What Is Your Data Worth? Insights for CPAs

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[H1]1. Preface

In 2018-2019, CPA Canada undertook a Foresight Initiative that examined key trends – economic, environmental, technological, geopolitical, and societal – to assess their implications for the future of the accounting profession.

The resulting strategy to advance the profession, documented in the Foresight Initiative's Report entitled *The Way Forward,*[1] recommended a strong focus on value creation and data governance. Working groups were established for both topics, and plans are currently being developed to review the ethical standards foundations of trust for CPAs in a digital environment.

All organizations today face challenging decisions about investing in data, managing privacy and data security, exploring opportunities for monetizing data, and measuring and reporting on the value of data. Both working groups recognized that, from the perspective of 2020, the importance of managing data as a business asset and the importance of data's role in value creation will continue to increase.

Given this, the value creation and data-governance working groups agreed to collaborate in publishing this document. It is intended to help CPAs provide decision-makers with better insights into the value of data, and how data can be used to create value for the organization and its stakeholders.

This paper is grounded on the assumption there is no single answer to the question: What is Your Data Worth? For a CPA responding to such a question, the correct response is: "Let us clarify the perspective from which you are asking the question. There are multiple perspectives from which to look at the relationship among data, value, and value creation."

Furthermore, there is no single concept for measuring value. When addressing decision-making challenges in their organization, CPAs need to be able to recognize which perspectives and which value concepts are relevant to the decision at hand.

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[1] www.cpacanada.ca/foresight-report/

The purpose of this paper is to provide CPAs with the insights into the knowledge and skills needed to respond to a question about what their organization's data is worth. It is not intended to provide step-by-step guidance on how to value data or measure its contribution to value creation. Subsequent publications will provide this detailed operational guidance, references to relevant standards, and resources for acquiring relevant knowledge and skills.

[H1]2. The Ubiquity of Data

Businesses have always generated and collected data; however, continued increases in speed and reductions in the cost of data collecting and processing require continuous improvement in data operations.

All organizations, from micro-sized businesses to multinational corporations generate and collect digital data in their daily operations. They create databases for financial, operational, sales (including number of customers and volume and types of product), logistics, purchases, and expenses, and provide support for multiple reports generated across the organization. Increasingly, new sources of data are included that in the past may have been ignored or, if collected, were not stored, such as customer web clicks, digital objects, web traffic on social media accounts, data from sensors and Internet of Things (IoT) devices, GPS tracking of employees, vehicles, packages, etc.

"Big Data" has emerged as a whole new sector of the economy, focused on accumulating, analyzing, and monetizing vast amounts of data about people and organizations. The continued emergence of the IoT promises to further increase growth in data sources that are already growing exponentially.

In the coming decades, deployment of artificial intelligence (AI) and machine learning technologies will bring an even sharper focus to creating, storing and accessing data. Multiple, high-quality datasets are needed to train algorithms and machine learning tools that respond to a given organization's needs and specific circumstances. Business literature is replete with use cases where digitization projects have resulted in increased efficiencies, enhanced predictive capabilities, real time reaction to events, and the creation of new digital products and services.

AI is behind significant advances in speech recognition, speech translation, image recognition, autonomous vehicles, crime and cybercrime prevention, and digital assistants. It can help forecast what will happen in a line of business, both at the macro and micro levels. It can predict customer demand and future financial performance of a business unit. AI and machine learning tools are increasingly used to automate processes that provide significant (and permanent) cost savings. The following are just some of the opportunities that many organizations will need to consider:

[H2]Customer Service

- Automating call centre activities with conversational assistants to handle routine calls in order to increase consumer retention rates
- Using algorithms trained on images of vehicle accidents to accelerate claim adjustments processing
- Making purchase recommendations to online customers

[H2]Operations

- Improving forecasting ability through real-time data access
- Moving financial planning and analytics from manual to automated processes
- Using prebuilt AI planning tools to improve forecasting and scenario analysis by accessing real-time data on customer behaviours
- Using prebuilt AI planning tools for HR staffing and compensation analysis, demand and inventory management, customer profitability, planning promotions and sales
- Reducing HVAC and energy costs in buildings

[H2]Risk and Compliance

- Getting real-time compliance advice on banking, tax and other regulations through trained AI recommendations
- Identifying fraud through tracking data sources such as customer data, real-time transaction data, ID of devices processing transactions, etc.
- Identifying and setting aside spam emails or inappropriate comments on social media
- Managing supply chains and inventories
- Making decisions about pricing, buying and selling

[H2]IT Operations

- Using prebuilt applications to monitor logs and detect intrusions
- Predicting or detecting component failure
- Predicting capacity surges
- Using AI to ensure data leaving the organization is legitimate and adheres to corporate data strategies

As organizations embrace these opportunities, their underlying datasets will increase in strategic importance and value.

Collectively, these phenomena are changing the rules of the game for businesses, not-for-profit organizations, and the public sector. There are

consequences for many aspects of public policy, including for economic policy and taxation.

