

Data Visualization in Annual Reports: Impacting Investment Decisions

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Abstract

In the digital era, the presentation of financial information has transcended traditional narratives to incorporate advanced data visualization, a transformation that holds significant implications for annual report analysis and investment decision-making. Therefore, this paper explores the efficacy of data visualization techniques in conveying complex financial data in annual reports for investment decision-making. We used questionnaires as a data collection method to get the perspective of investors after giving them an analysis of various companies' financial statements (JP Morgan, Apple Inc. HR Wallingford, Brac Bank, and ACLL Ltd) presented visually. Upon collection of the data, a comprehensive analysis of questionnaire responses from surrogate investors was done to get a perspective on how investors view the use of data visualization in annual reports to help them make investment decisions. The majority of the respondents indicated that data visualization helps them easily understand annual reports thereby helping them make informed investment decisions. The findings illustrate the significance of data visualization in annual reports for investors when they want to make investment decisions based on the financial reports presented visually. The paper concludes that data visualization is a significant contributor to investors' understanding of annual reports and thus helps them in making investment decisions. The contribution of this paper is that it will help companies understand the need of using data visualization to help investors clearly understand financial information and data. Some of the research limitations include biased viewpoint on the questions given to the surrogate investors. Additionally, it proposes a trajectory for future research, particularly the exploration of emerging technologies like AI and ML, to further refine data visualization practices in annual reports, thereby empowering stakeholders with unprecedented financial insight and foresight.

Keywords: Data Visualization, Annual Reports, Investment Decisions, Financial Reporting, Investor Confidence, Digital Transformation, Artificial Intelligence (AI), Machine Learning (ML), Power BI, Tableau

1.0 Introduction

Annual reports are crucial in offering investors valuable insights into a company's performance as they

help them in making investment decisions (Almilia et al., 2019). Despite the importance of annual reports to investors, the manner of data presentation may be complex for most of them to clearly understand and make informed decisions, hence, the rise of data visualization. Data visualization offers a powerful tool to help simplify and communicate complex financial information and data to ease its understanding by various consumers of the data such as investors. According to Eberhard (2020), “A visualization is defined as a visual representation of information or concepts designed to effectively communicate the content or message and improve understanding in the audience.” Thus, utilizing visual elements such as charts, graphs, and infographics, data visualization can change raw data into easily understandable and visually appealing representations for the audience, particularly, investors.

Despite data visualization becoming increasingly prevalent in financial reporting, it remains unclear whether it truly improves investors’ comprehension of a company’s performance and subsequently impacts their investment decisions positively. Research is limited to exploring the potential gap between the current practices of data visualization in annual reports and their impact on informed decision-making. Hence, this study attempts to fulfil this gap.

Therefore, the objectives of the research are to explore the practices of data visualization in annual reports and determine their effectiveness in availing financial information to investors. This entails assessing different types of data visualization such as graphs, charts, and other forms for their overall impact. Besides, another aim of this study is to investigate the impact of data visualization on investment decision-making by investors. Through a questionnaire survey, this study gathered insights from investors into how they view and interpret visualized financial information in annual reports.

Through an evaluation of 5 case studies and real-world examples, this paper aims to identify the various impacts of data visualization on investors' understanding and decision-making process as well as their confidence in financial information presented to them by companies. The case studies will highlight instances where data visualization has been used to help investors make informed investment decisions. It will also highlight how various tools such as Microsoft Power BI, Excel, and Tableau are used in data visualizations, ways of incorporating data visualization in a company, and the way data visualization promotes understanding of financial information and its impact on investor confidence. It also highlights the best practices for presenting financial information using data visualization. Thus, by taking advantage of the power presented by data visualization, companies can enhance investor confidence and build trust and credibility in their financial performance.

The research objective is to highlight the importance of data visualization in helping investors make investment decisions. From the researches highlighted in the literature review, there is a gap in the actual significance of data visualization in helping investors make investment decisions. The study will entail using a questionnaire as a method of collecting data from a group of 100 students who acted as surrogate investors. Using a questionnaire to collect data for the study will ensure we get unbiased responses from the investors as it is a yes or no questionnaire.

