation and comparability of accounting information, we need to carefully and strictly set the recognition

conditions for internally generated data assets. In the trial stage, it is recommended to adhere to IAS 38 and modify the conditional recognition conditions for Research and Development (R&D) expenses to create recognition conditions for internally generated data assets.

IAS 38 stipulates that entities can only capitalise R&D expenses during the development stage when certain recognition conditions are met. Similarly, the recognition conditions for internally-used data assets can be set based on the principles of "economic benefit inflow", "controllability", and "measurability" of data assets, which means that these assets are recognised only when the entity can provide evidence of the right to control the use of data, reliably measure the value of the assets, and able to derive economic benefits from them.

The process of generating data assets within the corporation can be divided into several steps: First, the data generation/collection step; second, the data recording, cleaning, pre-processing and storage step; third, the data analysis step under different application scenarios; and, finally, the data utilisation steps (as shown in Section 6). The first two steps might be considered the research stage, and the last two steps might be considered the development stage. For internally generated data assets, only expenses related to data resources in the development stage can be capitalised in the financial statements. Following the accounting treatment of R&D expenses in IAS 38, it is recommended that internally-used data assets can only be recognised in the financial statements under the following conditions:

1) It is technically feasible to generate specific data assets and enable their use;

2) Entities have the intention to complete specific data assets and to use them as production factors;

3) The data assets generate economic benefits, including the ability to prove that the products produced by using the data assets exist in the market and/or that the data assets are valuable internally;

4) Sufficient technology, financial resources, and other resource support to complete the development (maintenance) of the data assets and the ability to use them;

5) Expenditures attributable to the development phase of the data assets can be reliably measured.

For expenses related to internally generated intangibles that cannot be separately identifiable or meet the recognition criteria of the IAS 38, the default accounting treatment is to report them as expenses in the income statement. Only when internal-used data assets meet the relevant recognition conditions of the internally generated intangible assets can the entity capitalise relevant costs in the development stage as data assets.

For tradable data assets, additional conditions need to be set to evaluate their tradability, and it is recommended that the conditional recognition method be adopted. When certain “tradability” conditions are met, the entity can recognise the data assets in the financial statements. The recognition conditions of tradable data assets can be determined by reference to the standard framework of data exchanges for tradable data products. It is worth noting that currently, there are 39 data exchanges in China; among them, the Shenzhen Data Exchange and the Shanghai Data Exchange, that are actively formulating comprehensive guidance on the traceability of data products and guidance on trading/settlement procedures.

4.3 Measurement of Data Assets: Initial Measurement

IAS 38 mandates that reporting entities employ the cost-based method for the initial measurement of intangibles. In the case of externally acquired data assets, the cost of purchased intangible assets

includes the purchase price, relevant taxes and other expenses directly attributable to achieving the intended use of such assets.

For internal-use data assets, a cost-based measurement method is typically applied during the initial measurement, given the absence of a well-defined data asset trading market. In practice, what kind of costs could be capitalised is still under debate - we will explore further the cost allocation and cost recording (booking) system in Section 6.

Concerning tradable data assets, there are areas in which some stakeholders propose to make amendments to IAS 38, particularly in the area of measurement approaches. While IAS 38 currently allows only a cost-based measurement approach for internally generated intangibles, tradable data assets, subject to transactions between different entities, might possess a comparable market transaction price close to their intrinsic value. Therefore, some advocates suggest considering the reference transaction price of similar data assets for the initial measurement of tradeable data assets.

For example, when comparable historical transactions or an active market quotation for similar data assets exist, a fair value method (market method) might be a viable option for the initial measurement. In the absence of an active market quotation, the adjusted market comparable price or income method can be used to determine fair value.

Preliminary research has offered insights into valuation models based on market or income models for data assets. Deloitte (2019) posits that the value of data assets is reflected in their benefits or potential benefits to specific entities. The factors affecting the value of data assets are from four dimensions: *quantity, quality, application scenario, and risk.* Valuation of data assets can also be done based on models from professional appraisal entities. The China Asset Appraisal Association's "*The*

Data Asset Assessment Guidance" (CAAA, 2023) suggests evaluation methods to determine the value of data assets, including income, cost, market, and derivative methods.

Since valuation methods involve numerous parameters and inputs, primarily reliant on professional estimates, reporting entities would need to disclose the logic of the valuation model, assumptions of future cash flow forecasts, and model parameters in the financial notes or a separate narrative report. This enhanced disclosure aims to help principal users of financial reporting to understand the benefits and limitations of the valuation figure for making informed investment decisions.

