A GUIDE
TO DATA STORYTELLING
IN THE PUBLIC SECTOR

Communicating
Public Finances
Effectively

PULSAR

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TABLE OF CONTENTS

PREFACE

The Data Storytelling Guide was developed under the Public Sector Accounting and Reporting (PULSAR) program's raising awareness component. The PULSAR Program, launched in 2017, is a regional and country-level program in 13 beneficiary countries of Europe and Central Asia. Its objective is to support the enhancement of public sector accounting and financial reporting frameworks in line with international standards and good practices to improve government accountability, transparency, and performance.

The objectives and scope of the PULSAR Program are jointly determined by the PULSAR Partners – Austria, Switzerland, and the World Bank – who also provide institutional support for its implementation and mobilize the resources needed for its activities. Beneficiary countries help shape the program through regional cooperation platforms and input to two Communities of Practice: Financial Reporting Frameworks (FinCoP) and Education (EduCoP).

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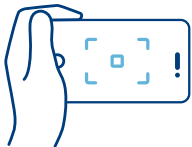
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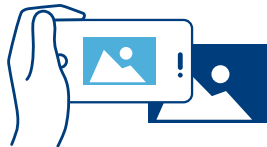
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FROM REPORTING TO COMMUNICATING

> The ability to take data — to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it — that's going to be a hugely important skill in the next decades.

Hal R. Varian
Chief Economist at Google and Professor at Berkeley University

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For several years, our society has been undergoing a challenging and profound transformation from a knowledge-based society to a data economy. As a result, the sheer volume of data generated – numeric and qualitative – is growing and accelerating. This development pertains to the public sector, where available financial and non-financial information has increased tremendously across all government sectors and services.

The existence of transparent public finances and the ability to hold those in power accountable for the use of public funds are crucial democratic cornerstones for a prosperous society. In this sense, public-sector financial data and reports serve as important sources of information and provide a reliable basis for decision-making and accountability.

Data produced by experts for experts

A recent OECD study on rationalizing government fiscal reporting, however, illustrates a paradoxical situation: as a result of improved public financial management (PFM) systems and reporting, more data and more sophisticated reports are being produced for the public sector. However, this wealth of information is not used for decision-making to the extent it could. Public sector financial information tends to be very detailed, non-contextual, and technically complex, affecting its comprehensibility. Often, only highly specialized PFM experts can understand and make full use of it.

Academic literature seems to agree that introducing modern and transparent reporting standards – often paired with state-of-the-art financial information management systems – does not necessarily result in increased accountability. For PFM, this development has manifested itself in the claim that more data would increase transparency; however, in reality, the opposite is true, that too much irrelevant data can negatively impact transparency.

Figure 1: Logical claim of better accountability
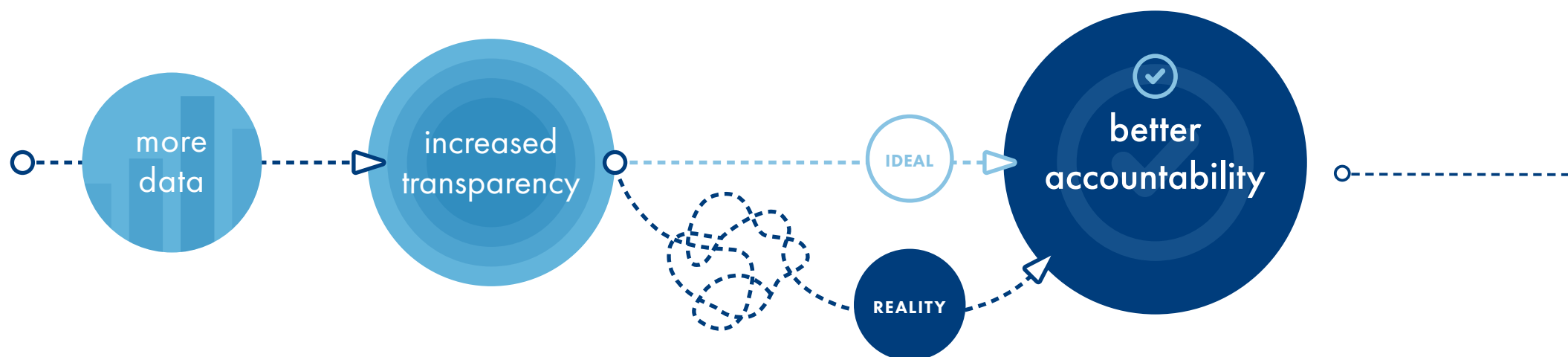
To make public sector financial and fiscal data and reports more useful, their content needs to be streamlined and their comprehensibility increased. To convey key messages derived from figures and numbers effectively and create insights, PFM experts need to communicate rather than simply report facts. This requires a shift from viewing fiscal and financial reporting as a unilateral process of transmitting information to practicing user-centricity.

Utilizing data storytelling for PFM

The addressees of government financial information range from private individuals, media, investors, and shareholders to politicians and other government officials, as well as decision-makers and public sector managers. This very diverse audience typically exhibits a lower level of financial literacy than the specialists producing the financial information. Moreover, for many people, handling quantitative data is challenging and depends on their numeracy – the ability to understand and work with numbers.

Financial communication approaches, such as data storytelling, help to communicate the meaning behind data by transforming it into linguistic and visual narratives. Processing, preparing, and communicating financial information derived from the PFM system in a comprehensible and user-friendly way is the prime aim of this guide.

Storytelling as a core competence

The Data Storytelling Guide is designed to support finance professionals working in the public domain to translate facts, numbers, and expert knowledge into understandable and relatable stories. It follows a skills-based approach, where data storytelling is viewed as a key skill set for acquiring what the Chartered Institute of Public Finance and Accountancy (CIPFA) identifies as one of the core competencies for public sector finance professionals: communication and impact.

The guide presents PFM specialists with a menu of options to realize their communication project by offering tips, tricks, and a helpful toolbox for each element of a data-driven story. It also includes a framework that outlines the process and individual steps when telling a story. In the final chapter, the guide provides some thoughts on dealing with ethical aspects and delineates the boundaries between storytelling and manipulation.
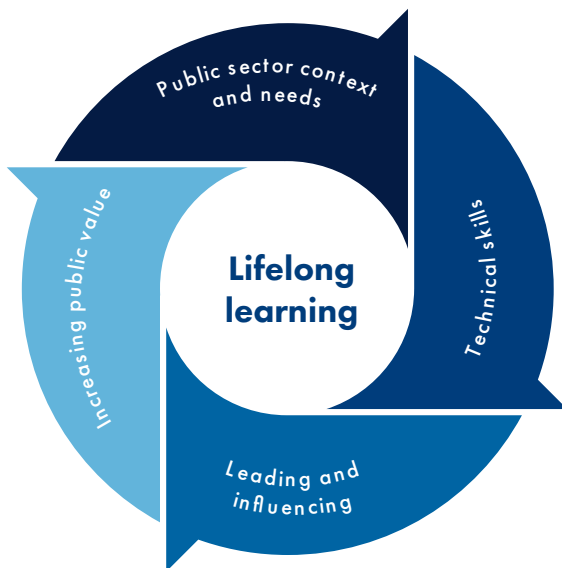
Figure 2
Key competencies for PFM professionals

Source
CIPFA (2020). Key Competencies for Public Sector Finance Professionals, p. 3.

Political awareness

Value for money

Financial reporting

Decision-making

Accountability

Governance

Risk management

Commercial understanding

Counter-fraud

Sector specific

Financial accounting

Management accounting

Audit

Costing

Procurement

Counter-fraud

Data

Strategy and governance

Collaboration

Business partnering

Communication and impact

Innovation and change

Stakeholder relationships

Value for money

Investment appraisal

Strategic thinking

Commercial understanding

Benchmarking

Delivery models

Reorganisation

Public sector context and needs

Technical skills

Leading and influencing

Increasing public value

Lifelong learning

ELEMENTS OF A
DATA-DRIVEN STORY

In PFM, data storytelling should enable recipients of public financial or fiscal information to assess an issue based on facts and make a well-informed decision. Recipients would include voters wanting to hold their government accountable, a government official planning and allocating public money, or an accountant engaged in financial transactions. Accordingly, data storytelling can be used to reach out to citizens and the wider public, as well as for internal communication with colleagues, superiors, or at government level in general.