These phenomena challenge the CPA profession to consider both internal and external threats and opportunities arising from the ubiquity of data. CPAs should be aware of the:

- implications of internal digital data for accounting, financial reporting, assurance, internal audit, and strategic and operational decisions
- perceptions of external stakeholders, such as investors, customers, potential partners or acquirers, and regulators about how well a business is transforming itself in response to a rapidly changing digital environment

For more information about key data trends, see Mastering Data Series #1, Setting the Context [add link]

[H1]3. Perspectives and Concepts for Understanding Data and Value

So, what is your data worth? A first point of departure in addressing this question is that the value of anything, including the value of data, is not absolute but depends on the perspective from which you look at it. Relevant perspectives for data discussed in this paper include:

• value creation
• decision-making
• buying, selling, or licensing
• taxation
• financial reporting
• risk and risk-management
• public policy

These perspectives are explored in the Sections 5 through 11 below.

A second point of departure in addressing the data-worth question is understanding key value concepts and how they relate to the perspectives listed above. The value concepts discussed include:

1. historical cost value
2. market value (value in exchange)
3. value in use
4. economic value (in context, incremental value in use)
5. fair value as defined in IFRS®13
6. financial reporting value

The word "value" has multiple meanings as both verb and noun. There are a person's "values" then there is the act of valuing as determining importance as well as valuing understood as finding the "worth" of something.

Value understood as "worth" is not absolute; it depends on perspective or context. If worth is defined as "monetary value," aside from currency, securities and objects (e.g., gold) where monetary value is inherent, monetary value is context-dependent, which is another way of saying that "value is in the eye of the beholder."

In measuring the value of a car, for example, the value of the car is not inherent in the car itself but in the relationship between the car and its current or prospective owner. The value of a car may be perceived differently depending on its utility as a means of transportation, its prestige value, scarcity value if a rare model, beauty if perceived as a unique expression of craftsmanship, etc.

More generally, when measuring value, the "object" being measured is not the object per se but the relationship of the object to the "beholder," which could be the owner or a potential purchaser.

"Valuation" is defined as an estimate or opinion of the worth of something, especially when provided by a professional valuation expert. Valuation is also context dependent, although relevant value-creating contexts are not always explicitly defined.

Because the word value is ambiguous and context dependent, it is important to clarify the relevant value concept and context. The following discusses various value concepts commonly used in business.

1. **Historical cost value**. When objects are bought and sold (i.e., a transaction occurs), we have a measure of value that sits somewhere between the perceived value of something to a buyer and the perceived value to the seller. Normally, a buyer will complete a transaction only if the acquisition cost is less than or equal to the value perceived by the seller.

   Accountants assume that a transaction establishes an objective cost value that can be recorded in books of account.

2. **Market value (also referred to as value in exchange).** For objects, where there is a sufficient volume of transactions, "markets" emerge that enable the generation of reliable estimates of probable transaction values for like objects. The ability to use market value as a reference depends on:
   - the existence of relevant markets
   - the ability to define and differentiate the characteristics of like but not identical objects with sufficient precision to make appropriate adjustments to value estimates. This method of valuation is similar to the way real estate valuators estimate value of a property based on "comparables" and adjust for the comparability of the properties based on the number of bedrooms, condition of the building, etc.

3. **Value in use**. For many objects for which we want to measure value, relevant markets do not exist, it may be impossible to find relevant information about "comparable" transactions, or market value is insufficiently precise to measure value creation potential in alternative contexts.

   In the case of the purchase and sale of a business, for example, a valuator may use the "income method" that typically involves projecting probable future cash flows and using present-value techniques to estimate potential value to the prospective purchaser. More generally, the concept of value in use can be applied in any situation where the potential value an asset can enable for the organization is a function of the future value streams the asset creates or enables.

   One definition of value in use is provided in International Accounting Standard (IAS®) 36 as "the present value of the future cash flows expected to be derived from an asset or cash-generating unit," and may be relevant in deciding whether the carrying value of the asset is impaired.

   However, in a decision-making situation as distinct from financial reporting, there are three important limitations to this definition:
   - Value in use does not explicitly consider context. Value in use is in fact context dependent: the future value streams an asset can generate for its owner are not necessarily identical to the future value streams the asset could generate for a prospective purchaser.
   - Future value streams should not necessarily be limited to those that can be measured as cash flows.
   - Value streams important for decision-making are not limited to those relevant to an owner since relevant value streams could also be those such as ecosystems that can have broader social impacts on stakeholders.

4. **Economic value** (in-context, incremental value in use). Given the limitations of the accounting definition of value in use, we use the concept of "economic value" to refer to value in use that:
   - explicitly considers context (e.g., an owner or a prospective purchaser)
   - includes both financial and non-financial value streams
   - views value streams from the perspective of the organization and its stakeholders
   - isolates the incremental value streams attributable to assets (e.g., intangibles) that create value streams in combination with complementary business assets

In a decision-making situation, this value concept will often have the greatest relevance.

5. **Fair value**. Similar to market value discussed above, International Financial Reporting Standards (IFRS) defines "fair value" in IFRS 13 as: "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date." IFRS 13 discusses a "fair value hierarchy" that essentially relates to the quality of the evidence available. Level 1 is defined as "quoted prices in active markets for identical assets or liabilities", Level 2 refers to prices "observable for the asset or liability", but not necessarily identical or in active markets, and Level 3 refers to "unobservable inputs for the asset or liability."

   However, IFRS 13 does not explicitly discuss the concept of context dependency, and its definition of fair value has little applicability to objects for which market value is not relevant.

6. **Value concept for financial reporting**. It is important to reiterate that financial statements are a tool for financial accountability of organizations and are not designed to reflect the market value of the entity or of its assets and liabilities. While the implementation can be complex, as a general principle, assets and liabilities are presented in financial statements at the *lower* of amortized historical cost or fair value. At this time, financial reporting standards are not sensitive to the complexities introduced by context dependency, value streams that are not financial in nature, or value streams affecting an organization's stakeholders.