For unrecognised strategic value data resources, reporting entities are encouraged to illustrate the contributions of these resources to the entities' market value, that is, the reference value to the corporate's business.

Illustrative Example: Since joint value data resources hold value only for reporting entities themselves, reporting entities may voluntarily disclose the reference value using internal valuation models. For example, they could adopt the net market value-added approach to give a reference value. That is, first, estimate corporate market value (MV1) considering the strategic value data resources; second, estimate corporate market value (MV0) when these resources are excluded; and third, calculate the difference between MV1 and MV0. as the reference value of the strategic value data resources.

4.4 Measurement of Data Assets: Subsequent Measurement

Considering the types and characteristics of data resources, reporting entities must make reasonable estimations of the service life of data assets and continuously monitor DATA assets' impairment using external and internal information sources.

In the subsequent measurement stage, for data assets utilised by reporting entities with a limited service life, an appropriate amortisation method should be selected for amortisation based on their expected useful lives. The amortisation amount for data assets shall be recorded in the current profit and loss account. At the same time, the amount of consideration received by the corporation from customers should be recognised as relevant income, with input costs recognised as contract performance costs.

Data assets with uncertain service lives should be tested for impairment periodically. The reporting entity must assess whether there are signs of potential impairment on the balance sheet date. If such signs are present, adjustments to the provision for impairment should be made, and the recoverable amount estimated. Should the recoverable amount measurement indicate that the recoverable amounts of the assets are less than their carrying amounts, the asset's carrying amounts should be written down to the recoverable amounts. The written-down amounts are recognised as asset impairment losses and recorded in the current profit and loss statement. A corresponding asset impairment provision is made simultaneously.

It is crucial to note that data assets exhibit characteristics of value variability. Hence, reporting entities should continually monitor relevant aspects such as business models, limitations of usage rights, timeliness, product or technology innovations, and similar and competitive products. Timely and comprehensive impairment tests should be conducted, and provisions for impairment should be created as necessary.

Lastly, it is worth noting that data assets show the characteristics of disruptive upgrading/iteration, so complete write-offs of the data assets may occur. The current income statement should include the

write-off amount for derecognised data assets. The amount of the complete write-off should be checked against the expense loss item in the income statement.

4.5 Presentation of Data Assets

In preparing the balance sheet, the reporting entity shall, following the materiality principle and the actual situation of the corporation, incorporate corresponding line items under relevant financial statement items. This ensures a direct reflection of the value associated with the corporation's data resources.

We recommend the inclusion of the net value of data assets listed as a distinct line item under the intangible assets account on the balance sheet. This allows information users to discern the proportion and changes of data assets within corporate assets, enabling a more comprehensive evaluation of future opportunities and potential risks.

To provide a detailed breakdown, a dynamic adjustment table for the amounts of various types of data assets at the end of the reporting period can be added to the notes of financial statements. This table would encompass the amounts of various data assets at the beginning of the reporting period, the increments (or decrements) during the reporting period, the amounts formed, purchased, sold, impaired, or written off within the period, and the final figures for different types of data assets at the end of the reporting period. This supplementary information enhances transparency and facilitates a deeper understanding of the dynamics surrounding data assets.

4.6 Disclosure of Data Assets

As for now, no existing accounting standards mandate the disclosure of quantitative or qualitative information regarding data assets in financial reports. Elevating the disclosure of corporate data assets holds intrinsic value for several reasons:

1) Illustrate Strategic Value Drivers

Given that material data resources can serve as crucial value drivers for some companies' corporate strategies and business models, enhanced disclosure provides users of financial reports with a deeper understanding of the role data assets play in corporate value creation for those companies, thereby shedding light on associated risks and opportunities.

2) Support Investor Decision-Making

Increased disclosure could offer investors valuable information for their decision-making processes, improving the overall value relevance of financial reporting.

3) Enhance Information Comparability

Expanding disclosure requirements, particularly regarding valuation methods related to DATA, contributes to increased information comparability across entities within the same industry.

In alignment with the information needs of stakeholders, China's "*Provisions on Accounting Treatment of Corporate Data Resources*" advocates a "compulsory plus voluntary disclosure" approach. On the one hand, it refines the information required by accounting standards; on the other hand, it encourages and guides corporations to continuously strengthen voluntary disclosure and provides more information related to the value of data resources to stakeholders. It also proposes that disclosure of data assets can specifically focus on the following two aspects: information on the data assets themselves and information related to data assets that can help third parties evaluate the contribution of data assets to corporate value.