In the following sections, the elements considered the main ingredients of successful data storytelling are outlined in detail

THE DATA

The first step in creating a powerful data story is processing and preparing data for analysis and communication.

THE NARRATIVE

The narrative (or storyline) is used to communicate insights extracted from data, its context, and recommended actions.

THE LANGUAGE

Making the story accessible through simple and understandable language is vital when being inclusive and communicating with a diverse audience.

THE VISUALIZATION

Visual representations of the data and narrative are essential for communicating the key message clearly and memorably.

THE
DATA

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with the Artivive app

Recent decades have seen a considerable increase in financial information linking the entire provision of public goods and services. This has led to a growth in the variety and volume, as well as the sophistication of available data. The PFM system provides a wealth of information that has been solicited by public financial managers, statisticians, and policymakers. Budgeting, accounting, and government statistics all generate financial and non-financial information, and this raw data can be combined or enriched with additional data to provide performance information, environmental, social, and governance metrics (ESG data), and policy targets. In the context of PFM, the term "data" generally refers to events with a financial impact on the government.

Figure 3
Integrated PFM cycle

Working with PFM data requires public finance specialists to perform at least a basic analysis to spot patterns and trends and ultimately understand and extract meaning from these numbers. In addition, the ability to communicate these insights to enlighten the audience is a critical skill in data-driven communication.
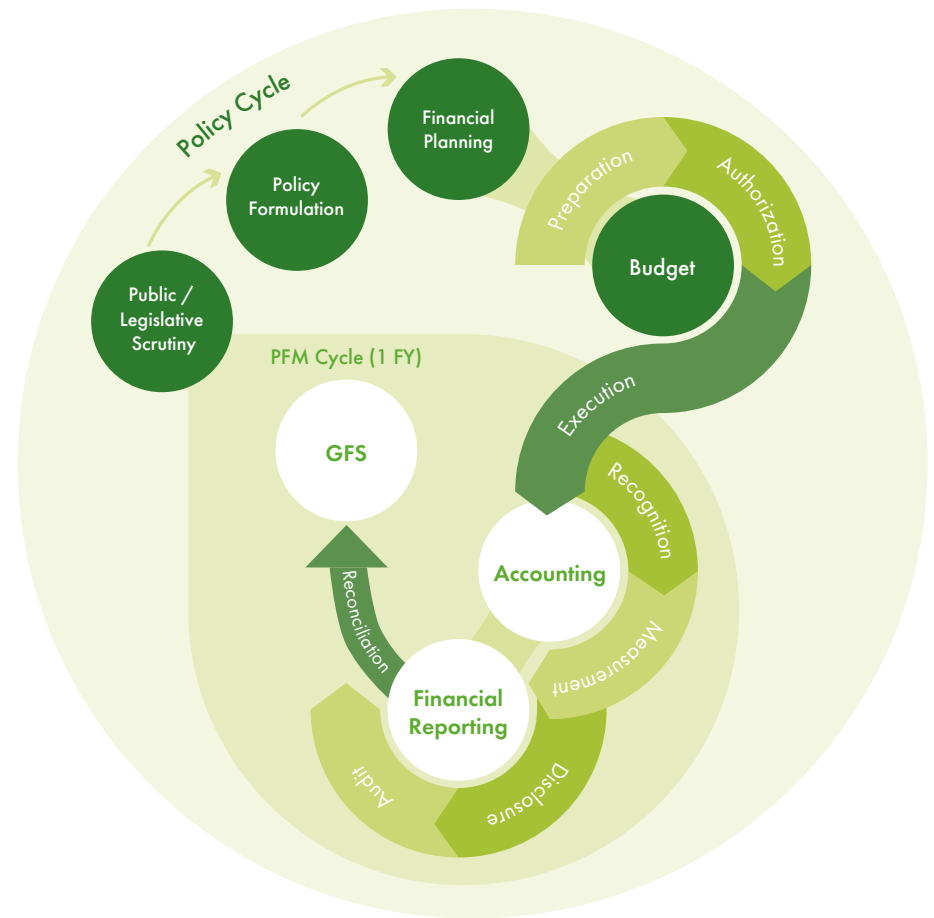
Source
World Bank (2019).
Benchmarking Guide: Integrating PSA and Government Finance Statistics (GFS), p. 27.

Extracting information from PFM data

The first step when creating a powerful story using PFM information is to prepare data for analysis and monitoring. As the digital transformation of governments proceeds, GovTech[1] solutions become the norm when extracting information from public sector financial data. Equally important is the quality of the data, which is instrumental in maintaining credibility.

1 DATA QUALITY

Use reliable data only

The underlying data should be verified for a data story to be credible and avoid any potential issue in the analysis. It is good practice to perform sanity checks on the raw data, which help detect missing values, misleading outliers, and imbalances. Moreover, data audited by internal and external auditors provide additional assurance.

[1] GovTech is a whole-of-government approach to public sector modernization that promotes a simple, efficient, and transparent government with the citizen at the center of reforms. It represents the current frontier of government digital transformation.

2 AUTOMATED STORAGE OF PFM DATA

3 MONITOR AND ANALYZE PFM DATA

FMIS
as the gold standard

Financial management information systems (FMIS) refer to the automation of PFM functions and are a valuable tool for recording and reporting all financial transactions. FMIS store various economic data in databases and have many advantages over manual storage in decentralized documents such as Excel sheets. Automated PFM systems improve the accuracy and integrity of financial information as more consistent applications of controls, standards, rules, and classification are facilitated. In addition, FMIS enable faster and more comprehensive monitoring and reporting of PFM data at an increased frequency.

Consider interactive dashboards

Contrary to static representation, dashboards facilitate interactive information exploration and are also a valuable tool for visualizing data. Another advantage of dashboards is that they can display not only financial information, but can be combined with non-financial data, performance indicators, or ESG information to provide a broader context to the financial data. Dashboards help decision-makers monitor PFM data and investigate the cause of changes and trends. Moreover, dashboards allow parliamentarians and citizens to delve into the detail of fiscal reports and structure their own queries. To ensure that this information is easily accessible, it is appropriate to organize the dashboard's structure with additional descriptions around a story. Dashboards, however, also have their limitations as they require a certain level of data analytics and IT literacy. This should be considered when they are employed to inform the broader public.

Presenting numerical information

As Knowles has pointed out in his foundational book, "Narrative by Numbers," data and facts should be used as the bedrock of a story rather than replacing or being the story. Unfortunately, while applying the data-driven approach, many find it tempting to "blind the audience with science" and present vast amounts of evidence supporting their argument. The focus, however, should not be on proving a point but on conveying the key message to empower the audience to make an informed decision. Here are some tips to be considered when presenting numerical information.

4 KEEP IT SIMPLE

Avoid decimals and fractions

It is not necessary to show numbers accurately to the second decimal place. They are much easier to remember when rounded and ending in a zero.

Break down large numbers into smaller units

It is difficult to comprehend figures larger than those people usually deal with. In public sector data, the numbers are generally huge, and they tend to lose their meaning on an audience of laypeople. It is worth considering breaking down yearly figures to weeks or even per head of population if necessary. So, for example, "*annual spending on climate mitigation measures amounts to USD 6.76 billion*" becomes "*the government invests about USD 130 million each week in climate mitigation measures.*"

5 BE CONCISE

Do not show workings or calculations

Workings and calculations should be treated as background information, not as part of the story's central message. Otherwise, the audience's attention will be drawn to the calculations and away from the story.

Use compound variables

The explanatory power of quantitative information can be increased by pulling together different numbers and statistics into indicators and other compound variables. One calculated value summarizing stories or supporting key messages is easier to absorb than many different numbers and statistics. For example, PFM data is well suited to generating performance data, thereby combining expenditure with services provided and spending efficiency.

6 WORK WITH COMPARISONS

Add reference values

The human brain is not naturally equipped to deal with isolated facts and figures; all numbers need to be put into a context to become meaningful. Adding reference values allows the audience to compare and better understand the size and significance of the numbers. For example, you could compare key figures of different countries or other expenditure categories.

Offer alternatives

Conveying the same data in a different format ("In other words, this means...") is very useful when dealing with varying degrees of audience numeracy. For example, use relative frequencies to make the number more tangible, such as 3% means 3 out of 100. It is also advisable using data visualization to facilitate the processing of numeric information.