[H1]4. Essential Insights for Thinking About Data and Value

[H2]4.1 Unique Characteristics of Intangibles and Data

Data is a specific category of intangibles. When thinking about value streams intangibles can generate, it is important to make two key distinctions as summarized in the following chart.

	Tradeable Intangibles	Non-Tradeable Intangibles
Multiple value streams	Internal and external use	Internal use only
Single value stream	Internal and external use	Internal use only

A value stream is a flow of financial and/or non-financial benefits to an organization and/or its stakeholders from a specific innovation, technology, product, or service line.

1. **Tradability**. A tradeable intangible is an intangible asset that can be sold or licensed to another organization. Patents and trademarks are tradeable intangibles. Tradeable intangibles can create value streams in organizations other than the current owner. By contrast, non-tradeable intangibles, such as a company's unique culture, can only create value streams in the context of the owner.

2. **Multiple simultaneous value streams**. Some intangibles can create multiple simultaneous value streams in multiple contexts. For example, a patent can be used to protect one product line while being licensed out to create additional value streams in other markets or applications. By contrast, a sports contract is an intangible that creates a single value stream: a professional basketball player cannot compete simultaneously for multiple teams in the National Basketball Association.

Data falls within the category of intangibles that are codified and tradeable and can generate multiple value streams. Data can be used by its owner in

multiple internal and external contexts, subject to any legal or regulatory constraints.

For example, by removing internal access restrictions to datasets within an organization, streamed customer sales data from a web platform can be used to generate insights in other departments such as logistics, business intelligence, forecasting and finance. Managing wider access to datasets can increase its value within an organization.

Additionally, data collected by an organization can also be licensed externally to create additional value streams. For example, upstream supply chain participants may license data from downstream customers in order to gain insights to guide future innovation initiatives.

While data has characteristics in common with other tradeable intangibles, it also has unique characteristics as summarized below. It is important for CPAs to consider which of the above characteristics apply to their organization's data.

Data Characteristics Common to Other Tradeable Intangibles	Unique Characteristics of Data
• high initial creation cost but low replication cost for data in particular (although infinite reproduction may diminish commercial value in the long run)	• growing exponentially faster than any other category of intangibles
• little inherent value: value potential depends on enabling value streams	• for many organizations, value creation potential depends on emergence of relevant data value chains (see 4.3 below)
• value creation potential depends on complementary business assets and context	• legal protections around data not as well defined as for IP. Some types of data are easy for competitors to emulate.
• potential ability to create multiple simultaneous value streams in multiple contexts	• risks related to privacy and protection of personal data
	• potential value time limited

Data Characteristics Common to Other Tradeable Intangibles	Unique Characteristics of Data
	• Internet-accessible data more exposed to theft and misuse than many other categories of intangible

[H2]4.2 Complementary Business Assets and Context

The organizations that led in creating value from intellectual property in the 1990s and early 2000s recognized that intellectual property (IP) is not inherently valuable: IP has value in context.

> That means that the same IP will have different values depending on the owner or user. Even two firms in the same industry will capture different value streams from the same IP because their context and complementary business assets, strategies, and market positions are different, thereby providing different contexts in which the value will be utilized.[2]

Owning the patent on a new type of widget is not sufficient to capture its potential value; the owner must have the capacity to manufacture the widgets and bring them to market through the necessary distribution and sales channels. Similarly, owning data is not sufficient to realize its value; the organization must also possess the capabilities required to create and leverage the relevant value streams.

[Consider emphasizing this conclusion in a call-out box]

More broadly, understanding the potential value of any intangible, including data, requires consideration of context. A patent on a new and more efficient widget manufacturing process may have significant value for a widget manufacturer but limited or no value for a gadget manufacturer. Similarly, an organization may own some data that has no value outside the organization, but other data that has potential value for many other organizations

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[2] Suzanne S. Harrison and Patrick H. Sullivan, *Edison in the Boardroom Revisited: How Leading Companies Realize Value from Their Intellectual Assets*, 2nd ed. (Hoboken, NJ: John Wiley & Sons, 2011), Chapter 6.

[H2]4.3 Data Value Chains

As was noted previously, all organizations, from micro-sized businesses to multinational corporations generate and collect data in their daily operations. As the strategic importance of data increases, organizations specializing in data collection, analytics and brokerage are emerging that help organizations manage and create value from their data. Value creation from data takes place along a "data value chain" of organizations rather than within the boundaries of a single organization. At each link in the chain, there are or will be buyers and sellers, each with unique access and capabilities to utilize an information asset. Their relative negotiating position and legal and economic ability to monetize the raw data, processed data, analyzed data (information), and corporate/consumer insights will vary and affect value along this chain.