We propose that, for recognised data assets in financial statements, such as internally-used data assets and tradable data assets, relevant information should be disclosed in the notes to the financial statements. The disclosure may encompass information on the formation, storage, investment,

impairment, write-off of data assets and the net value at the end of the period. For unrecognised data resources, such as strategic value data resources, relevant information can be disclosed in narrative reports, such as management commentary (MC) or integrated reports.

Specific recommendations for disclosure concerning data assets include:

1) Source or Generation Process of data assets

Reporting corporations should disclose how data assets are generated within the entity or obtained (for example, whether obtained through a data exchange or agents). Qualitative information related to data assets might include the types, permissions or restrictions on the rights of data assets and other issues related to the ownership and usage of data assets. For example, in some jurisdictions, an entity must prohibit using certain types of data information, such as relatively private customer data, to benefit itself.

2) Value Creation and Business Model Contribution

Reporting corporations should disclose how data assets contribute to corporate value and the business model, primarily how to yield economic benefits, detailing application scenarios related to customers, products, operations, or management.

3) Additional information related to data assets

Reporting corporations should disclose data types, structures, investment maintenance inputs/costs, and amortisation methods. The quality of the data assets, like the level of standardisation, accuracy, timeliness, reliability, etc., and information about data resources likely to be recognised as data assets in the future: for example, the corporation plans to transform its business model in the future and plan to use original customer/channel information for enhanced product marketing capabilities.

4) Measurement Model Information

Reporting corporations should disclose information on the measurement model of data assets, including the valuation method, model parameters, and the basis of estimators (like future cash flows in the income-based model).

5) Risk factors affecting data assets

Reporting corporations should disclose information on risk factors affecting data assets, countermeasures taken to handle related risks/opportunities, managing, mitigating, or exploiting risks/opportunities, security measures related to data, and legal compliance issues.

In conclusion, given the intricate nature of corporate data resources, especially the complexity of their ownership rights, value creation mechanisms, and measurement methods, comprehensive qualitative and quantitative disclosure of data assets is encouraged. This not only increases credibility but also empowers external users to make informed value judgments and decisions.

5. Challenges Ahead for Accounting Treatment of Data Assets

The paramount challenges in incorporating corporate data resources into financial statements are multifaceted. One of the primary challenges in recognising data assets on financial statements is the inadequate understanding of the paths through which these data assets are formed. The complexities might arise from internal organisational structural issues, redundant resource utilisation between departments, and intricate personnel deployment. This hinders the aggregation and allocation of costs for data assets, particularly when applying the historical cost method for initial measurement. To overcome this challenge, companies should enhance their business processes, align organisational structures with data product development, and efficiently manage activities from raw data to data products.

Second, a significant hurdle is faced in matching the costs associated with data asset income. The incongruity between the final usage and development models for data products, driven by their non-exclusive and highly adaptable nature, leads to challenges in cost allocation among different business lines. A more nuanced approach, considering factors such as data usage patterns and service differentiation, is required to ensure accurate cost allocation and income matching. Companies must reassess the potential usage scenario of data products and pricing models, incorporating historical data usage, service frequency, and the perceived value of forming data products.

Third, distinguishing between the capitalisation and expensing of data resources proves challenging due to uncertainties in determining the timing of the research and development phase for these products. The lack of clear guidelines complicates the accounting treatment, especially for internally generated data resources. To address this issue, specific standards differentiating capitalisation and expensing of data assets should be introduced, offering detailed application guidance. Companies are advised to adjust their project initiation and management processes accordingly.

Fourth, choosing an appropriate amortisation method for data assets is intricate, primarily because these assets lack an active market. The choice among different methods, such as straight-line or accelerated amortisation methods, heavily relies on professional judgment. Each method has its merits, and companies should consistently apply the most suitable method across accounting periods based on their unique business scenarios and market conditions.

Fifth, the difficulty in determining the amortisation period for data assets stems from the inherent variability in the time-based usefulness of these assets. The challenge lies in identifying factors influencing the economic benefits' lifespan (the service period), leading to uncertainty in determining

the amortisation period. For data assets with an uncertain service period, impairment testing is recommended. This testing, however, poses difficulties due to the absence of an active market and the significant fluctuation of data asset values over data product life cycles.