2.0 Literature Review

A study conducted by Brown et al. (2022), show that graphical representation to nonprofessional investors plays an important role in their decision-making as these investors in social media platforms depend more on non-GAAP earnings highlighted with eye-catching pictures of stock movement, regardless of the textual dominance of GAAP or non-GAAP earnings.

A study by Solis (2019) discovered that data visualization is significant in investment decision-making

for private equity investors. It enhances their understanding of the data presented, thereby helping them make informed investment decisions. Similarly, a study by Moore (2017) conducted a study on 50 executives on the impact of data visualization in support of executive decision-making. Moore (2017) discovered that data visualization is a key aspect in helping executives understand financial data and information, thereby helping them make informed decisions on their companies' investment undertakings. Perdana et al. (2018) discovered that data visualization simplifies complex financial information and data, thereby helping enhance its understanding by investors. This in turn helps them improve their decision-making on investments.

A recent study by Nekrasov et al. (2022), where they examined tweets containing any still image or video, including illustrative tweets having graphics, stock pictures, profitability outlook, return on investment, and executive pictures showed that firms experience increased retweets and enhanced Google search volume when they include a visual in their earnings announcement on Twitter. They discover investors easily understood information presented in the reports due to visuals such as pictures, graphics, and charts. Likewise,

Asay et al. (2018), discovered that including pictures of the CEO in annual reports during the earnings release improves investors' confidence in the financial reports, and would impact their decision-making. A study by Widyatama & Nasra (2023) highlights how visual presentations are an integral part of helping investors navigate the investment decision making process. The study highlighted the gap presented by the use of traditional financial reports presentation in easing the investors' understanding of financial reports.

Data visualization techniques allow companies to transform raw financial data into visual representations such as charts, graphs, and dashboards, making it easier for users to comprehend complex financial information at a glance and also enabling them to identify patterns, trends, and outliers that may not be immediately apparent in traditional reports (Perkhofer et al., 2019). Data visualization techniques can handle large volumes of data compared to traditional reporting methods (Trigo et al., 2014). In today's digital age, businesses generate massive amounts of data daily. Traditional reporting methods often struggle to handle this influx of data, resulting in delays and inaccuracies (Ojua, 2016). On the other hand, data visualization techniques can process and analyze large datasets quickly and efficiently, allowing businesses to make faster and more accurate financial decisions (Shao et al., 2022).

Moreover, data visualization techniques offer a level of interactivity that is simply not possible with traditional reporting methods. With modern tools and software, users can interact with visualizations, drill down into specific data points, and explore different scenarios (Yue et al., 2019). This interactivity not only enhances user engagement but also enables users to gain deeper insights into the financial data.

2.1 Best Practices for Effective Data Visualization in Annual Reports

Ensuring the effectiveness of data visualization entails using and conforming to some of the best practices that ensure the information relayed meets the needs of the intended target audience with their understanding also put into consideration. First, the visualizations should be clear, concise, and easy to understand through avoidance of filling the report with excessive data or complex visual elements that may confuse investors but rather focus on presenting the most relevant and meaningful information that aligns with the report's objectives (Jiles, 2020). Secondly, choosing the appropriate type of visualization for each type of data, such as trends, comparisons, or distributions, requires different visual representations (Jiles, 2020). For example, use line charts to show trends over time, bar charts to compare different categories, and pie charts or donut charts to represent proportions. By selecting the right type of

visualization, one can effectively convey the intended message and avoid misinterpretation, thereby making it easier for investors to deduce meaningful insights from the annual reports.

Finally, ensure consistency in design throughout the annual report. Use a consistent color palette, font, and layout to create a cohesive visual experience as this will improve readability and also enhance the overall appeal of the report. Consistency also helps investors navigate through the report more easily and locate relevant information quickly (Jiles, 2020).