7 BE
MINDFUL OF BIAS

○

Consider the opposite

Humans tend to be biased and selectively ingest information that is consistent with their own beliefs. Communicating contradictory information will help achieve a more comprehensive and balanced understanding of scenarios and consequences ("conversely, this means...").

○

Consider the base

Probabilities and percentages are rather abstract concepts and should be communicated carefully because they are susceptible to misinterpretation and distortion. One option is to consider the base ("In absolute terms, this means..."). For example, the handy guide "Making Sense of Statistics" offers the following example: "A disease with a 0.1% mortality rate doesn't sound too worrying until you consider that it could still cause the deaths of thousands of people every year if it is a common disease."

8

CREDIBILITY
IS OUR CURRENCY

Maintain your persuasive power

Once we lose credibility, whether through oversight or negligence, we lose our persuasive power. These rules of thumb can help avoid this:

- Declutter, but be careful not to omit essential data necessary for a holistic and balanced view.

- If analysis or evaluation shows exceptional or unexpected results, these should be mentioned.

- Be ready to offer background information, such as your workings or data sources, if challenged to do so.

- Be aware of your own biases to prevent unconscious tendentious analyses and evaluation.

THE
NARRATIVE

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The human brain is not naturally equipped to digest abstract information and dissect the meaning behind data. Therefore, financial or technical information only provides the basis for a story yet to be told. The narrative sits at the very core and is the fabric that binds the data together with the story. The basic plot provides explanations and context, while the story arc is the chronological sequence and dramatic structure that guides the audience through the data story.

The purpose of a story is to engage emotionally and generate insights by giving structure to the underlying message. It can be applied to any form of communication and various documents, including presentations, financial reports, graphs, statistics, videos, and websites. Consequently, storytelling is a particularly powerful tool that can be used to communicate public sector financial information because it delivers the "so what?" of PFM data.

An excellent example of a meaningful narrative is offered by the massive increase in public spending on health care at the global level in recent years. Unfortunately, media coverage often focuses negatively on the debt brought about by this development. However, this spending also relates to investments in health care infrastructure, medical equipment, and stocks of vaccines (and other medication). In turn, this generates more operational capacity for future services and creates significant benefits for future generations.

Figure 4
Increases in health spending in OECD countries

COVID-19 has led to increases in health spending

Annual % growth in health expenditure and GDP per capita, OECD average
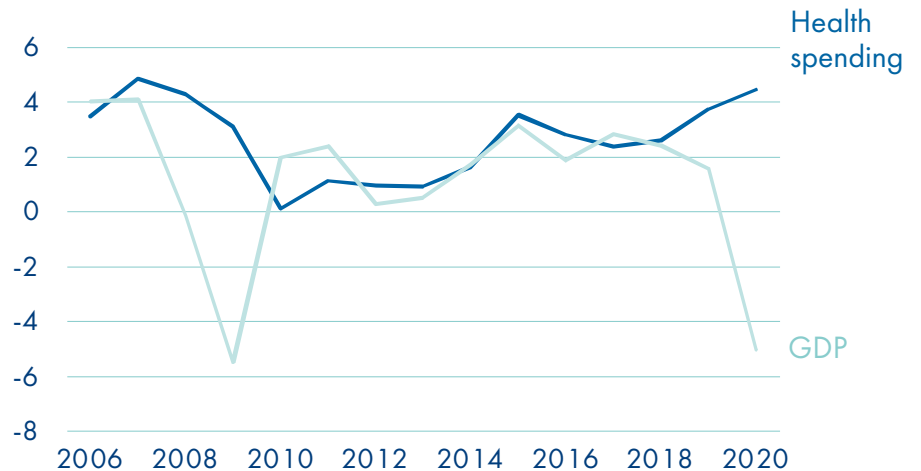
Source
OECD (2021). Health at a Glance 2021, p.16.

The foundation of the narrative

Before structuring your communication, you must be clear about what you want to say. Only when you can boil your "so what?" down to its essence will you arrive at the story's key message, which is the foundation of your narrative. For highly specialized professionals, being concise is often more challenging than expounding on a subject at length. However, putting a significant constraint on yourself – such as limiting the time or the word count – can help you focus.

1 GETTING TO THE POINT

Sixty seconds to explain yourself

The so-called elevator pitch is an excellent exercise to reduce your message to one paragraph. Suppose you are in an elevator with your superior and have just 60 seconds to brief this person for a decisive meeting. Not only will this help distill the message, but because it is verbal, you will need to articulate it in a way that is quickly understood.

Reduce it to one sentence

Now try to condense your elevator pitch into a single sentence; the result is your key message, sometimes also referred to as the "big idea." This key message should express a unique point of view, convey what is at stake, and be a complete sentence.

Constructing the story

Having established a narrative that builds on the key message, the basic plot of a user-centric story is formed. Then a suitable sequence is determined to create a powerful story arc to conclude the narrative.

2 BASIC PLOT TO ADD CONTEXT

Focus your story on the user

The basic plot is a golden thread running through the story, providing additional explanations and context to supplement the narrative. In addition, it contains several elements or building blocks that help explain the relevance of that information.

Start producing content

The main elements of a basic plot are

- the problem to be solved,
- the benefits for the target group,
- the "how-to" of addressing the problem, and
- a call to action.

The guiding questions below will help you start creating content for your story.

Guiding questions to produce content for your story.

Problem What problem (that you can solve) is your target group facing?

Benefit What is the relevant benefit for the target group (that will help them meet their needs)?

What is the relevant benefit that you want to create?

What problem can you solve for the target group?

How-To How can the problem be addressed?

What outcomes or recommendations are most important (to emphasize your message and its benefits)?

Call to action How should your audience respond?

3

CHOOSE
A SUITABLE STORY ARC

The rise and fall in a narrative are what turn it into a story. A story arc is created by rearranging the main building blocks of the plot according to a basic theme. Storytelling techniques include themes such as the "from-rags-to-riches" story and the "hero's journey", which are particularly useful in a PFM context.

A from-rags-to-riches story for scenarios

A from-rags-to-riches story can be used to plot the evolution of various scenarios. The current and target situations are described, and these two worlds ("hell/rags" and "heaven/riches") are juxtaposed. The underlying theme is that a less-than-ideal situation can be fundamentally improved – and we know how.

The story arc for the from-rags-to-riches story evolves as follows:

What does hell look like and what does heaven look like?

Which world comes first?

How can you describe the difference as clearly as possible?

What solution can bridge these two worlds?

How-to

Call to action
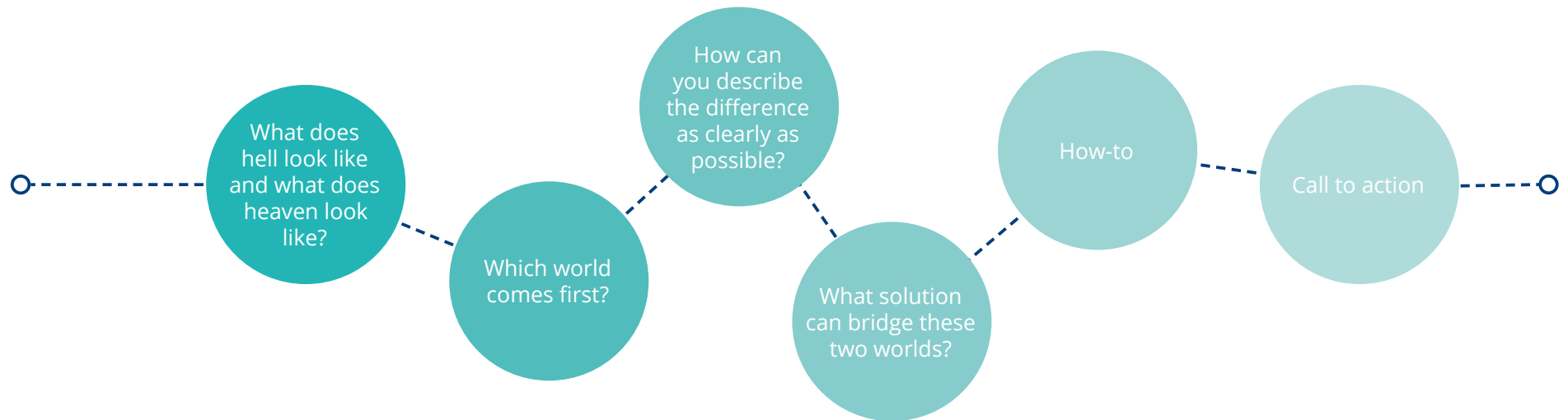
A hero's journey for the human touch

A heroic figure who helps us overcome a problem is at the heart of the hero's journey. Our hero can be a target group member, mentor, expert, or even an artifact such as a report. For the hero's journey to work, the audience must identify with our hero and have a positive attitude toward this character.