BIG DATA VALUE CHAIN

UPSTREAM   DOWNSTREAM

Data Collection | Data Access | Data Analytics
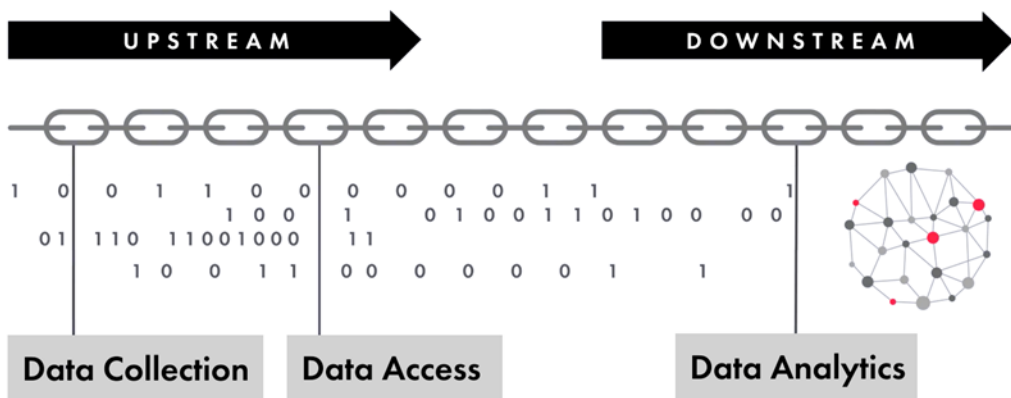
To properly assess the value of data to organizations engaged in the digitization of their operation or the creation of new data-centric business lines, a direct connection needs to be made between datasets generated by organizations upstream and algorithms trained to solve a particular issue or generate a particular outcome downstream.

Currently, many organizations rely on their own datasets to train algorithms by hiring data scientists or contracting with specialized AI firms. Increasingly, supply chains will be constituted of multiple organizations share streaming data in real time order to feed algorithms that will benefit all participants. In

various sectors, data integration initiatives are already creating a technical pathway for data sharing across firm boundaries.

As data value chains continue to evolve, organizations will need to determine which external data/insights to purchase and how to assure themselves that particular data/insight is appropriate for their intended use.

Given this evolution, anyone modelling value streams must recognize that these can cross organizational boundaries (as well as regulatory and national boundaries), in which case the model must reflect the share of the overarching value stream that accrues to each participant in the data value chain.

For more information about Data Value Chains, see Mastering Data Series #2, Data Value Chains [add link]

[H2]4.4 Dynamic Nature of Data Portfolios

While other intangibles are accrued over considerable periods of time, data portfolios are highly dynamic and continually evolving as new data is accumulated. Portfolios that are not continually refreshed typically become stale dated quite quickly. In many situations, it is important to think of data as a "flow asset" rather than as a "stock asset" since, unless data is continuously refreshed, its value may diminish to zero in a remarkably short period of time.

The inherently dynamic nature of data is reinforced by:
• technological changes that make it easier to accumulate data and derive insights
• regulatory developments affecting the ability to use certain types of data for various purposes, particularly personal data. Such regulations may vary across different jurisdictions in which the data is used and stored.
• competitive and security threats that require constant vigilance in safeguarding data.

One of the challenges for large organizations is the tension between attempting to maintain "one source of truth" for the extended organization, and the need for nimbleness and flexibility to respond to the needs of specific business units.

Any attempts to model value streams from data must ensure the model fully reflects the dynamic nature of the underlying data.

[H1]5. Decision-Making Perspective on Value Creation From Data

Building on the concepts and insights discussed above, you need now to return to the core question: What is Your Data Worth? In Sections 5 through 12, seven perspectives were discussed, each of which provides a different lens through which to look at data and its value.

To explore the decision-making perspective on value creation from data, assume that in probing a colleague's question about what your data is worth, you learn that the question behind the question is: How can our organization create more value from data? Alternatively, perhaps the question is: How much should our organization be investing in data so we can create more value in the future, and at what link in the value chain should these investments be made for the greatest competitive advantage and ROI?

The value creation decision-making perspective is that of executives wishing to make decisions based on understanding the role of data and insights into creating value for the organization. This perspective includes decisions about creating, acquiring, and using data with the objective of optimizing value creation for the organization and its stakeholders.

[H2]5.1 Value Streams From Data

Most data is not inherently valuable; its potential value is a function of the value streams data can enable. The following is a typology of data-related value streams that could be of interest to many organizations.

A. Data Insights Value Streams	B. Data Transactions Value Streams
A1. Customer-related value streams	B1. Data-based advertising
A2. Operations-related value streams	B2. Data-based services
A3. Innovation-related value streams	B3. Data-based licensing

A4. Algorithm-based value streams	B4. Data-based sales

[H3]A. Data insights value streams – data as an enabler

In this category are value streams for goods and services enhanced by using insights derived from data to improve performance above that which would have existed without those insights.

- A1. Customer-related value streams arise from mining data to generate insights that can be used to increase customer loyalty, identify new opportunities to generate revenue from existing customers, speed up the acquisition of new customers and reduce the costs, or otherwise increase revenues. For example. any company using some form of customer relationship management software aims to enhance customer-related value streams by doing so.

- A2. Operations-related value streams arise from mining data to generate insights that create more efficient operations, reduce manufacturing or service costs, reduce waste, or otherwise decrease costs. For example, any company adopting "lean" processes will use data to identify opportunities to increase productivity and reduce waste.

- A3. Innovation-related value streams arise from mining data to generate insights that result in new technologies, products or services, more efficient or faster time to market for products and services, or otherwise increase the pace, efficiency and effectiveness of innovation. For example, any company that makes significant investments in R&D will use data to try to enhance its "hit rate" of successful innovations.