2.2. The Significance of Data Visualization in Investment Decisions

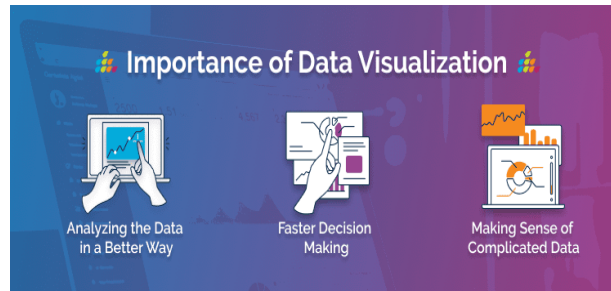


Figure-1: www.spashBi.com by Kalluri (2020)

In order to make sound investment choices, it's important to have a deep grasp of a company's financial status and performance. However, reading through lengthy reports can be tedious and confusing, leading to potential misinterpretations (Eberhard, 2020). Appreciatively, data visualization is a game changer, as it presents data in an engrossing, visual way. This makes it much simpler for investors to digest the information and spot relevant trends, anomalies, and patterns. Thus, data visualization assists in making wise and precise decisions.

When it comes to investment decisions, data visualization serves a crucial purpose of simplifying complicated financial information that can be quite daunting and intricate. This is vital to aid investors and other stakeholders to better digest these numbers and assess their implications. Financial data can be convoluted, comprising intricate variables and interdependencies, thereby making it cumbersome for investors to decipher. Yet, by transforming this complex data into a visual format, it becomes much more straightforward to interpret and comprehend (Perdana et al., 2018). From a line chart illustrating a stock's performance over time, investors can nimbly identify trends such as a sudden surge or drop in value. By simplifying complex data, data visualization can enable investors to make more educated investment decisions (Chy et al., 2023). For example, a scatter plot can display the correlation between two variables, like interest rates and housing prices (Eberhard, 2020). Bar charts convey financial data clearly to help investors make investment decisions as they display the relationship between a given financial aspect over a given time as shown below.

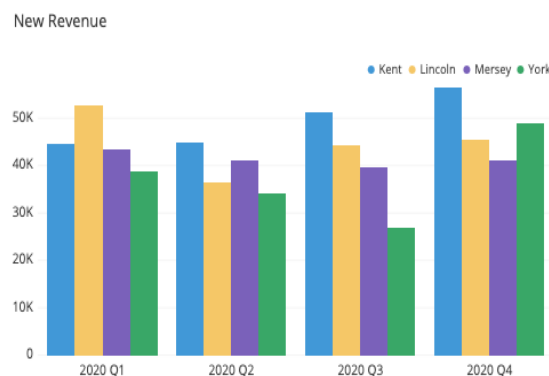


Figure-2: www.chartio.com

Moreover, investors may use data visualization to determine the relationship or connection between varied financial metrics. In this context, visual presentation of such links is important in that it enables investors to acquire useful information about the financial health of a firm and risks or opportunities available in these visual reports (Padilla et al., 2018). A nice chart can be used to establish the correlation between a company’s revenues and costs within a specific time frame, thus enabling investors to assess the company’s potential for growth and profitability.

In investment decisions, data visualization helps to identify outliers and anomalies that might not be visible in the presentation of raw financial data to different stakeholders since there are always outliers in any set of data – observations that deviate significantly from the norm; and these outliers can offer valuable insights into possible risks or opportunities. (Almilia et al., 2019) However, finding outlying points amidst a group of numbers is not easy; hence, it is much easier with data visualization where the data are presented visually thus making it easier for one to spot and identify outliers (Padilla et al., 2018). For instance, a bar chart could be used to display the range of returns on various stocks showing any extremes. Therefore, investors can delve deeper into causes for such anomalies and then adjust their investment strategies accordingly.

In addition, data visualization enables investors to compare one investment against another and assess how they have done so far. When making an investment decision, it is important to look at several options and determine the potential returns and risks for each option (Knafllic et al., 2015).

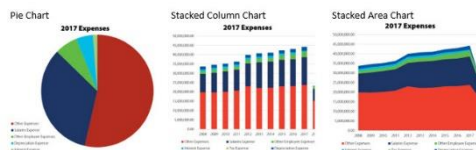


Figure-3: www.erpsoftwareblog.com

2.3. How Data Visualization Promotes Understanding of Financial Information

To make financial information easier to understand by various stakeholders, especially investors, data visualization is used. Data visualization employs color, size and shape to easily communicate its message in less complex and understandable form. For example, using a bar chart, the growth of revenues for a company over several quarters can be illustrated, where each bar is used to represent a specific time period (Zheng, 2018). This picture helps investors rapidly understand how well the company has been doing over several years and compare it with industry benchmarks or competitors.

