INITIAL BACKGROUND RESEARCH

Nekezova, Ivayla I.M.

Table of Contents

1. Introduction

This research aims to investigate how current data visualisation practices can be enhanced to facilitate better-informed decision-making for clients. In an era where data serves as a cornerstone for organisational strategy, understanding the effectiveness of visualisation techniques becomes paramount. By delving into specific questions surrounding data visualisation tools, client preferences, challenges, and the integration of AI forecasting, this study seeks to provide valuable insights for optimising visualisation practices.

2. Data Visualisation Trends:

2.1 Explore current trends in data visualisation across various industries.

General Trends

- Animated and Interactive Visualisations
- Data Storytelling
- Artificial Intelligence and Machine Learning Data Visualisation
- Mobile-Friendly Visualisations
- Video and Storytelling visualisation
- Data Democratisation - anyone can read, understand, and transmit data without significant effort.
- Real-time Data Visualisation
- Building a Reporting Ecosystem Through Application Integration

One of the biggest trends for the upcoming year is merging data visualisation tools. Application integration allows businesses to achieve better results through a complex reporting ecosystem.

In turn, such a system can **facilitate responding** to routine demands of data processing and analysis. Besides this, it simplifies on-demand operations.

Therefore, companies can share their progress with customers, stockholders, and third parties. They additionally get to track performance indicators, which promotes faster growth.

Sales and Marketing

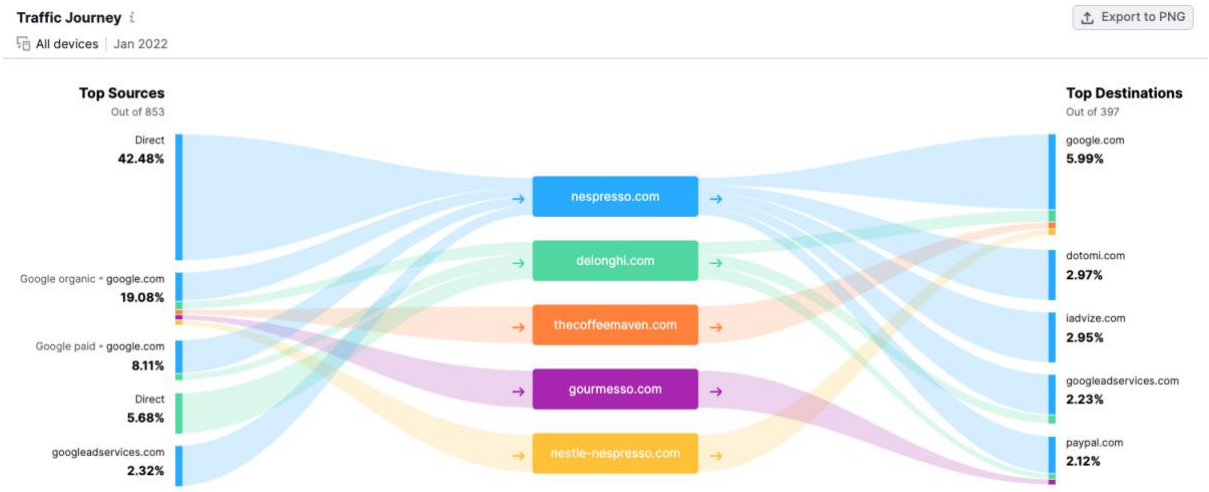
- Customer Behaviour Analysis Visualisation

This trend includes the analysis and visualisation of data related to customer interactions, preferences, and purchasing patterns. This data is essential for

marketers to understand their target audience, personalise marketing strategies, and optimise customer journeys.

Moreover, by analysing and understanding demographic and behavioural data more thoroughly, data visualisation may assist you in developing lead nurturing programs that are especially designed to move leads farther down the sales funnel and in lead categorisation by segment. By utilising:

- **heatmaps,**
- clickstream,



- social media listening,
- **sentiment analysis**
- Marketing Campaign Performance Dashboards

Marketers will be provided with a consolidated view of key metrics and insights related to their campaigns when adapting to this trend. These dashboards enable marketers to monitor campaign performance, track important KPIs, and make data-driven decisions to optimise marketing strategies.

Choosing the ideal target market and creating tailored message that will increase the likelihood of a sale are no longer the tough tasks. You even can optimise budget allocation by concentrating on what works best and make real-time adjustments to your campaigns depending on campaign results.