- A4. Algorithm-based value streams arise from using underlying data coupled with algorithms to influence terms of trade for online markets, offer demand-based pricing, or otherwise increase profits from a transactions stream. For example, most airlines have adopted pricing algorithms that automatically raise or lower seat pricing based on available seats for specific flights in relation to the date of departure. Since Amazon, for example, sells products directly from its warehouses

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while offering a platform for other sellers, it can leverage customer data to create preferential terms of trade for its direct sales, thus increasing its market share and profitability relative to other platform sellers.

[H3]B. Data transactions value streams – data as a product

In this category are value streams in which data directly enables transactions that would not occur in the absence of the data.

- B1. Data-based advertising refers to organizations that collect personalized data and display advertising to individuals based on a match between the profile of the individual and the advertiser's target demographics. In this case, the advertiser does not get direct access to profile data. Data-based advertising is the basis of the business model for many online advertising companies including Facebook and Google.

- B2. Data-based services refers to organizations that leverage data by selling services premised on insights arising from the underlying data without actually making the data available. In this case, the services customer does not get full access to the underlying data. Many data analytics services providers and consulting firms apply this model, accumulating data from multiple clients and offering specialized services based on insights from the underlying data.

- B3. Data-based licensing refers to organizations that leverage data by licensing use of data to another entity. In this case, the licensor retains ownership of the data and makes it available to the licensee for a specific use or period of time. As an example, Bloomberg offers reference, pricing and regulatory data to feed customers' accounting, portfolio management and compliance systems.

- B4. Data-based brokering and sales refers to situations in which an organization sells data to another entity and retains no ongoing ownership interest in the data. The most common instances of this sort occur when a startup sells itself and its accumulated data to a larger organization (e.g., Microsoft's acquisition of Skype). A growing number

of organizations are positioning themselves as data brokers and exchange services (e.g., BDEX and WorldQuant).

[H2]5.2 Making Strategic Decisions About Data-Based Value Streams

In each of the above categories, the key strategic question for executives is: What do we need to do to optimize future value streams enabled by or deriving directly from data?

Addressing this question requires a sophisticated analysis of the interactions among the data (including the type, quantity, quality, validity, precision, and traceability of the data and/or data-derived insights) and the value streams the data enables. It also requires consideration of:

- both financial and non-financial value streams, given that non-financial value streams may have strategic significance for the organization
- value streams from both the organization and stakeholder perspectives

Some value streams arising from the use of data cannot be measured directly in units of currency but could have strategic significance, including positive or negative impacts on an organization's:

- market reputation and customer loyalty and trust
- liability risk exposure
- attractiveness as a supplier or business partner
- innovation capability

Examples of value streams from a stakeholder perspective include an organization's impact on ecosystems and its impact on the health and well-being of societies and communities within which it operates.

All these value streams are relevant when making decisions about leveraging data to create value.

When deciding how to proceed, it can be helpful to consider two categories of actions:

1. those aimed at optimizing the data to enhance its ability to enable value streams
2. those aimed at using the data to enhance existing or generate new value streams

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┌─────────────────┐          ┌─────────────────┐
│  Optimizing the │  ◄────►  │  Optimizing the │
│      data       │          │  value streams  │
└─────────────────┘          └─────────────────┘
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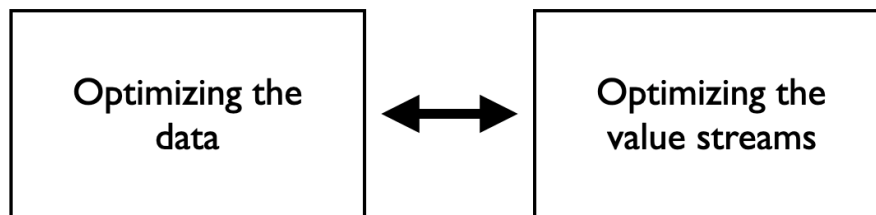
Optimization always requires measurement: for both categories of optimization, a method is needed to measure the future value streams in such a way as to inform executive decisions. In many contexts, it will be important that a third party using the same data and processes would arrive at similar conclusions.

The value concept most relevant for the executive decision-making perspective is economic value as discussed in Section 3.

- **"value in use"** is relevant because historical costs tells us nothing about the future value of data. In the vast majority of cases there is no "market value" or "fair value" for data. To estimate value in use, we model the future value streams that data can enable. Past value streams may be relevant in the estimation process, but the future should not be assumed to always resemble the past. In many cases, the value streams that data can enable did not exist in the past. (Reference Class forecasting may be a useful methodology to consider, but it will only be applicable if appropriate datasets are available.)

- **"in context"** is relevant here because in most cases data does not create value on its own; it does so in combination with "complementary business assets." The combination of the specific data and the specific complementary business assets constitutes the "context" within which the value streams are enabled. The same data could potentially create more or less value in a different organizational context.

- "**incremental**" refers to the need to recognize the specific contribution of the data to the organization's value streams. If one model of the organization's value streams is generated assuming the data does not exist, and another model that assumes the data does exist, the difference between the two models represents the incremental contribution of the data in question. Prudence and judgment will be required to ensure this potential incremental value is neither over- nor understated.