Moreover, data visualization enables investors to explore different aspects of financial data by interacting with the visualizations. Interactive charts and graphs can provide investors with the ability to drill down into specific details, zoom in on specific periods, or filter data based on different criteria (Perdana et al., 2018). This interactivity not only enhances the understanding of financial information but also allows investors to uncover hidden insights and make more informed decisions.

Data visualization allows for better communication and collaboration when it comes to financial information. Instead of depending on verbal explanations or lengthy written reports, visuals can present information in a more impactful way where people can quickly understand and interpret the data without needing extensive explanations making it easier for teams to work together, as they can easily share visualizations and discuss their findings (Padilla et al., 2018). Whether it's a team meeting or a presentation to stakeholders, data visualization enhances communication and ensures that everyone is on the same page. Data visualization enables the identification of patterns and trends that may not be immediately recognized from raw numbers alone. Thus, by representing data visually, it is easier to identify correlations, outliers,

and other insights that may have been missed from the raw financial information presented (Eberhard, 2020). For example, a line graph showing sales over time may reveal seasonal patterns or fluctuations that can inform business strategies. A line graph highlights the performance of each year's sales revenue, and an investor can analyze how the line moves over a given time, thus helping them make informed decisions. Therefore, by highlighting these patterns through visualization, investors can make more informed decisions and take advantage of opportunities that may arise from the information presented.

2.4. The Impact of Data Visualization on Investor Confidence

According to Almilia et al. (2019), aside from improving understanding, data visualization also has a significant impact on the level of investor confidence as a well-designed, visually appealing, and designed annual report that effectively utilizes data visualization instills trust and credibility in investors. When investors are presented with clear and concise visual representations of financial information, they are more likely to have confidence in the company's transparency and ability to manage its finances.

A study by Wang (2011), discovered that data visualization improves financial data and information understanding of less knowledgeable investors as it simplifies the complex data into easy-to-understand graphics and visuals.

Data visualization can also enhance communication between companies and their investors. By presenting financial information in a visually engaging manner, companies can effectively present their key messages and strategic objectives to different stakeholders such as investors, strengthening the relationship between the company and its investors and also helping investors to better understand the company's financial performance and prospects (Almilia et al., 2019). As a result, investors are more likely to make confident investment decisions based on reliable and transparent information.

Another key benefit of data visualization is that it helps investors identify patterns and trends that may not be readily apparent in traditional data formats (Bateman et al., 2010). Through the use of color-coded charts and interactive visualizations, investors can easily spot correlations and anomalies that would otherwise go unnoticed. This deeper level of insight allows them to make more accurate predictions about future market movements and adjust their investment strategies accordingly. This newfound ability to identify patterns and trends not only enhances investor confidence but also increases their chances of making profitable investments.

Data visualization also enhances investor confidence by reducing the risk of errors or misinterpretations. When dealing with large volumes of financial data, mistakes can easily occur when manually inputting or analyzing information (Sun et al., 2019). However, by using data visualization tools, investors can minimize these risks by automating data processing and analysis, saving time, and reducing the likelihood of human error resulting in investors having greater confidence in the accuracy and reliability of their findings, knowing that they are based on objective data rather than subjective interpretations (Kamath et al., 2022).

In assessing the impact of data visualization of annual reports in helping investors make investment decisions, we analyzed five case studies for different organizations. We sourced the case studies from the internet and companies' websites to view their financial data and how they apply data visualization to ease investors' understanding. The case studies are supposed to show me how companies use data visualization to ease their investors' understanding of financial reports to help them make informed decisions about investing or divesting from the companies. We choose companies from the US because Apple and JP Morgan are some of the biggest in the world and have investors from different backgrounds, thus they

have to help all these investors understand the information presented to them, and data visualization is one of those methods.

3.0 Findings of Case studies: Successful use of data visualization in annual reports

There have been numerous instances where companies have successfully utilized data visualization in their annual reports to enhance investor understanding and confidence.