The basic story arc for the hero's journey evolves as follows:

Who is our hero?

What problem does our hero face?

How does our hero learn about the solution?

Who or what supports and helps our hero?

What is the solution and its benefit?

What happens to our hero at the end of the story?

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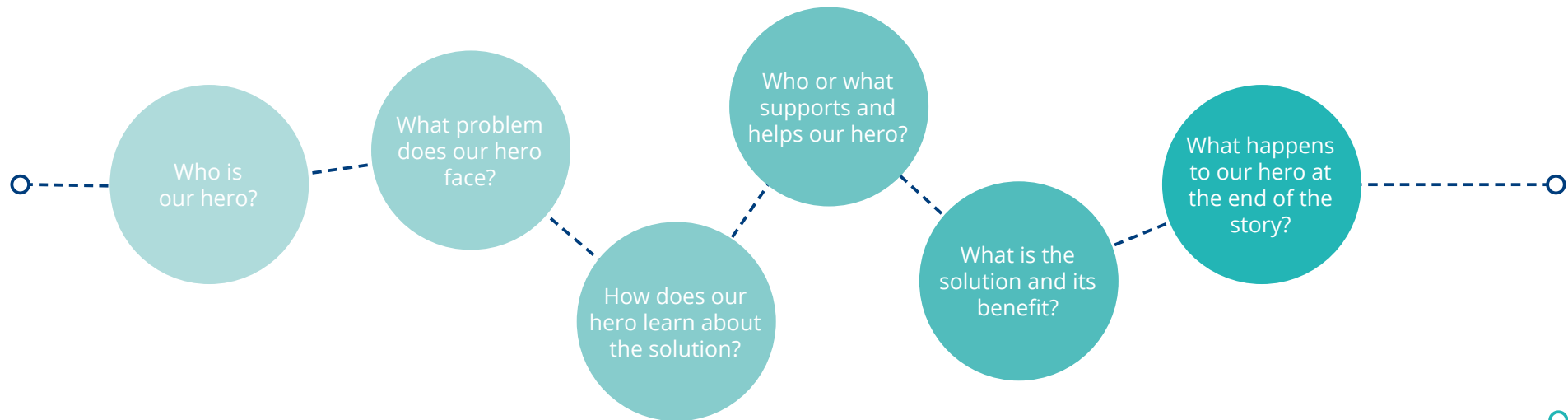
4 STRATEGIC PLANNING OF CONTENT

Try low-tech storyboarding

A storyboard is a visual outline of the content we want to create. Nothing is set in stone when developing the storyboard, and elements can be moved around and changed until the story is concise and to the point. Begin in a low-tech way with post-it notes, a whiteboard, or plain paper. Letting go of ideas is much easier if they are on paper rather than embedded in a PowerPoint presentation.

ISSUE

Climate Change poses a financial risk to the government

DEMONSTRATE ISSUE

Show increase in public spending to mitigate natural disasters

Measures for overcoming the issue, including pilot programs

Describe pilot program, goals, etc.

Show before and after data to demonstrate success of the program

RECOMMEN-DATION

Pilot was a success, lets expand the program

Figure 5
Post-it storyboard

Source
Author, based on Nussbaumer Knaflic, C. (2015). Storytelling with data. A data visualization guide for business professionals.

THE
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Public financial and fiscal reports have become more complex and sophisticated in recent decades. Experts usually write them for other experts. Reading and understanding them can require a high level of technical knowledge, not necessarily shared by a large section of the population. Nested sente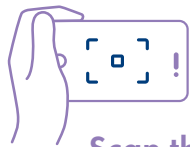nces, long words, sophisticated modes of expression, technical terms, and detailed content are all difficult to process and memorize. This not only makes them extremely difficult to understand but also makes the audience lose interest or stop reading.

For example, a 2021 Financial Report by the U.S. Government published on the U.S. Treasury website states that it is intended to inform "the President, Congress, and the American people" about the government's finances. The report also includes a one-page executive summary (see figure 5). However, a readability-analysis[2] of the text shows that the average person would have needed almost 22 years of formal education to understand it.

Results in Brief

The "Nation by the Numbers" table on the preceding page and the following summarize key metrics about the federal government's financial position for and during FY 2021:

• The budget deficit decreased by $356.3 billion (11.4 percent) to $2.8 trillion and net operating cost decreased by $746.5 billion (19.4 percent) to $3.1 trillion.

• The government's gross costs of $7.3 trillion, less $462.3 billion in revenues earned for goods and services provided to the public, plus $518.4 billion in net losses from changes in assumptions yields the government's net cost of $7.4 trillion.

• Tax and other revenues increased by $684.3 billion to $4.3 trillion. Deducting these revenues from net cost yields the federal government's "bottom line" net operating cost of $3.1 trillion referenced above.

• Comparing total government assets of $4.9 trillion to total liabilities of $34.8 trillion (comprised mostly of $22.3 trillion in federal debt and interest payable, and $10.2 trillion of federal employee and veteran benefits payable) yields a negative net position of $29.9 trillion.

• [...]

Figure 6
Snapshot of the Financial Report of the United States Government from 2021.

Source
U.S. Treasury (2022). Financial Report of the United States Government, p. 2.

[2] The so-called Gunning Fog Formula, calculated using http://readable.io, analyzes a text and generates a score that equals the number of years one needs. In this case, the score was 21.9.

Clearly, the words we use to tell the story are at least as important as the numbers we include. The primary purpose of language in data-driven storytelling is not only to facilitate information transfer but to communicate complex issues and explain abstract concepts succinctly. Through simple and comprehensible language, the story becomes more accessible and relevant.

Good writing style

A good writing style conveys the underlying message effectively. One key element is readability, which includes the use of words, phrases, sentences, and paragraphs to communicate facts and ideas clearly.

1

FROM ONE PERSON
TO ANOTHER

Avoid technical terms and polysyllabic words

Beware the curse of knowledge, and remember that your audience may have less financial expertise or a different educational background. Communicate so they can understand and respond, and try to avoid technical terms (if this is not possible, explain any specialist language). Similarly, refrain from using long, polysyllabic words, often derived from Greek or Latin. Instead, first try reading aloud what you have just written and put yourself in the place of your reader. Would you understand it the first time?

Use verbs for actions, nouns for facts, and adjectives for emotions

Make your language more energetic and, therefore, more relatable. Liveliness is conveyed by different types of words and how they are used and combined – verbs describe actions, nouns provide facts, and adjectives display emotions. Adjectives can spark interest and add clarity, but do not overuse them as they can slow down your flow of ideas.

Use the active rather than the passive voice

It is a common habit of academics to use the passive rather than the active voice when writing. However, what can be justified in research should be avoided in storytelling. The passive voice can weaken the narrative and usually requires more words, which may cause the reader to lose interest. Above all, use the passive form with care as it tends to distance you from your audience if overused.

2 FOCUS ON
WHAT IS IMPORTANT

○

Not all data are equally important

Use numbers and data sparingly. Data or statistics should be the foundation of the story we want to tell, but never the story itself. Overwhelming your audience with metrics is the easiest way to lose their focus. Instead, use the existing attention span wisely by removing unnecessary data or text.

○

Keep it short

Long sentences slow the reader or listener down and are difficult to follow, making them lose interest in the text or presentation altogether. Keeping sentences short, concise, and to the point has the same effect as a person talking in a passionate and entertaining way. Therefore, communicate your underlying message with as many words as necessary but as few words as possible.

Formatting text

Reading is a demanding exercise, especially when confronted with an unformatted block of text. However, with the help of visual clues and a logical structure, we can draw attention to the important information.