From this discussion, it becomes clear organizations need a sophisticated value-stream modelling capability to support strategic decisions. This capability will be focused on the organizations' existing and future data portfolio and the future value streams it can enable.
[Consider emphasizing this conclusion in a call-out box]

[To discuss: include case study here or leave for an Appendix or the next publication. A better alternative could be to link to a case study online, since then it could be interactive]

[H1]6. Buying, Selling, or Licensing Data Perspective

A second perspective for addressing the "worth" question is: What is our data worth to others, or what is someone else's data worth to us? This perspective on the relationship between data, value, and value creation is relevant for an organization that wishes to purchase, sell or license data. It encompasses the following situations:

- direct purchase or sale of data or a data portfolio (a relatively rare event)
- acquisition or sale of a data portfolio as part of a company purchase or sale (more common)
- out-licensing of data or in-licensing of data (which happens regularly in specialized industries, such as cost estimating)

In each of these situations, there are two parties, each with its own view of the potential value of the data. As in the value-creation, decision-making perspective discussed in the previous section, the relevant value concept for this perspective is also "economic value" with the difference that the context for modelling value streams includes the prospective owner or licensor, not just the current owner of the data.

Direct purchase: For a purchaser wishing to acquire a data portfolio directly, the relevant questions are:
- What are the incremental future value streams (financial and non-financial) our organization could generate (for itself and stakeholders) as a result of acquiring the data?
- How do those future value streams compare to the cost of acquiring the data? Could the data be developed internally, or is purchasing it the only option?
- Is the future ROI worthwhile?

The seller in such a transaction should undertake similar analyses to avoid under- or overestimating the value it offers to a prospective buyer. In both cases, the analysis should consider both cost avoidance as well as revenue generation.

Portfolio acquisition: In the case of a purchaser considering acquisition of a data portfolio indirectly as part of a merger or acquisition, the relevant questions include:

- What are the value streams (financial and non-financial) the target organization is currently generating for itself and stakeholders? To what extent will these continue post-acquisition?

- What are the incremental future value streams that could be generated:
  - by using the acquired organization's data in conjunction with the purchaser's complementary business assets
  - by using the purchasing organization's data in conjunction with the acquired organization's complementary business assets

- What is the strategic value to the purchaser of ensuring that none of its competitors is able to acquire and leverage the data and complementary business assets of the target organization?

- Are there any risks associated with the target organization's data portfolio that could result in future liabilities for the purchaser? For example, are the intended activities permissible under existing or future regulatory schemes in the relevant jurisdictions of both existing and potential new markets?

The answers to these questions in combination will influence the purchaser's view of the maximum transaction price it would be prepared to pay for the target organization and its data portfolio.

The seller in an M&A transaction involving a data portfolio should do its own analysis of value to the prospective buyer in order to gain insights for negotiating the purchase price.

Licensing: A company wishing to in-license a data portfolio will presumably already have evaluated its potential value in its context.

For an owner considering out-licensing of data, the relevant questions include:

- Are there strategic considerations or risks that could make out-licensing unattractive?

- What are the incremental financial and non-financial value streams the licensee of the data could potentially generate given the licensor's complementary business assets? This analysis will help set an upper limit on what the licensee would be prepared to pay to have access to the data.
- If there is potential demand from multiple potential licensees, is there a premium for exclusivity? How do the incremental value streams a potential licensee could generate from exclusive access to the data compare to the potential revenues generated by multiple licensees?
- To protect the long-term value potential of the data, what restrictions should the owner consider on use and time limits for access, as well as mechanisms to ensure the data cannot be simply appropriated over time?
- What risks may be manifested to the seller if the data is not refreshed often enough to prevent losses to purchasers as insights may have changed drastically from one refresh period to the next?

In sum, to support buying, selling, or licensing data, organizations need the same sophisticated value-stream modelling capability as required to support strategic internal value-creation decisions.

[H1]7. Data Valuation Perspective

There are various circumstances under which an organization might require a formal valuation of a data portfolio performed by a professional valuator.

Valuations undertaken by professional valuation experts are increasingly performed in accordance with valuation standards issued by the International Valuation Standards Council (IVSC). While IVSC has not yet issued a specific standard relating to data valuation, a working group has been established to consider specific issues relating to valuations of data.

Traditionally, valuators use one or more of three methods to value assets:

- market method (preferred where reliable and comparable transaction data is available)
- income method (preferred when relevant market data is not available)
- cost method (least preferred method, may be used to establish a value baseline)

For data, comparable transaction data is rare. This may change in future, as multiple data exchange initiatives have been launched in recent years. For instance:

- Streamer advertises itself as "the decentralized platform for real-time data" (streamr.network)
- Amazon has launched AWS Data Exchange, which intends to enable users to "easily find and subscribe to third-party data in the cloud" (aws.amazon.com/data-exchange/)
- Snowflake promised to "eliminate data silos and instantly and securely share governed data across your organization, and beyond, by creating your own data exchange" (www.snowflake.com/workloads/data-exchange/)
- Lotame, which monetizes user data to marketers, claims to host "the world's largest 2nd and 3rd party data marketplace" (www.lotame.com/products/lotame-data-exchange/)

- Ringlead offers a "one-stop-data-shop where businesses can discover, review, and acquire the third-party data sources that fuel revenue operations".(dataexchange.ringlead.com).

Many of these exchanges focus on data about consumers, which is an important but still limited segment within the universe of data. For the foreseeable future, the likelihood is extremely small that for most data portfolios sufficient reliable and comparable transactions information will exist to support a market method for valuing a data portfolio.

The income method of valuation, when applied to a business, typically relies on applying a discount rate to an estimate of future cash flows to calculate a present value for the business. Various techniques are used to provide evidence to support the estimate of future cash flows.