JP Morgan Chase & Co. has effectively used data visualization to present its loan portfolio and risk management strategy to its shareholders and investors. By using interactive charts and graphs, JP Morgan Chase enabled investors to explore the bank's loan exposure to different sectors and assess its risk management practices (ProjectPro, 2021). This transparent and visually compelling presentation of financial information helped JP Morgan Chase gain investor confidence and attract potential investors. JP Morgan Chase also uses data visualization to present its growth rates in different geographical locations to help its shareholders and investors understand the company's potential in the market. Investors can see and assess different growth rates for different regions, thereby helping them understand the company's drive to expand its customer base and the approaches used to realize it (JP Morgan Chase & Co., n.d.). Thus, it is safe to assume that data visualization will help investors decide if the company's prospects are good and if their investments are bound to grow.

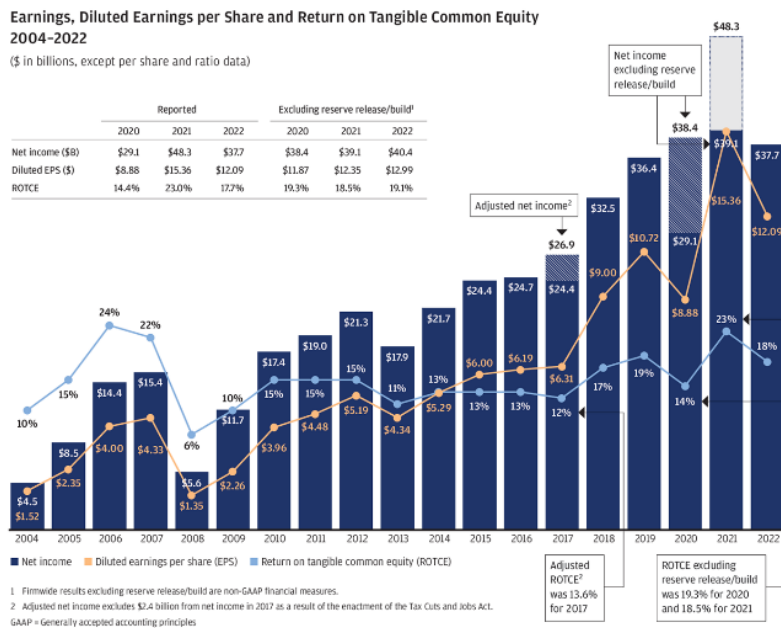


Figure-4: www.reports.jpmorganchase.com

Apple Inc., a global leader in the technology industry, has mastered the art of presenting its financial data using data visualizations to help its shareholders and investors easily understand the message being relayed (Wan et al., 2021). In its recent annual report, it utilized vibrant color schemes, creative illustrations, and interactive charts to effectively communicate its financial performance (Apple Inc, 2022). By using data visualization techniques, Apple Inc. was able to convey important information such as revenue growth, market share, and profitability trends, making its annual report more engaging for stakeholders, and also helping them stand out from its competitors.

