

Data Visualization: The Impact on The Communication of Financial and Non-Financial Information to Stakeholders

Muhammad Faris Hidayat

Faculty of Accountancy, Universiti Teknologi MARA, Cawangan Selangor, Kampus Puncak Alam, Selangor, Malaysia

Vani Tanggamani

Azlina Rahimi*

Faculty of Accountancy, Universiti Teknologi MARA, Cawangan Melaka, Kampus Alor Gajah, Melaka, Malaysia

Adibah Jamaluddin

Faculty of Accountancy, Universiti Teknologi MARA, Cawangan Selangor, Kampus Puncak Alam, Selangor, Malaysia

Abstract

This article aims to discuss the impact of data visualization on the communication of financial and non-financial information to stakeholders. Data visualization plays a crucial role in effectively communicating both financial and non-financial information. This article review will explore on the benefits as well as some of the imperfections of data visualization. By reviewing some of the existing literature, research, and articles, this article review can provide a foundation for understanding the theoretical underpinnings of data visualization and its application in stakeholder communication. The findings were that information, when presented visually, is much more effective in communicating certain data as compared to traditional reporting. Stakeholders are found out to be much more engaged, leading to better decision making towards the organizational success. However, there are also challenges of the presentations that affected the stakeholder's information acquisition such as framing effect. The article review found out that stakeholders that are utilizing data visualizations such as charts, dashboard and heatmaps indicate a high perceived ease of use. Therefore, organizations should offer trainings as well as tech-support to bolster the level of adoption. This article review provide insight that data visualization can present good value towards stakeholders' communication. Stakeholders are able to appreciate organizations, turning complex data to be much more accessible and easier to digest. Thus increased the level of understanding of the organization's performance holistically.

Keywords: *Data Visualization, Stakeholder Communication, Financial Information, Non-Financial Information, Decision Making and Organizational Performance*

*Corresponding author. Email: azlina@uitm.edu.my

INTRODUCTION

For what seemingly forever, businesses have collected data, analysed it, and generated reports manually. The process continued for a long period of time with the requirement of highly trained data analysts to pull out the expected results and figures. With the industrial and technology modernization, businesses found out that traditional reporting process does not work well with bigger data which in turns not capturing the true potential value for what the data represents. In a recent study by Helweg-Larsen & Helweg-Larsen (2007), the author expresses that traditional financial statements are an amalgamation of details without relationship. Data visualization is the process of transforming data into visual representations such as charts, dashboards and heatmaps.

The purpose of data visualization is mainly to make data easier to understand and interpret, hence enhancing decision-making process. Data visualization has become increasingly important tool in modern businesses for communicating financial and non-financial information to stakeholders. As raw data is often voluminous and tends to change rapidly, making it challenging and difficult to analyse the data (Syed Fiaz et al., 2016), data visualization can enhance the user experience of the financial and non-financial information towards stakeholders. This is because data visualization simplifies the challenges and create an opportunity in analysing and controlling the data in much more efficient way. Furthermore, financial data tends to be complex and difficult to understand. Data visualization can help to make financial information more accessible and easier to digest.

LITERATURE REVIEW

With the advancement of technology giving birth to data visualisation tools such as Power BI, it has become a necessity for an organization to adopt to such tools as it enables organizations to accomplish several objectives. One of it is to utilize analytics dashboards for facilitating real time decision-making regardless of time and location. Data visualization is also used to highlight important financial metrics such as liquidity, solvency, and profitability. This can help stakeholders to quickly identify areas of strength and weakness in the organization's financial performance, hence optimises all type of decisions (Widyatama & Narsa, 2023). This thus resulting the stakeholders, informed with the business outcomes as well as the risks in their portfolio. To add on as well, non-financial information such as customer satisfaction, product reviews, and operational efficiency is also important for stakeholders to understand. One of the examples that uses data visualization is Sustainability reports that highlights what has the organization had done to reduce carbon footprint.

To further support this, a study by Edu, (2022) on the positioning big data analytics capabilities towards financial service agility, the author gathered survey data from 485 banking professionals in Ghana to demonstrate that organization can achieve financial service agility by developing robust big data analytics. Key findings were that big data analytics offer financial institutions to source, analyse and store vast amount of data, enabling quick and informed decision. Furthermore, it enhances customer service while optimizing operations giving the effectiveness of the analytics. The author concluded that by harnessing big data analytics, financial institution can gain a significant competitive advantage and commit high value towards their customers.

Study by Hirsch et al., (2015) further demonstrate that the use of supplementary graphs significantly improves decision quality. The study which requires participants from experienced managers to evaluate 8 different business units based on sales, EBIT, FPY and delivery reliability. They were presented with business data in two formats which is tables only, while another, tables supplemented with graphs. The study concludes that the use of graphs in management accounting report can significantly improve the effectiveness of management judgment. The study also provides empirical evidence to support the advantage of data visualization in the context of management accounting and offers value for stakeholders, in this case management, that is seeking to enhance their decision-making processes within organizations.

Concrete Evidence of Successfully Implemented Data Visualization Strategies

Companies that adopts data visualization in their operations is none other than the Big-Four. Paper by Liew et al., (2022) examines the data analytics in Big-Four financial audit. Microsoft Excel, a fundamental yet powerful spreadsheet tool, stands as the longest-standing IT tool utilized by auditors for accomplishing their tasks. Gepp et al., (2018) argues that data visualization is not widely used in auditing as it is in other fields. However, in recent years, readily available financial data bring new challenges for data analysis especially when the data volume is overwhelming. To cope with this, Big-Four firms have been creating a set of proprietary intelligent audit tools in-house.