There are various challenges when applying this method to data. Data rarely generates future cash flows on its own. It is therefore necessary to employ other techniques to isolate the value relevant to the data. These techniques include:

- **multi-period excess earnings method**. estimates revenues and cash flows from the data portfolio and then deducts portions of the cash flow that can be attributed to supporting assets

- **with-and-without method**. estimates the data portfolio value as the difference between the present value of the company's earnings with the data portfolio in place and the present value of the company's earnings assuming the data portfolio does not exist

- **relief from royalty method**. estimates the cumulative royalty costs a company would be willing to pay to license the data portfolio from a hypothetical third party

When applied to a data portfolio, the cost method typically estimates the cost of replacing the data portfolio if it did not already exist.

The income methods summarized above have some similarities to economic value as described in Section 5. There are three important differences.

1. Formal valuation methods may or may not explicitly recognize the importance of context for intangibles in general and data in particular. The word "context" does not appear in the IVSC glossary. (ivsc.org/standards/glossary)

2. Formal valuation methods focus on cash flows. However, when looking at the value of data from a strategic perspective, it may be significant to consider non-financial as well as financial value streams.

3. Similarly, valuation methods focus on cash flows to the owner of an asset. However, when looking at the value of data from a strategic perspective, it may be significant to consider value streams for stakeholders as well as value streams to the owner of the data.

These differences may be significant, depending on the purpose of a formal valuation of a data portfolio.

[H1]8. Data From a Taxation Perspective

For most businesses today, the tax value of data is not a factor. The expenses involved in accumulating a data portfolio are usually deducted as costs in the calculation of taxable income.

However, the emergence of international data-rich companies with users in multiple countries has given rise to a new concern for taxation authorities and the companies in question: Where should the income derived from utilization of that user data be taxed? This can be a billion-dollar-plus question.

Until recently, the answer was that the locus of taxation was based on where the data resided, not where the users resided. However, this situation drove a number of prominent decisions by international companies to transfer data portfolios from a higher-tax-rate jurisdiction (e.g., the U.S.) to a lower-tax-rate jurisdiction (e.g., various European and Caribbean countries) in order to ensure that corporate income on future transactions enabled by that data portfolio was taxed at a lower rate.

Within the Organization for Economic Co-operation and Development (OECD) and the European Union (EU), negotiations are underway to restructure the tax treatment of data-derived income both for consumption taxes (e.g., VAT, GST) and corporate income taxes. The details of these "digital taxation" negotiations are beyond the scope of this paper but will have future implications for most companies engaged in cross-border digital transactions.

However, a number of high-profile tax disputes between international companies and U.S. tax authorities has shone a spotlight on valuation of data for tax purposes. These cases arose after large U.S. companies transferred their data portfolios to a lower-tax jurisdiction. In these cases, the most important component of the data portfolio was information about users and customers, a significant percentage of which were repeat customers.

In such cases, the tax authority in the exited jurisdiction knew that it would lose future corporate income tax revenue and therefore wished to maximize taxes on the departing portfolio transfer transaction based on the "fair value" of the data portfolio.

On the other hand, the taxpaying corporation wished to pay as little tax as possible on the portfolio transfer transaction and had an interest in minimizing the value of the portfolio for tax purposes.

Litigation resulting from these cross-border data portfolio transfers emphasized the importance of two major factors in determining the value of the data portfolio for tax purposes:

1. estimating future revenues likely to arise from use of the user / customer data, based on extrapolating past repeat business patterns
2. estimating how quickly the value of user / customer data decays over time if not continually refreshed, based on empirical analysis of that decay

Among the insights emerging from these cases is that the ability of user / customer data to generate repeat sales revenues decays much faster than tax authorities initially assumed.

The fact that the ability of a static data portfolio to enable future value streams can decay quickly is potentially significant for all data value perspectives.

Going forward, the digitalization of tax regimes will have implications for all businesses engaged in data-enabled cross-border transactions and may have implications for any businesses operating in cross-border cloud-enabled environments. Taxation-related developments that CPAs should monitor include:

- changes in tax treatment of cross-border data-enabled transactions for both consumption and income tax purposes
- potential taxation exposure arising from data that resides on infrastructure in another tax jurisdiction or that is used to support decisions in another jurisdiction

Looking to the longer run, Canada may need to consider how its tax regime should evolve as the economy becomes increasingly digital, given that major features of Canada's corporate taxation system were designed for a pre-digital economy.

[H1]9. Data From a Financial Reporting Perspective

In financial reporting, the cost of accumulating a data portfolio has traditionally been treated as an expense unless the data is acquired in a third-party transaction in which case it can be recorded on a balance sheet at the lower of cost or fair value.

Updated accounting standards now provide for recognition of certain self-generated intangibles (including data) at cost provided evidence of future economic benefits is strong and cost can be reliably determined.

At present, and likely for the foreseeable future, balance sheets will continue to record data (and all other assets) at the lower of historical cost or fair value. Traditionally, the purpose of transaction-centric financial reporting has not included accounting for the market or economic value of assets.