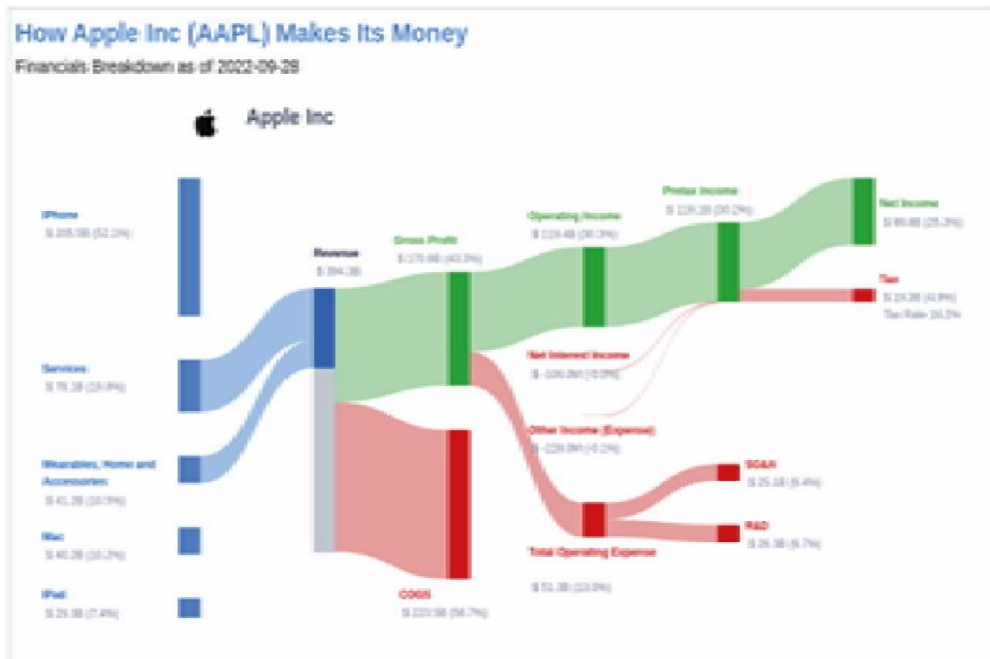


Figure-5: www.apple.com

HR Wallingford, an independent civil engineering, and environmental hydraulics organization uses data visualization in its annual reports to highlight its achievements to investors and donors. The company aims to solve the globe’s most complex water-related problems (Pomanda, 2022). It uses data visualization to highlight achievements realized, net income gained, and prospects for the subsequent financial year together with the funds needed to realize its projects (Hillier, 2021). Data visualization helps it present its annual reports in an easier-to-understand format to its investors and donors, who fund some of its projects such as the Dengue Forecasting Model Satellite-based System (D-MOSS) that aims to give early warnings to dengue outbreaks in six South Asian countries of Laos, Thailand, Philippines, Sri Lanka, Malaysia, and Cambodia (Hillier, 2021). One of its key donors is the UK Space Agency’s International Partnership Program, which must be presented with annual reports highlighting how the funds given have been used and what is needed for the program for the subsequent financial year (HR Wallingford, 2023). The data visualization makes it easier for the donor to identify trends and progress of the projects they are funding, thus helping them make informed decisions going forward.



Figure-6: www.pomanda.com

The Brac Bank in Bangladesh has for years been using data visualization in its annual reports to help its investors clearly understand various aspects of the financial reports (Brac Bank, 2022.). The company uses data visualization to display its annual net income, to highlight how the company has been performing over a given period of time as seen in figure 6 (Brac Bank, n.d.). The figure shows the bank’s net income performance over a period of a period of 5 years. With such clear visuals the bank’s investors and shareholders can easily understand and see how it has been performing, thereby easing their decision-making process as the bar chart below is easy to understand.



Figure-7: www.bracbank.com

ACI Ltd, a leading pharmaceuticals and chemical company in Bangladesh uses data visualization in its annual reports to relay financial data and information to its investors and shareholders (ACI, n.d.). The company uses data visualization to highlight how different segments of the company are performing in terms of sales as indicated in the figure below. This information visually presented may be significant to investors as it may help them easily understand the directions of the company in terms of turnover sales, thereby aiding them to decide whether it is viable to invest in the company or not.

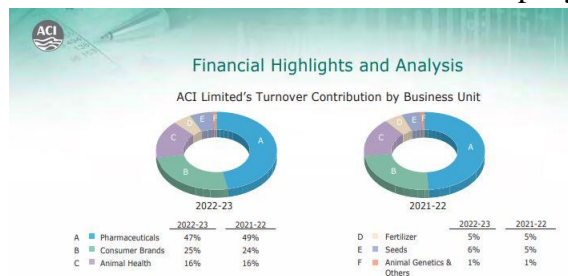


Figure-8: www.aci-bd.com

The successful application of data visualization by JP Morgan Chase & Co, Apple Inc., HR Wallingford, Brac Bank, and ACI Ltd highlights the power of data visualization in annual reports. Thus, through presenting complex information in a visual format, companies can engage their stakeholders and effectively communicate key messages helping them better understand the company's performance but also enhances the overall user experience (Davenport et al., 2010).

3.1 Methodologies

The research design is quantitative since it entails using Yes/No survey questionnaires. To gather data, we chose to use the questionnaire survey to get more perspective on the topic aside from the qualitative viewpoints from the case studies mentioned above. The survey seeks to give us an in-depth independent understand of the topic aside from the case studies.