Lastly, the variability in the value of data assets, heavily dependent on their application scenarios, creates a challenge in confirming their figures on financial statements. In extreme cases, changes in application scenarios, data asset-sharing policies, or external factors may render data assets ineffective, resulting in a sudden increase in extraordinary expenses. To mitigate these impacts, companies are advised to enhance their data asset management throughout the lifecycle, define conditions for data asset failure cautiously, and prioritise comprehensive information disclosure to meet diverse user needs.

We list the issues and some recommendations to tackle these issues in detail.

5.1 Difficulty in Cost Allocation for Data Assets

Companies invest significant resources in developing and utilising data resources, forming data assets that meet the conditions for recognition. However, due to an unreasonable organisational structure and the complexity of resource reuse and personnel deployment among departments, the aggregation of costs related to data assets becomes challenging. This difficulty arises when using the actual cost method for the initial measurement of data assets, as the upfront costs invested in bringing data assets to the intended usable state cannot be clearly recorded and accurately measured.

The reporting corporation should scientifically plan business processes, improve organisational structure alignment with data product development, and enhance efficiency in managing production and operational activities from data collection to sales. It should establish clear organisational

structures for departments involved in data asset collection, compilation, and dissemination, avoiding personnel engaging in data asset-related and unrelated activities.

5.2 Difficulty in Matching Revenue and Costs of Tradable Data Assets

When using internal data resources to provide services externally, there is duplication and repeated combination of data resources among different business or product lines. This results in challenges in appropriately allocating costs to different data assets during cost aggregation.

The reporting corporation should adjust data product sales models and pricing strategies. Consider factors such as data usage frequency, service provision frequency, service charge rules, expected service frequency, and the value creation of data assets for more reasonable cost allocation.

5.3 Difficulty in Distinguishing between Research & Development Phase of Data Products

Companies find it challenging to determine the criteria for distinguishing between capitalisation and expensing in the research and development phase of data products, especially during the self-creation process where clear guidance is lacking. Additionally, the time-sensitive value of data resources increases the complexity of recognising contract fulfilment costs.

The reporting corporation should provide detailed application guidelines for executing provisional regulations on the accounting treatment of enterprise data resources. Carefully determine product research processes and distinguish between internally generated data resources and externally purchased data assets based on their characteristics.

5.4 Difficulty in Choosing the Amortization Methods for Data Assets

The choice of amortisation method for data assets poses challenges for accountants, especially when data assets have not yet formed an active market. There are straight-line amortisation methods

and different accelerated depreciation methods for fast-updating data, which makes it difficult in practice to determine the most suitable amortisation method for data products.

The reporting corporation should select an amortisation method suitable for data products based on business scenarios and market conditions and consistently apply the chosen method across different accounting periods.

5.5 Difficulty in Determining the Amortization Period of Data Assets

Companies face challenges in determining the amortisation period of data assets, mainly due to the time-sensitive nature of data product usage. This leads to difficulties in determining the product's useful life. This challenge involves considering factors such as product lifecycle, technological development, market demand, and peer product competition. Additionally, impairment testing is required for data assets with undeterminable service life, but the lack of an active data asset market makes impairment testing challenging.

When determining the amortisation period, the reporting corporation should consider factors such as the typical product life cycle, available information on similar asset useful life, technological factors, market demand for products or services, potential competition, and the correlation with the useful life of other held assets; it should also regularly review and adjust amortisation periods based on clear evidence of significant changes.

5.6 Fluctuation in Financial Statement Figures Due to the Time-Varying Nature of Data Assets

The time-varying nature of data assets makes their value highly dependent on application scenarios. Once application scenarios change or factors such as policies and competition lead to the external sharing of data assets, their value experiences significant fluctuations. In extreme cases, data assets may become unusable due to policy factors, resulting in their book value directly becoming

zero and causing a substantial increase in non-operating expenses in the financial statements (a complete write-off).

The reporting corporation should enhance the overall lifecycle management of data assets, define clear conditions for data asset ineffectiveness, and prioritise uncontrollable factors. It should also emphasise information disclosure to meet the diverse needs of financial statement users and accurately reflect critical information related to data assets.

In conclusion, navigating the complexities associated with the accounting treatment of data assets presents a multifaceted challenge for reporting entities. From the intricacies of cost aggregation, revenue-cost matching, and distinguishing between capitalisation and expense to the nuanced decisions regarding amortisation methods and periods. These challenges are compounded by the dynamic nature of data resources, where their value hinges on shifting application scenarios and external factors. However, adopting comprehensive solutions such as optimising organisational structures, refining business processes, aligning internal practices with industry standards, providing continuous professional training, and embracing real-time monitoring mechanisms contribute to a more resilient data asset management framework and enhance information disclosure; reporting entities will surmount these obstacles. The collective adoption of best practices will pave the way for improved transparency, reliability and comparability in financial reporting related to data assets.