However, there are various international discussions currently underway aimed at expanding disclosures about intangibles (including data) which could have implications for data-related disclosures. CPAs should consider:

- whether their organization could benefit from voluntarily providing disclosure about their data portfolios, how they are being managed, and the role in value creation for the organization
[Consider emphasizing this conclusion in a call-out box]
- whether they should adopt alternative value-creation reporting frameworks, such as integrated reporting, the metrics recommended by Embankment Project for Inclusive Capitalism, or other similar frameworks

CPA Canada's Global Value Creation Solutions Directory can help you locate reporting and other frameworks of interest. The Directory can be accessed at: cpacanada.ca/en/foresight-initiative/value-creation/global-value-creations-solutions-directory

[H1]10. Data From a Risk and Risk-Management Perspective

It is important to note that data is not only a potential enabler of future value streams. If not managed properly, it can be a potential source of liability risk. Litigation arising from alleged misuse of data is a rapidly evolving area of case law. Given this risk, mismanagement of data can destroy value instead of creating it.

Care must be taken to appropriately protect all data. Data of strategic relevance needs to be protected. Should others gain access to data, companies are required to disclose the compromise and will be subject to an investigation. The disclosure alone could reduce public trust in the company and result in a loss of future earnings. Moreover, the organization will incur legal costs. Should regulators conclude the compromise arose from negligence, the company could be subjected to significant fines.

Additionally, risk does not end with securing the data itself. If the data is sold or transferred and used for a secondary purpose not permitted in your jurisdictions or by upstream data owners, the seller could be held accountable. Again, this could impact public perception and subject the organization to potential legal action.

Additionally, with data sold or licensed to another organization, there may be contractual obligations to ensure data remains relevant. Should the organization not meet these conditions, it could be in breach and subject to all associated ramifications. This risk could cascade from the previous risks to make potential trust and legal issues more complex and costly.

With this as background, here are some initial questions CPAs should consider with regard to data-related risk and risk management:

- What risks would the organization face if there were a privacy or security breach involving the data portfolio? Are the controls currently in place sufficient to prevent such a breach?
- Are all uses of the data portfolio complying with the terms under which the data portfolio was accumulated?
- Is the organization taking sufficient steps to ensure the data is refreshed and managed in such a way as to preserve its strategic value to the organization?

For additional insights on risk and risk management related to data, please see:
• Mastering Data Series #3: Corporate Data Policies [add link]
• Mastering Data Series #4: Creating a digitization strategy [add link]

[H1]11. Public Policy Perspective on Data

Public policy is concerned with multiple aspects of data. Actions by governments may have significant implications for value in various categories of data. Some of the more prominent public policy considerations include:

- Privacy and other data-related risks to citizens and organizations - At present, in Canada, a patchwork of national and provincial policies is creating complexity for organizations operating across provincial boundaries. These complexities are magnified for corporations operating across international boundaries.

- Efforts to promote innovation – Digitized historical data is being made available to the public to support new economic opportunities for existing and new businesses.

- Exploring ways to leverage technologies such as blockchain and automated reporting – This should simplify compliance monitoring while reducing compliance costs for businesses and operational costs for regulatory authorities.

- Work by Statistics Canada – Statistics Canada is working to measure the emergence of the digital economy and estimate investment in data across the economy.

Around the world, many governments are also re-assessing how to encourage innovation while ensuring that Big Data organizations are regulated and taxed appropriately. For example:

- In the U.S., a bill entitled *Designing Accounting Safeguards to Help Broaden Oversight and Regulations on Data* was introduced in the Senate in May 2019. If passed, it would direct the U.S. Securities and Exchange Commission to develop methods for calculating the value of user data and accounting for varying uses, sectors, and business models.

- France, along with several other European countries, has introduced legislation aimed at the taxation of digital businesses which could take effect in 2022, depending on the outcome of discussions at the OECD

regarding the taxation of the digital economy.

- Looking forward, the European Commission announced in its Data Strategy (2020) a comprehensive plan to foster business-to-business (B2B) data sharing. Much of the data collected by organizations remains locked up and is not available for innovative secondary use. The strategy's ultimate objective is to remove obstacles to B2B sharing and trading, help create data value chains and spur the buying and selling of datasets among organizations.

CPAs will need to monitor these and other public policy developments to assess potential implications for their organization's ongoing ability to create value from data.

[H1]12. Conclusion and Next Steps

So, what is your organization's data worth?

This paper was designed to provide you with ways to respond to this question even though there is no single answer. Finding the most relevant answer depends on:

- Which of the perspectives discussed in Sections 5 through 11 above is applicable in the circumstances?

- Given the perspective, which value concept should be used to quantify value?

Building on this publication, CPA Canada will continue to support CPAs who are involved with exploring issues around data, its value in relevant contexts, and its role in creating value for their organizations. Stay tuned for future announcements arising from the CPA Canada's Data Governance and Value Creation workstreams.

[H1]13. Where to Find Further Information

CPA Canada publications:

Data Governance Primer

Mastering Data Series

1. Mastering Data - Setting the context
2. Making sense of Data Value Chains
3. Corporate Data Policies
4. Corporate Digitization Strategies

Value Creation Measurement and Decisions Primer [add link]

From data to decisions: A five-step approach to data-driven decision making (Guideline)

Future Value Drivers: Leveraging your intangible assets using a five-step process (Guideline)

A CPA's introduction to AI: From algorithms to deep learning
cpacanada.ca/en/business-and-accounting-resources/other-general-business-topics/information-management-and-technology/publications/a-cpa-introduction-to-ai

How are big data and AI transforming accounting and finance?
cpacanada.ca/en/business-and-accounting-resources/other-general-business-topics/information-management-and-technology/publications/ai-impact-on-accounting-and-finance

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