We prepared a questionnaire to collect data from investors and financial professionals on the impact of data visualization in investment decision-making. Zimmerman (1999) also opines that using questionnaires to conduct business research yields is crucial in helping the users of the research report to assess the significance of the subject. To effectively gauge the impact of data visualization on investment decisions, we gave a 7-question questionnaire below to a group of 100 investors through Qualtrics, a web-

based software that allows the user to create surveys and generate reports. We used descriptive statistics, which summarizes data using indexes such as mean and median.

1. Have ever heard of data visualization in financial reporting? Yes or No
2. Do you believe that data visualization in annual reports can significantly improve your understanding of a company's financial performance? Yes or No
3. Is visual representations of data in annual reports more effective in conveying information compared to traditional textual reports? Yes or No
4. Are you to rely more on visual elements such as charts and graphs when analyzing annual reports for investment decision-making? Yes or No
5. Do you think that the use of data visualization in annual reports can increase transparency and make it easier for investors to identify potential risks and opportunities? Yes or No
6. Does the inclusion of interactive features in data visualization enhance your engagement with annual reports and aid in making investment decisions? Yes or No
7. Can data visualization assist in identifying patterns or trends in a company's financial performance that may not be evident in textual reports? Yes or No

3.3 Analysis and Findings of Survey Data

Questionnaire Response							
Questions	1	2	3	4	5	6	7
Yes	100	80	75	79	75	80	79
No	0	20	25	21	25	20	21

Figure: 9

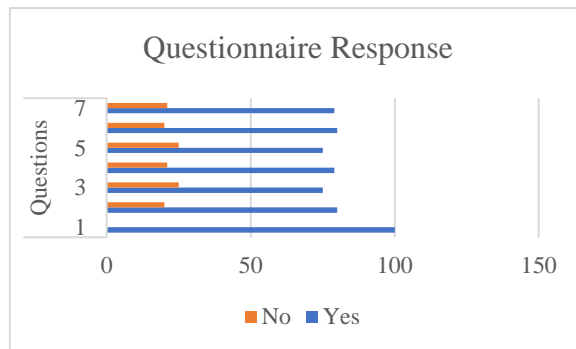


Figure: 10

On the first question, all the participants said that that they are aware of the existence of data visualization in annual reports, and they encounter it in almost every financial report nowadays. This finding is consistent with Dilla et al (2010) study which discovered that more and more investors and financial professionals are increasingly using or encountering data visualization in financial reports. Eccles & Krzus (2014), discovered that data visualization has become an integral part of financial reporting, thereby making it availed to investors through financial reports. This has enabled many to become accustomed to the technique.

On the second question, 80% (80 out of 100) of the participants said that data visualization of financial data significantly improved their understanding of a company’s financial performance. According to Luroe & Mason (2007), data visualization has improved investor decision-making as it has enhanced their understanding of financial data and information. Rodriguez & Kaczmarek (2016), discovered that using data visualization helped improve the investor decision-making process. This is consistent with our findings.

On the third question, 75% of the participants (75 out of 100) agree that data visualization is more effective than traditional textual financial reporting. According to Perkhofer et al. (2019), data visualization is more effective than traditional textual financial reporting as it simplifies the complex financial data into more understandable visuals, thereby easing investors' decision-making.

On the fourth question, 79% of participants (79 out of 100) agree that they rely on visual elements such as charts and graphs to analyze annual reports for investment decisions. This finding is consistent with Archambault et al. (2015) finding that data visualization, particularly charts and graphs, is a significant communication tool companies can use to avail complex financial data to investors. According to Ko et al. (2016) using bright and standard colors enhances the appeal of visuals, thereby making it easier for investors to understand and interpret the information.

On the fifth question, 75% (75 out of 100) of the participants agreed that data visualization increases transparency in annual reports. This finding is consistent with Barcellos et al (2017) findings that pointed to the essence of data visualization in ensuring transparency in financial reports of companies as the investors believe that with easy-to-understand data presentation, companies are transparent.