This is to assist the auditors to systematically analyse client's data to bring forth audit results. For example, Deloitte is using data visualization called Ilumia to identify patterns in client data that could indicate potential fraud. While Ernst & Young using its in-house tool Helix to track trends in client performance and identify areas of risks. KPMG's Clara is used to communicate the audit findings to clients concisely. Lastly, PwC's Halo and GL.ai is using data visualization to improve the efficiency of its audit processes by supplementing with artificial intelligence. With these findings, we can conclude that data visualization holds immense potential to revolutionize stakeholder communication by simplifying the challenges from traditional reporting, to be making an informed decisions within or in regards of an organization.

Similarly, The New York Times has successfully implemented interactive data visualization strategies in its election coverage systems. Through the use of choropleth maps, bar charts, and live vote trackers, the organization was able to present complex electoral data in an accessible and comprehensible format. The effectiveness of these visualizations is evidenced by increased user engagement and improved public understanding of election outcomes, particularly during high-stakes political events such as U.S. presidential elections. In conclusion, these examples provide concrete evidence that data visualization strategies are not only theoretically valuable but also practically effective. Across public health, media, business, entertainment, and transportation sectors, organizations have demonstrated that well-designed visual analytics systems lead to improved understanding, better decision-making, and measurable performance outcomes.

Counter Argument

However, data visualization is not perfect. Visualized data can be inaccurate or even wrong. Moreover, in the synthetic digital world anybody can visualize anything in any shape or form, disregarding how users might perceive or get the information. Worse, as technology develops, it becomes easier to do so (Gershon, N. D. 1998). It means that organizations may have corrupted data or worse yet, data manipulation that may represent incorrect visualization. For example, an organization may use a chart to show its profits have increased over the past year. However, the chart may use a truncated y-axis, which makes the growth appear more dramatic than it actually is.

A study by La Torre et al., (2018) raises the concern on data security and privacy. The author expresses that some data contains sensitive information. This prompts inquiries about the ethical limits of data collection, particularly when gathering publicly and legally obtainable data. Cybersecurity risks can impact the organizations reputation and credibility. Furthermore, sabotaged data can negatively impact the data quality and reliability. Stakeholders will lose their confidence in the organization hence it is important for an organization to invest in data security and protect the data from unauthorized access.

Furthermore, in a paper by Chang & Luo, (2021), it is mentioned that framing effect is the major bias for data visualization. Framing effect in data visualization is the idea that the way data is presented can influence how people interpret it. This can be done through choices of colour, scale, and other visual elements. Improper designed visualizations can trigger framing effect where organizations can strategically convey an intended story towards the stakeholders which can impact the information acquisition, evaluation, interpretation and in the end lead to different decision. Ways to mitigate the framing effect in data visualization as an organization is to be accurate in the visualization of data. This can be achieved by being transparent about the goals of the visualization. While for stakeholders, mitigation comes from awareness of the potential bias in the visualization. Investigate multiple perspectives that can help to assess the credibility of the visualization. These are some of the imperfections of data visualization. It can be intentional or unintentional, but it can have a significant impact on the message of the visualization.

Theoretical Framework Related to Data Visualization

A theoretical framework for data visualization provides the conceptual foundation that explains how visual representations of data influence understanding, decision-making, and knowledge construction. Several established theories and models underpin the effective use of data visualization in organizational and analytical contexts.

1. Information Processing Theory

Information Processing Theory suggests that the human brain processes visual information more efficiently than textual or numerical data. In the context of data visualization, this theory explains why graphical representations such as charts and graphs enhance comprehension. By reducing cognitive load, visualization allows users to quickly identify patterns, trends, and anomalies within complex datasets.

2. Cognitive Load Theory

Cognitive Load Theory emphasizes the limitations of human working memory. Data visualization reduces extraneous cognitive load by organizing information into structured visual formats. Well-designed visualizations help users focus on essential insights rather than being overwhelmed by raw data. Poorly designed visuals, however, may increase cognitive load and reduce understanding.

3. Technology Acceptance Model (TAM)

The Technology Acceptance Model explains user acceptance of technological systems based on perceived usefulness and ease of use. In data visualization, tools and dashboards are more likely to be adopted if users perceive them as easy to understand and beneficial for decision-making.

CONCLUSIONS

Although data visualization is not a flawless solution for all aspects of data analytics, it offers a significant advantage by establishing a “common language” among stakeholders (Syed Fiaz et al., 2016). This shared visual language facilitates clearer communication and enhances mutual understanding across different organizational levels. The effectiveness of data visualization depends largely on the appropriate selection of visualization techniques, as different types of data require different forms of graphical representation. For instance, line charts are particularly effective for illustrating trends over time, whereas other forms of visualization may be more suitable for categorical or comparative data.

In addition, the incorporation of interactivity into data visualization systems can further enhance user engagement. Interactive features enable stakeholders to explore datasets at their own pace and to drill down into specific areas of interest, thereby fostering deeper analytical insight. Furthermore, organizations can promote the effective adoption of data visualization tools by providing adequate training and technical support, which can increase user confidence and willingness to engage with data-driven systems.

Overall, data visualization serves as a powerful tool for communicating both financial and non-financial information. By transforming complex datasets into more accessible and comprehensible formats, it enhances understanding, promotes stakeholder engagement, and ultimately supports more informed and optimized decision-making processes.

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