3 STRUCTURE YOUR TEXT

One paragraph for one basic idea

Each paragraph should be dedicated to one basic idea and relate to a single argument. Explain one thing after the other and guide the reader with a logical and linked progression of points. For coherence, make sure each sentence relates to the preceding one.

Subheadings are the storyline

Subheadings and subtitles introducing each paragraph will add even more structure to your text and guide the reader through the story. This not only enhances readability but makes the text easy to scan visually.

4 USE VISUAL ANCHORS TO GUIDE THE READER

Use visual eye-catchers

So-called preattentive attributes help to draw attention to single or multiple elements in a text. Figure 7 shows how features can be employed, such as size, color, bold type, italics, or uppercase text. By formatting the text, your reader's eye is immediately drawn to the critical points without consciously searching for them. However, be careful not to overuse these attributes and thereby overwhelming the audience visually.

No preattentive attributes

Public Sector Accounting (PSA) and Government Finance Statistics (GFS) fulfill different purposes within a holistic PFM cycle. PSA is focused on recording and presenting financial information on public sector entities' financial performance and position. GFS is primarily concerned with determining the general government's impact on the economy and serves as input for macroeconomic reporting.

Color

Public Sector Accounting (PSA) and Government Finance Statistics (GFS) fulfill different purposes within a holistic PFM cycle. PSA is focused on recording and presenting financial information on public sector entities' financial performance and position. GFS is primarily concerned with determining the general government's impact on the economy and serves as input for macroeconomic reporting.

Size

Public Sector Accounting (PSA) and Government Finance Statistics (GFS) fulfill different purposes within a holistic PFM cycle. PSA is focused on recording and presenting financial information on public sector entities' financial performance and position. GFS is primarily concerned with determining the general government's impact on the economy and serves as input for macroeconomic reporting.

Bold

Public Sector Accounting (PSA) and Government Finance Statistics (GFS) fulfill different purposes **within a holistic PFM cycle.** PSA is focused on recording and presenting financial information on public sector entities' financial performance and position. GFS is primarily concerned with determining the general government's impact on the economy and serves as input for macroeconomic reporting.

Italics

Public Sector Accounting (PSA) and Government Finance Statistics (GFS) fulfill different purposes within a holistic PFM cycle. *PSA is focused on recording and presenting financial information* on public sector entities' financial performance and position. GFS is primarily concerned with determining the general government's impact on the economy and serves as input for macroeconomic reporting.

Separate spatially

Public Sector Accounting (PSA) and Government Finance Statistics (GFS) fulfill different purposes within a holistic PFM cycle.

PSA is focused on recording and presenting financial information on public sector entities' financial performance and position. GFS is primarily concerned with determining the general government's impact on the economy and serves as input for macroeconomic reporting.

Outline (enclosure)

Public Sector Accounting (PSA) and Government Finance Statistics (GFS) fulfill different purposes within a holistic PFM cycle. PSA is focused on recording and presenting financial information on public sector entities' financial performance and position. GFS is primarily concerned with determining the general government's impact on the economy and serves as input for macroeconomic reporting.

Underline (added marks)

Public Sector Accounting (PSA) and Government Finance Statistics (GFS) fulfill different purposes within a holistic PFM cycle. PSA is focused on recording and presenting financial information on public sector entities' financial performance and position. GFS is primarily concerned with determining the general government's impact on the economy and serves as input for macroeconomic reporting.

Create a
visual hierarchy

Preattentive attributes can also be combined to create a visual hierarchy within your text. Again, it is crucial to find a balance and choose which elements to emphasize while de-emphasizing others. Highlighting one component draws attention away from the other feature of the text. This helps with drafting the story and clarifying what is essential.

Using preattentive attributes to create a visual hierarchy – an example

Factors that can affect budget reliability.

These include

Policy initiatives

Policy initiatives or other post-budget spending decisions outside the annual budget process;

Major reallocations

Major reallocations between ministries and programs;

Unreliable revenue estimates

Over-optimistic or otherwise unreliable revenue estimates;

Allocations outside the budget cycle

Allocation of grants and other budgetary support by development partners outside the annual budget cycle;

External shocks

External shocks such as natural disasters or adverse global or regional economic conditions.
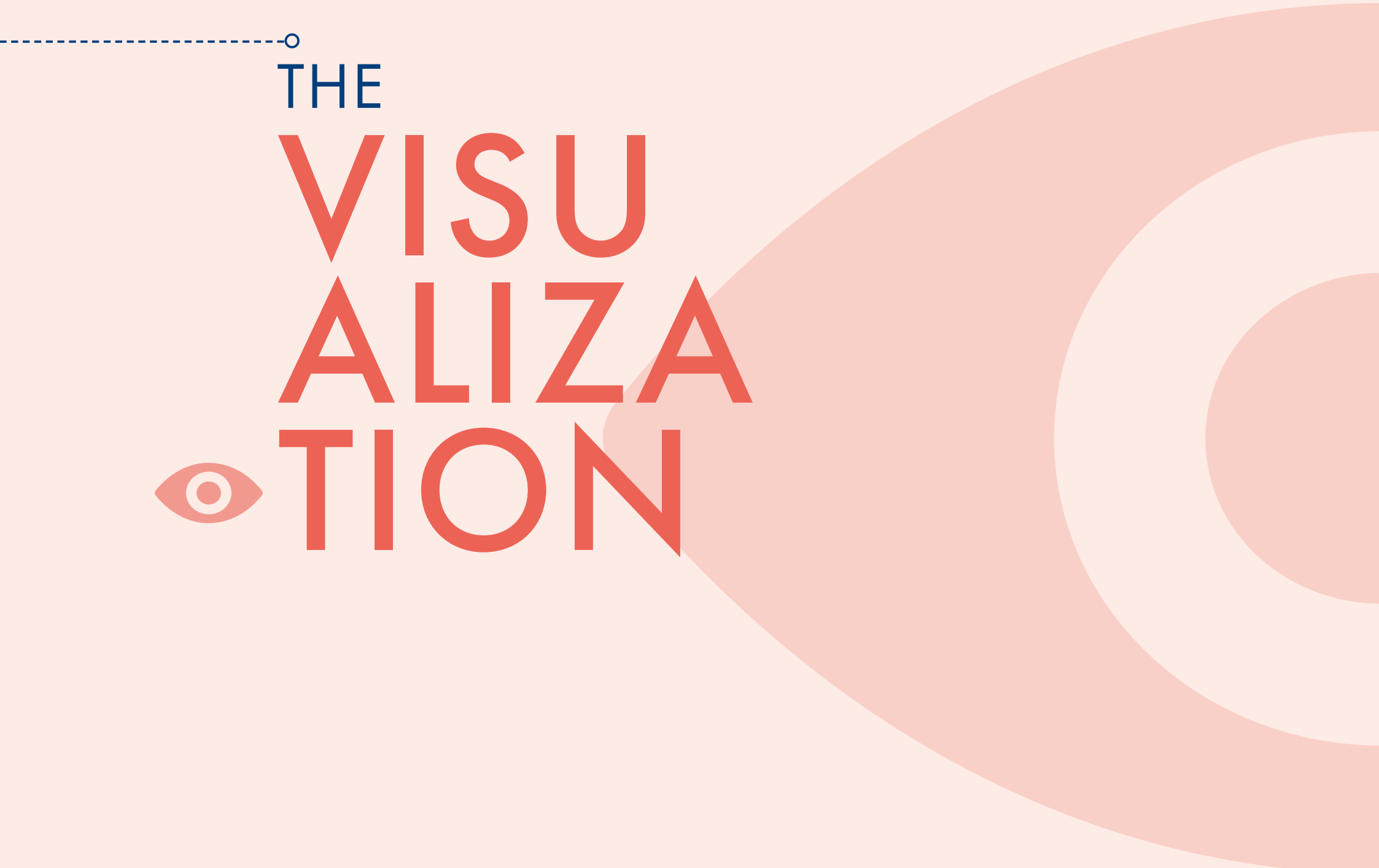
Figure 8
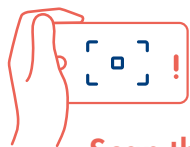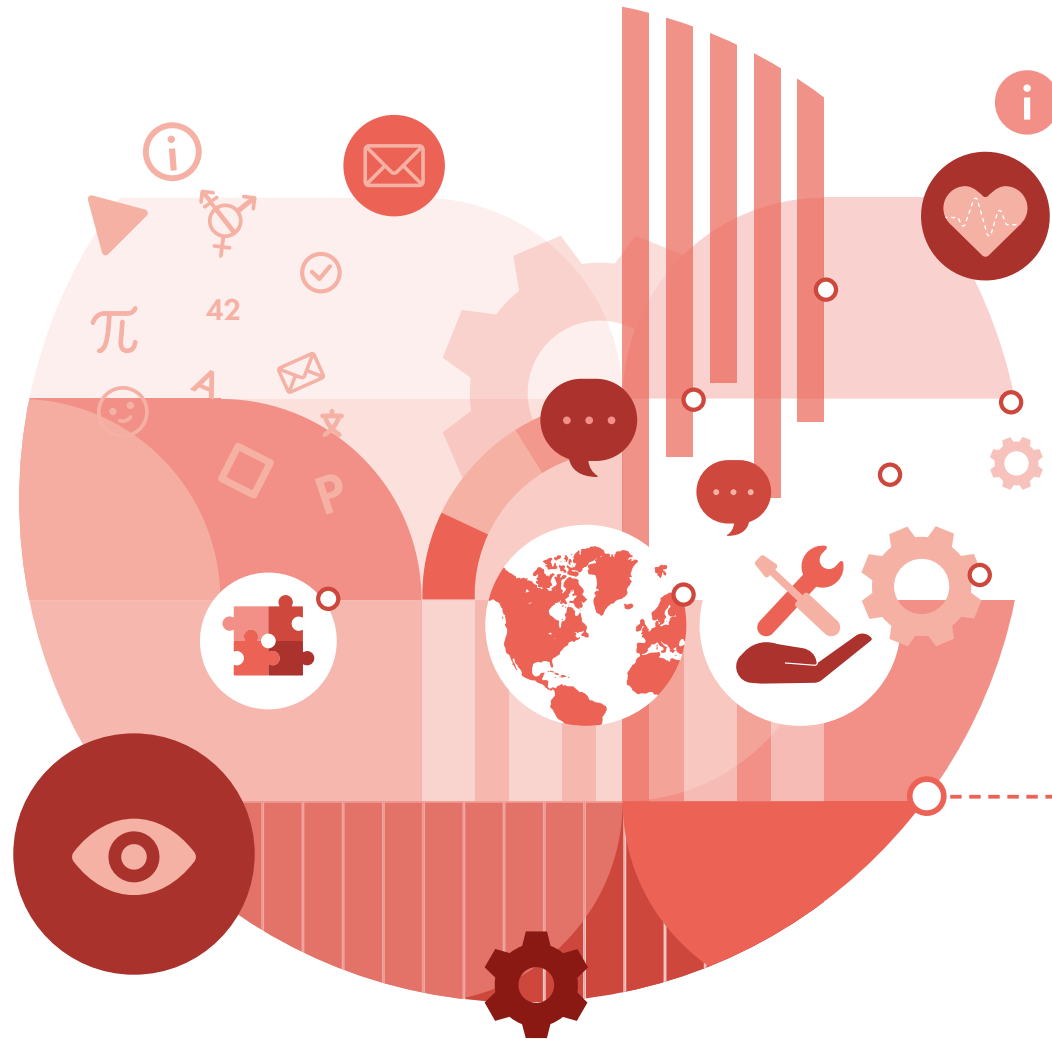Using preattentive attributes to create a visual hierarchy