On the sixth question, 80% of the participants agree that the inclusion of interactive features in data visualization enhances their engagement with annual reports and helps them in making investment decisions. This finding is consistent with Ko et al. (2016) finding that highlighted the importance of interactive features such as graphs and bar charts in helping investors understand financial information, thereby helping improve their decision-making on investment.

On the seventh question, 79% of the participants (79 out of 100) opined that data visualization can help them identify trends a pattern in a company's financial reports as compared to textual reports. This finding resonates with Perkhofer et al. (2019), who discovered that many investors rely on data visualization to help them identify patterns and trends in financial reports compared to traditional financial reporting.

From the evidence presented it is good enough to conclude that data visualization is an integral part in helping investors easily understand financial reports and information, thereby ensuring they are able to make more informed investment decisions.

4.0 Recommendations for Future Research on Data Visualization in Annual Reports

Investigating the use of data visualization across different industries also offers significant research potential. Understanding the unique challenges and best practices in various sectors can provide a comprehensive view of how data visualization techniques are applied in diverse business contexts. This cross-industry analysis would shed light on the versatility and adaptability of visual data presentation in financial reporting.

Longitudinal studies tracking changes in investor behavior in response to data visualization advancements in annual reports would be invaluable. Such studies could reveal insights into the long-term effectiveness of visual data representations and their impact on investment strategies over time.

The cognitive load associated with data visualization in financial reports is another critical area for research. Investigating how different visual representations affect investors' ability to process and retain financial information could lead to the development of more effective and user-friendly visualization designs. This research could inform the creation of visualizations that balance informativeness with ease of comprehension.

Examining global trends and cultural differences in the perception and use of data visualization in annual reports can offer a broader perspective. This research should consider how cultural and regional

differences affect the acceptance and effectiveness of various visualization techniques, potentially leading to more universally effective financial reporting practices.

The role of User Experience (UX) design in financial reporting is an area ripe for exploration. Future research could delve into how UX design principles, such as aesthetics, layout, and interactivity, can be applied to enhance the engagement and effectiveness of data visualizations in annual reports.

Ethical and transparency issues in data visualization are also crucial. Investigating the potential for data misrepresentation or bias in visualizations is essential for developing ethical standards and best practices. This research would contribute to ensuring that financial reports are both transparent and accurate.

Finally, analyzing the need for and impact of training programs in data visualization for financial professionals is essential. This could help identify educational gaps and suggest improvements in training methods, ensuring that professionals are well-equipped to understand and utilize advanced visualization tools effectively.

Additionally, comparing the impact of traditional financial reporting methods with modern visualization techniques on investment decisions would provide empirical evidence on the evolution and effectiveness of financial communication strategies. This comparison could highlight the benefits and limitations of both approaches, offering a balanced perspective on the transition towards more visually driven financial reporting.

4.1 Study Limitations

There might be limitations to the findings based on the research design used since, there is a possibility that many of the participants might have been biased or dishonest and that they gave inaccurate information since the questions were either Yes or NO. Some respondents may also have given answers they thought the financial community would deem most acceptable.

5.0 Conclusion

In conclusion, visualizing data in annual reports empowers investors is crucial for understanding the impact of data visualization on investor decision-making as the Excel analysis indicated that a huge average number of participants (investors use data visualization of annual data to help them understand the information presented and make investment decisions. The findings have indicated that the majority of financial professionals and investors rely on data visualization in annual reports to help them in making investment decisions. The research has shown how data visualization has shifted the dependence of investors on textual reports to visuals for clear understanding of financial information. The findings set a basis for businesses that are yet to fully embrace data visualization in their annual reports to start considering fully incorporating visuals to help financial information users easily understand the data presented before them.

The findings of this research can have significant implications for investors, companies, and future research in this area. The findings reinforce the importance of incorporating visual elements in annual reports to empower investors with meaningful insights. Therefore, through incorporating data visualization best practices and utilizing the right tools, companies can take advantage of the power of data visualization in their annual reports and unlock new opportunities for growth and success, as well as increase their investors' confidence and trust through simplified financial information presentation.

The contribution of this paper is that it will help companies understand the need of using data visualization to help investors clearly understand financial information and data. The findings of this paper are related to other researches on data visualization such as by Solis (2019), Eberhard (2020), Almilia et al. (2019),

among others.

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