6. Discussion and Conclusions

In this paper, we suggest that, in addition to discussing the general connotations, attributes, and functions of corporate data resources, the accounting treatment of corporate data assets should focus more on the diversity of value-creation mechanisms of different types of data resources: (1) Internally-used data assets, tradable data assets, and strategic value data resources differ in their

mechanisms and contributions to corporate value creation and in the reliability of their measurement methods. Thus, the presentation and disclosure in financial statements should reflect these differences; and (2) Classification and measurement of data assets should consider their role in the business model, with their value creation mechanisms disclosed in the notes to financial statements or qualitative narrative reports.

In summary, recognising corporate data resources in financial statements could reveal and enhance the value creation process of corporate data resources, contributing to the high-quality development of the digital economy. With the rapid development of the digital economy globally, data's importance as a production factor is increasing, particularly as its use and integration in various scenarios enhances its economic value. The critical consideration for accounting standard setters should focus not only on if but also on how data resources are recognised in financial statements, emphasising their separate disclosure to hopefully better reveal the digital economy's impact on corporate operations and boost the digital transformation process in the reporting entities. Future research directions may include: first, refining the type of controllability of data assets and promoting more orderly transactions of data based on confirmed rights; Second, in the absence of an active market, lack of market quotations for data products and large differences in valuation models and model parameters, the "reliability" of data asset valuation will remain a significant challenge, a key argument among stakeholders against recognising data resources in financial statements. Accounting standard setters could explore data pricing and valuation models, drawing on research from fields like economics and statistics, and innovate in formulating data asset accounting standards. Third, reporting entities should address stakeholder needs to enhance report relevance without significantly increasing preparation costs to disclose information related to data assets.

For the supporting mechanisms of accounting treatment of data resources, we suggest: first, continue to vigorously develop data trading venues, build data exchange, match supply and demand better, and gradually enlarge the scale of orderly data assets transactions. As data transaction volume increases, the tradability and value discovery of data assets will gain wider recognition, leading to the accumulation of best practices. Second, to promote the development of third-party supporting services for data asset compliance certification, rating, custody, and valuation and enhance the audit procedures for data assets, forming a solid guarantee for the recognition of data assets in financial statements. Lastly, in the evolving digital economy, corporations should focus on the complexity of data across various value dimensions, thoroughly assess financial report users' information needs, and analyse in-depth the value creation mechanisms and paths of different corporate data resources. Moreover, by improving the classification, measurement, presentation, and disclosure of corporate data asset information, reporting corporations can aid users in scientifically assessing corporate value and assisting corporations in their digital transformation process and the efficient execution of digital business strategies.

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Appendix A: From Raw Data to Data Assets: A Practical Guide

From the above analysis and illustration, we can see that transforming raw data into well-defined data assets presents substantial challenges for reporting entities. To meet the essential accounting recognition conditions of "*identifiability*", "*measurability*", "*controllability*", and "*auditability* ", the establishment of a robust corporate data governance and data management system is crucial. The following figure provides an outlined guidance which provides a structured approach for corporations to navigate this complex process effectively.