Sources
PEFA (2018). Volume II: PEFA Assessment Fieldguide; in combination with: Nussbaumer Knaflic, C. (2015). Storytelling with data. A data visualization guide for business professionals.

THE
VISU
ALIZA
TION

Scan this visual
with the Artivive app

> **Being able to visualize data and tell stories with it is key to turning it into information that can be used to drive better decision making.**
>
> Nussbaumer Knaflic, C. (2015). Storytelling with data.

Visualization is a vital part of data storytelling. Illustrations and visuals are instrumental in

- highlighting key moments of the story and communicating the central message,
- substituting language to explain complex and/or technical issues, and
- communicating and (visually) representing raw data.

Visualization also helps strategically to attract the audience's attention by making dry and fact-based information more appealing. For example, if you compare the covers and verso pages of these financial reports below, which one would you be immediately drawn to?

The visualization toolbox offers two primary ways to graphically support data-driven and financial communication – data visualization and infographics.
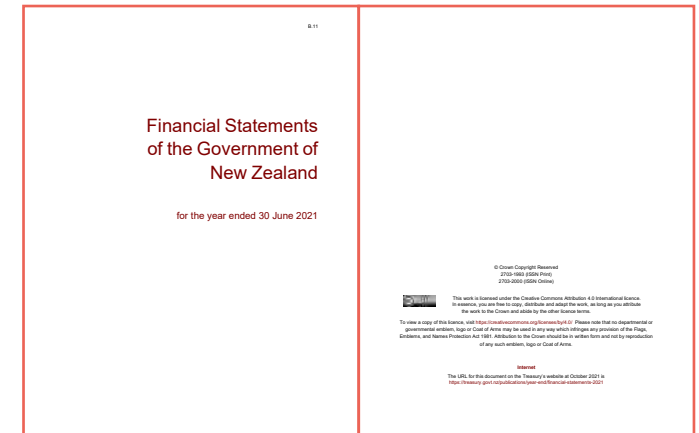
Figure 9

Financial statements published by the Government of New Zealand and the City of Toronto

Sources

Treasury of New Zealand (2021). Financial Statements of the Government of New Zealand; City of Toronto (2021). Annual Financial Report 2020.

Data visualization

Data visualization refers to the visual representation of large(r) volumes of numeric data, typically drawn by an algorithm using graphing, charting, or diagramming software. Choosing a compelling image is vital for successful data communication. In general, there are two types of data visualization – tables and graphs. While tables are read and interact with us verbally, graphs connect with us visually and communicate that information more quickly.

1 CHOOSING THE CATEGORY OF DATA VISUALIZATION

Tables help organize data

Tables can be used to structure your data in a well-organized visual form. They are typically used for communicating multiple figures to an audience who will be looking for a particular fact. To aid comparisons, a table of numbers can be converted into a heatmap, where shades of color can be used to emphasize "hotspots." However, you should avoid using tables during a live presentation because attention will be drawn away from the story and focused on the table.

Table

	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%

Heatmap

	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%

Figure 10
Table and Heatmap

Source
Nussbaumer Knaflic, C. (2015). Storytelling with data. A data visualization guide for business professionals.

NOTE

These figures show two views of the same dataset. Color is used to convey the relative magnitude of the numbers.

Use graphs to represent relationships

Graphs can present a large volume of data quickly and in an easy-to-consume way. They are particularly useful when there is a message in the shape of the data, or you want to demonstrate how different variables relate to each other. Many different graphs are available to represent data sets, each suitable for a specific application case. The most frequently used graphs are shown in figure 11.
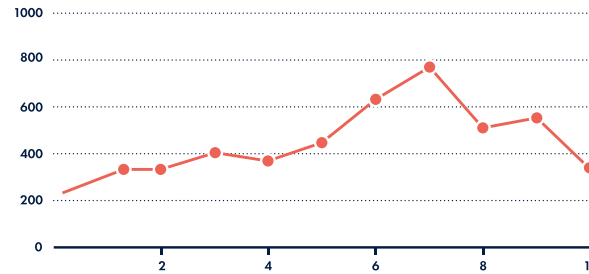
Bar plot

A bar plot shows the relationship between a numeric value and a category that is usually qualitative. Bar charts are very common because they enable easy visual comparison.
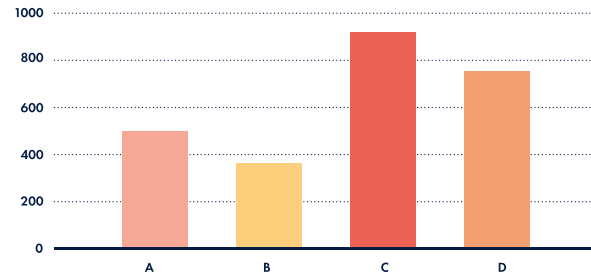
Line graph

Line graphs display quantitative values over time and are mainly used to show trends and analyze how the data has changed over time.

Scatter plot

Scatter plots are utilized to display the relationship between two quantitative values. The size of the dots can also convey information when a third dimension is added, which converts the plot into a bubble chart.

Tree map

Tree maps show (usually hierarchically) data as a set of nested rectangles. They take up little space and help represent significant amounts of data.

Pie chart

Pie charts give the audience a quick idea of the proportional distribution of the data, where the sectors sum up to 100%. It is challenging for the human eye to ascribe quantitative value to two-dimensional space; thus, data labels should be added.
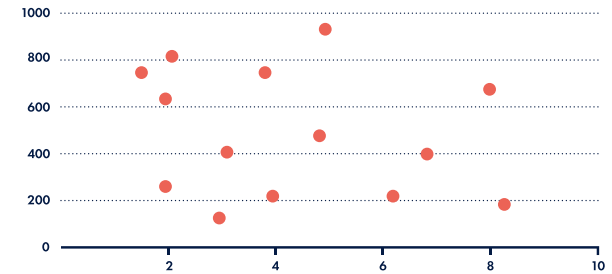
Figure 11

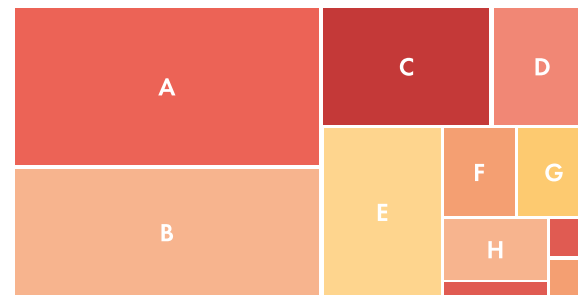Frequently used types of graphs

Sources

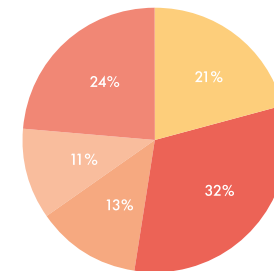Severino Ribecca (2022). Data Visualization Catalogue; Data Viz Project (2022). Ferdio; From Data to Viz (2018).

2

USEFUL
TOOLS

Online
decision support

It is important to consider beforehand what type of data visualization is most suitable. Various online catalogs are helpful when choosing the right type of visual. Examples include the "Data Visualisation Catalogue", the "Data Viz Project", and from "Data to Viz".

Visualization
tools

Most data processing programs or spreadsheet software, such as Excel, include a visualization function. You can also use specialized data visualization software, which offers more features. "Datawrapper" is an excellent example of an easy-to-use, web-based software application for creating attractive graphs and tables.

NOTE

Detailed information on all the tools described in this section can be found at the end of his chapter under "Further reading and data storytelling examples", accessible via QR-code.

Infographics

In contrast to data visualization, infographics are manually drawn illustrations that show and explain information or knowledge while sharing a limited amount of data. At the intersection of art and data, an infographic can help you simplify a complicated issue or turn an otherwise uninteresting subject into an engaging one.

3 DESIGN AND USE CASES

Figure 12
Infographic on environmental financial accounting

Source
Grafl A. (2021): Environmental Financial Accounting in the Public Sector - A Stocktaking of Current Initiatives.

Visual storytelling

Infographics provide an easy-to-understand overview of a topic and are often referred to as visual storytelling. Visually communicating the central message of a story, report, or analysis are typical applications.
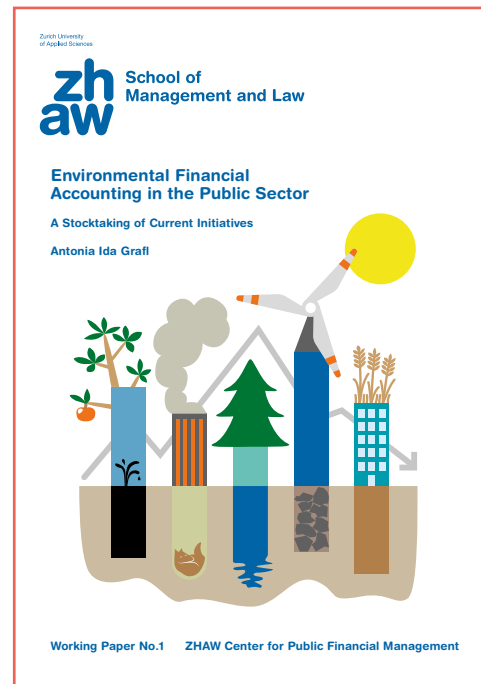
NOTE

This infographic illustrates the topic of a working paper on environmental financial accounting. It introduces the economic element with what resembles a bar chart, which simultaneously represents subsoil and other natural resources.

Substitute for language

In addition, infographics can explain complex issues quickly, clearly, and in an appealing way. They can be used to depict processes or sequences by substituting language with visuals to make a text more accessible to the reader.

Figure 13
Infographic on PEFA in 10 steps

O

NOTE

This infographic outlines the process of a PEFA assessment. It serves as orientation throughout the respective handbook, where it is repeatedly inserted at the beginning of the various chapters.

Source

PEFA Secretariat (2018): Handbook Vol. I: The PEFA Assessment Process – Planning, Managing, and Using PEFA.

PEFA in 10 Steps

Start process /
Repeat as appropriate

PHASE 4. PFM REFORM ACTION

PHASE 1. PLANNING

PHASE 2. FIELD WORK

PHASE 3. REPORTING

STEP 10 Monitoring and follow-up

STEP 01 Dialogue on the need for PEFA assessment

STEP 02 Develop the Concept Note

STEP 09 Reform dialogue

STEP 03 Prepare for the assessment

STEP 08 Final report and publication

STEP 04 Assessment launch

STEP 07 Peer-review and refinement

05 Data collection and analysis

STEP 06 Draft report preparation

Timeframe will vary

About a 6 month timeframe

About a 4 month timeframe

4 CREATING INFOGRAPHICS

Outsourcing

Experience shows that the creation of infographics is often outsourced to professional graphic designers. However, overall responsibility remains with the data owner, who must guide and brief the graphic designer. It may be helpful to create an initial sketch to convey thoughts, suggestions, and the underlying story.

DIY web-based tools

Some useful web-based programs can create infographics, including "Canva" and "infogram" (where pre-registration is required).

Readymade visualization: Crude but effective

Shortage of time and money may prevent you from consulting a professional graphic designer. Fortunately, many online catalogs and databases of visuals can be downloaded free of charge or purchased with usage rights (e.g., "freepik" or "ICONS8"). In addition, many word-processing programs include a vast selection of customizable icons to structure and facilitate navigation within written documents. However, make sure that the icons or images you use match the content.

This section introduces a framework including guidance on assembling the elements for data stories most effectively. The framework provides a structured approach to implementing communication projects involving public sector financial information.

PUTTING IT ALL TOGETHER

Preliminary considerations

Before implementing your storytelling project, you should consider the context in which you are communicating. The more time and effort you invest at this stage, the more focused you will stay. Understanding the context will consolidate your actions and help you choose your resources wisely. Being clear about the following five aspects will also help you avoid mistakes and endless iterations.

1 MOTIVATION

It is essential that you establish the "why" and the core objective of what you are trying to communicate. Having a clear purpose is the difference between simply sharing information and communicating with your audience in a memorable and meaningful way.

Guiding questions

- What is your intention? What do you want to achieve?
- What will change because of your communication?
- Which of your audiences' needs can be met?

Possible needs include

Support	Trust	Receiving information
Commitment	Contributing	Acceptance
Belonging	Solidarity	Attention
Compassion	Being noticed	…

2 KEY MESSAGE

Try to condense the findings of your analysis into a concise single sentence. The key message comprises the main information, presented as bite-sized summaries to explain the meaning behind the data.

Guiding questions

- What is the critical piece of information the audience should understand and remember?

- What should the audience then convey to their friends, co-workers, or superiors?

3 TARGET GROUP

Your audience should be defined as precisely as possible. For example, "the general public" or the "internal and external stakeholder" is not a target group. A clear definition will help you identify the benefits and touch points linking the audience to the message. The characteristics of the target group will also determine the choice of communication means and channels.

Guiding questions

- Which person or group of people will be most affected by your communication?

- Is it one person or a group of people – and what links them?