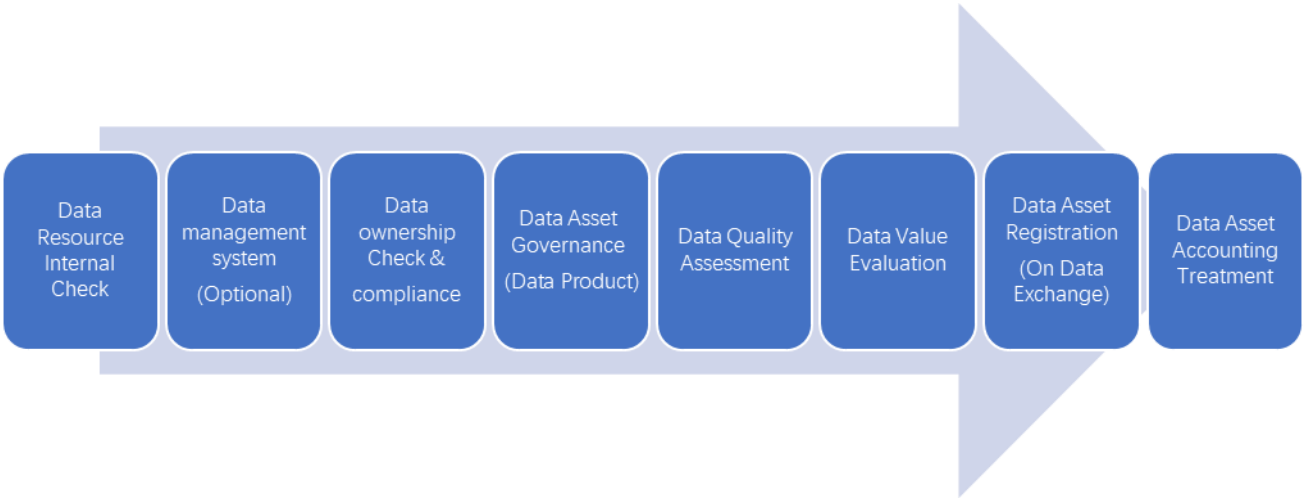

Figure 6-1: From Raw Data to Data Assets

1. Conduct an Internal Examination of Data Resources

This foundational step involves systematically cataloguing and evaluating internal and external data resources, establishing a comprehensive understanding of the organisation's data landscape. Key points are (1) Systematically catalogue and evaluate internal and external data resources; (2) Consider both internal corporate and external ecological data sources; (3) For internal data, include financial, business, management, and online data; (4) Encompass external ecological data from the value chain and industrial chain ecosystem.

2. Institute a Comprehensive Data Management System

Establishing a centralised data management system involves implementing policies and procedures to govern the entire data lifecycle, ensuring alignment with the overarching data governance framework. Key points are: (1) Address prevalent data quality challenges; (2) Unlock the full potential of data resources。

3. Conduct a Compliance Audit of Data Ownership and Privacy Rights

Undertaking a compliance audit in data ownership and privacy rights issues involves verifying adherence to regulations, defining ownership responsibilities, and ensuring ongoing compliance through systematic internal audits, fostering a secure and ethically sound data management system and process.

4. Develop Prototypes of Data Products within the Framework of Data Governance

Creating data product prototypes involves leveraging data governance principles to guide the design and development process by incorporating data with different application scenarios, with active stakeholder involvement and iterative testing based on internal evaluation and external user feedback. It should actively involve stakeholders in the design and development of data products and iterate the prototypes based on internal evaluation and external user feedback.

5. Undertake a Rigorous Assessment of Data Quality

In the pursuit of data excellence, a rigorous assessment of data quality necessitates the establishment of stringent standards and metrics to systematically evaluate the accuracy, completeness, consistency, and reliability of DATA. The reporting corporations should establish stringent data quality standards, systematically evaluate key facets of data quality and implement corrective actions for continuous improvement.

6. Perform a Valuation Analysis of Data Assets

Evaluating the value of data assets requires a comprehensive analysis considering data quality factors and application scenarios, such as revenue generation, efficiency increases, etc. The reporting corporations should consider data quality from different dimensions, identify scenarios of data applications based on business models or business processes and maximise the value of data assets in corporate strategy.

7. Register Data Assets on the Data Exchanges

Registering data assets on the data exchanges is an organisational commitment to maintaining an accurate and up-to-date repository of essential information, securing the controlling and Intellectual Property rights and maximising data assets' value through the exchange to other entities. The reporting corporations should register relevant Information on Data assets, including metadata such as source, format, and usage restrictions, create a comprehensive and well-maintained data asset/product registry, and work closely with the regulators and Data Exchanges to ensure deliverability and data security.

8. Apply Accounting Treatments to Data Assets

Determining appropriate accounting treatments for data assets involves classifying data assets into different types and applying coherent accounting treatment to each type. The reporting corporations should align the accounting treatment with organisational accounting policies, establish a cost allocation and booking system and accurately present and disclose data assets in financial statements.

In conclusion, by conducting a comprehensive internal examination of data resources, instituting a well-structured data management system, ensuring compliance with data ownership and privacy rights, developing prototypes of data products, rigorously assessing data quality, performing a valuation

analysis of data assets, registering data assets on data exchanges, and applying appropriate accounting treatments, entities can not only enhance accounting treatment of data asset but also embrace the opportunities presented by a well-structured and efficient data governance framework. This comprehensive approach not only addresses data quality challenges but also facilitates the strategic utilisation of data assets in alignment with corporate objectives, contributing to the organisation's overall success and competitiveness in the data-driven landscape.