- What level of numeracy and financial literacy can you expect from your audience?

- What experiences, needs, hopes, and dreams do they have in common?

4 TONE

Consider the mood you wish to create as this affects the wording and the design of your project.

Guiding questions

- Is the key message a solemn word of warning or a cause for celebration?

- Is the objective a general call for action or an urgent appeal?

- What emotions would you like to convey? How do you want the target group to react?

- What emotional associations does the target group have with the key message?

Possible emotions include

Trust	Fear	Enlightenment
A sense of duty	Joy	Surprise
Shock	Motivation	...

57

5 MEANS OF COMMUNICATION

Finally, you should consider your mode of communication before generating any content. Possible vehicles include live presentations, written documents, videos, and other multimedia – or a combination of several. Your choice will depend on the level of detail required, the desired degree of control over how the recipient processes the information, and the preferred communication channel.

Guiding questions

- Through which medium and channel can you reach your target group?
- Which medium would tell your story best?
- What resources do you have available?

Telling the story

Once the context of your data-driven story has been established, you can launch the storytelling project. The implementation phase requires a few decisions regarding the data you use, how your narrative should flow, and whether your communication is more text-based or visuals-based.

6 DATA SELECTION

The starting point of data-driven storytelling in PFM is the insight gained from data analysis and monitoring or reporting activities. Remember, however, that data are only the foundation of your narrative and not the story itself. Therefore, remember to use quantitative information sparingly and focus on essential figures and numbers when communicating your findings.

Guiding questions

- What key figures do you need to present to convey your key message?

- How can you simplify the presentation of your numbers?

- Would it help to visualize your data? If so, which type of visualization is most suitable?

7 STORY ARCHITECTURE

Memorable stories have a definite structure in which facts and data are sequenced. Once the key message has been identified, you can start to build your narrative. First, you must decide on the flow of the narrative. There are several predefined patterns your storyline could follow.

Guiding questions

- Is the key message best conveyed through a human being? If so, the hero's journey format might be best.

- Is there a problem to be solved, and are there various possible scenarios? If so, the from-rags-to-riches format might be a good choice.

- If neither of the above seems suitable, can the story follow a simple plotline?

8 WORKING WITH TEXT

The story architecture is a useful tool for writing because it provides a basic structure for your text. Even when preparing for a live or recorded presentation, it is a good idea to write everything down first. Let the first version of your text sit for a while, read it again and amend as necessary. If time allows, have someone who is part of (or knows) your target group read the text and offer feedback.

Guiding questions

- Is your wording clear and concise? Is your language appropriate for the target group's level of education and financial literacy? **(see p. 38)**

- Would it be easier to read if you formatted your text ? **(see p. 40)**

- What are the key visual aspects of your text? Are there any verbal sections you could replace with visualizations? **(see p. 52)**

9 WORKING WITH VISUALIZATIONS

When working with visualizations, the first step is to consider the tone of the message since this will influence design choices, such as the colors and styles used. As a rule, what is true for writing is also true in the visual world – "less is more." Visualization is there to support your key message and communicate the key findings, so avoid distracting your audience with clever but unnecessary visuals.

Guiding questions

- Are your data suitable for data visualization or an infographic?

- In the case of more extensive datasets, what data visualization best illustrates the message? **(see p. 50)**

- In the case of small or qualitative datasets, what is the visual story of your infographic? What elements should it contain? **(see p. 51)**

- Are there any corporate identity (CI) specifications you must follow or include?

THE PUBLIC SECTOR
DATA STORYTELLING FRAMEWORK

Conceptualize

1

THE MOTIVATION

establish the "why"

2

KEY MESSAGE

boil down findings
to one sentence

3

TARGET GROUP

identify the audience

4

THE TONE

determine
the mood

5

MEANS OF COMMUNICATION

consider mode
of communication

Set The Basis

6

DATA SELECTION

identify key figures

7

STORY ARCHITECTURE

choose structure
of narrative

Choose Medium

8

WORKING WITH TEXT

write down and
iterate

9

WORKING WITH VISUALIZATIONS

select type of
visual

To outsource or not to outsource

The question of outsourcing when planning your communication project is fundamental and is influenced by many factors such as financial resources, time constraints, individual preferences, and available talent. That is why this guide contains many tips for shortcuts and DIY options. But even if you plan to outsource the bulk of the work, editorial responsibility will always remain with the person wishing to tell a story based on data. This also applies to preliminary considerations when establishing a context since this will help you choose the right suppliers and service providers.

ETHICAL ASPECTS OF DATA STORYTELLING

Data storytelling is a very powerful tool, and with it comes the responsibility to use it carefully. The ethical aspects of data-based communication go beyond data analytics because we must find a way to persuade others while remaining trustworthy and fact-driven. When constructing our story, we must strive to

- focus on what matters without compromising transparency,

- offer targeted and specific advice without compromising objectivity, and

- prepare and engineer data without compromising credibility.

Below are some considerations for navigating ethical boundaries while maintaining sincerity and authenticity.

1 BE EMPOWERING RATHER THAN INFLUENCING

In determining what is ethically acceptable, the aim and purpose of our actions are critical. Communication with no clear message is not communication, but simply a transfer of information. Attempting to influence others is a balancing act, and we must be careful not to become manipulative. Using storytelling to empower the audience to make a well-informed, evidence-based decision is a good approach.

2 THE STORY FOLLOWS THE DATA

When we think of stories, it is memorable books or movies – many of which are fictional – that come to mind. However, in data storytelling, the data we use to tell the story determine the limits of our narration. Accordingly, "storytelling" can only go so far as the data allow or, to put it another way, the story follows the data and never the other way round. The lines become blurred when we are selective with data or force it to fit our prescribed narrative.

3 KNOW THE LIMITS OF THE DATA

The data sample we collected might allow us to draw broader conclusions, which can be an important aspect of the story. However, never forget the limitations of your data – and there will always be limitations. These might relate to the method or time the data were collected, the sample size, gaps in the data, ambiguities in qualitative responses, and many other factors. The key here is to be as transparent as possible about interpreting the data used for the story.

4 SIMPLIFY – BUT DO NOT FALSIFY

From a pure data storytelling perspective, it is desirable not to include too many details, to focus only on selected key numbers, and to treat some context as background information. When required, however, you should be able to produce specific calculations and additional evidence without difficulty. Furthermore, ensure you do not ignore the context or omit any essential data necessary for a comprehensive and balanced view.

5 BE HONEST ABOUT CONTRADICTORY EVIDENCE

Frequently, not all the data collected will support the story. While it is acceptable to highlight the data that helps you tell your story, resist the temptation to conceal data that does not back up your narrative. To maintain credibility, be transparent when analysis or evaluation shows exceptional or unexpected results.

6 MAKE VISUALIZATIONS COMPELLING, NOT MISLEADING

Carefully choose scales, legends, and titles in your visualizations. These are the trajectories on which the audience or readers process the data, draw conclusions, and formulate questions. The use of specific techniques explained in this guide to emphasize or de-emphasize can help capture the target group's attention without compromising the integrity. The figure below shows examples how using different manipulative scales results in distorted perception and misinterpretation of the data presented in the charts.

7 MAKE DATA AVAILABLE

Public data belong to the public. Open government approaches and increasing accountability have enabled greater interaction between private individuals and the public sector. Making government data publicly available supports the general oversight of administrations and helps reduce corruption by promoting greater transparency.
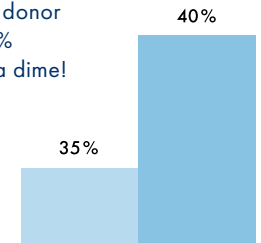
Figure 14
Manipulative scales

Source
Kaplowitz (2016). 3 Tips for Using Data To Tell Your Story, Ethically.
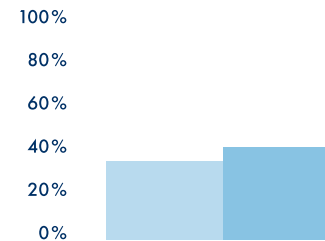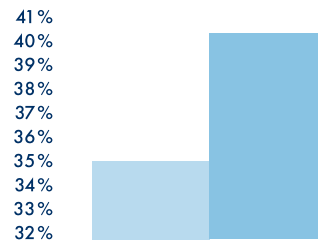
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