Banking and Finance

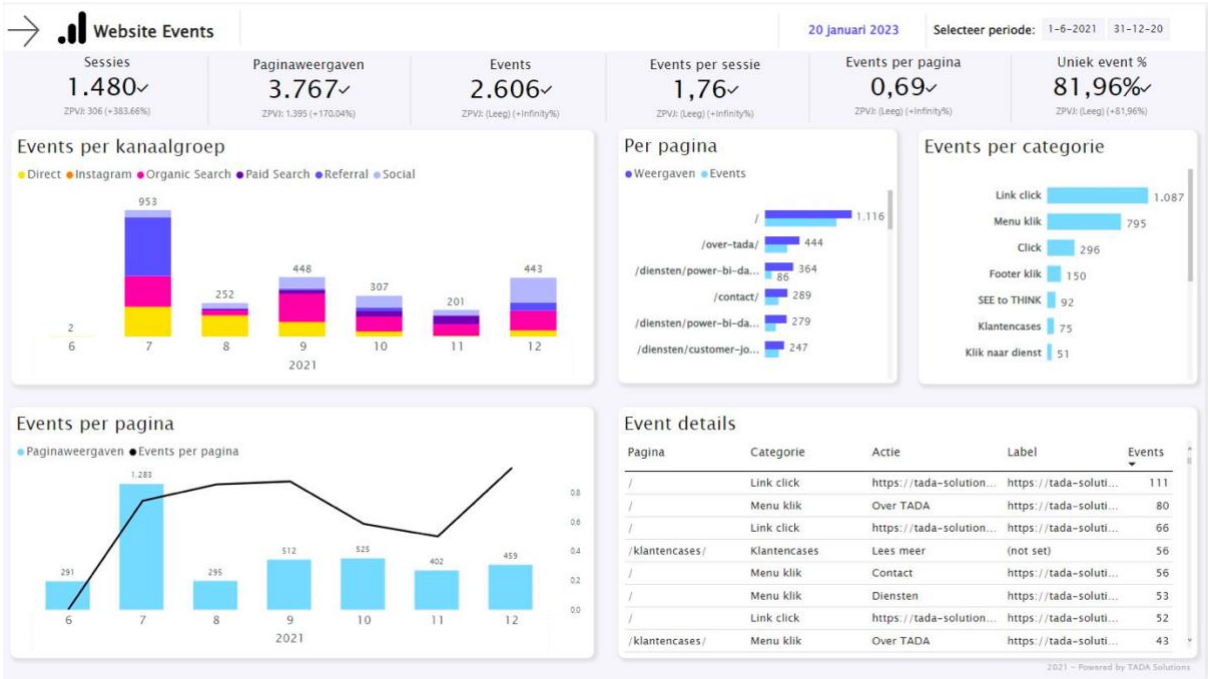
Organisations can visualise and detect suspicious activity and financial disruptions by data visualisations software. It can reduce the future risk of fraud. Total financial visibility enables leaders to improve transparency, increase accountability, bring accuracy in transactions, and ensure the productivity of the programmers.

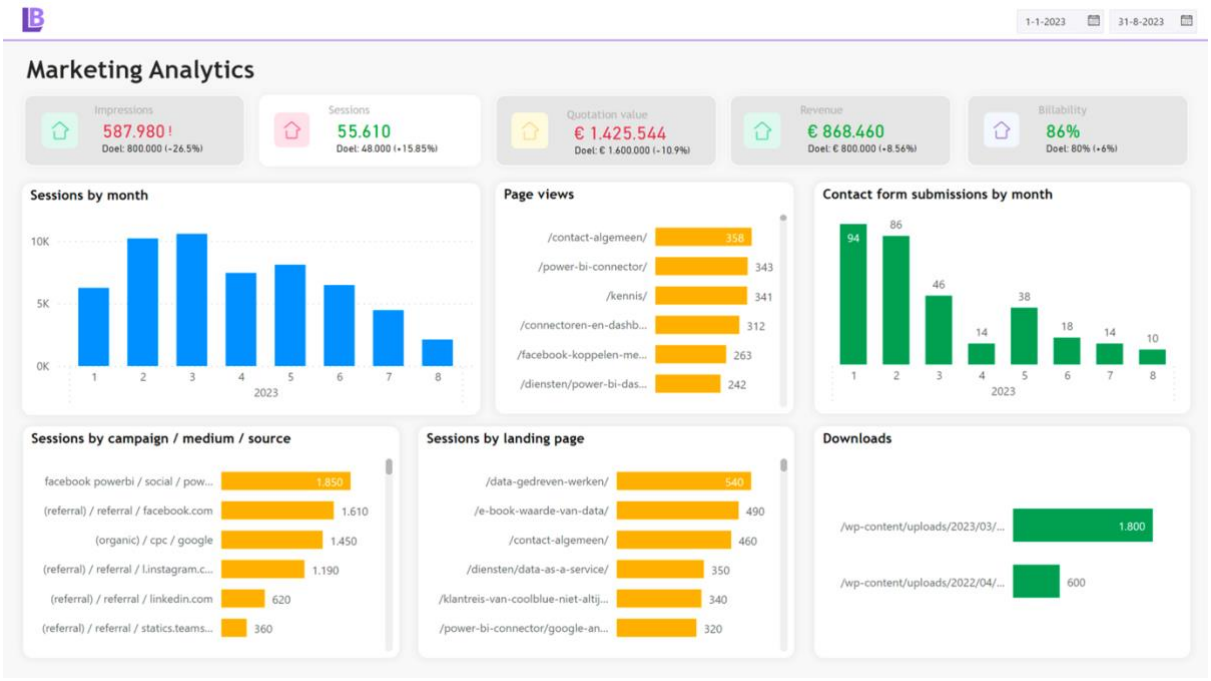
2.2 Identify popular tools and platforms used for data visualisation.

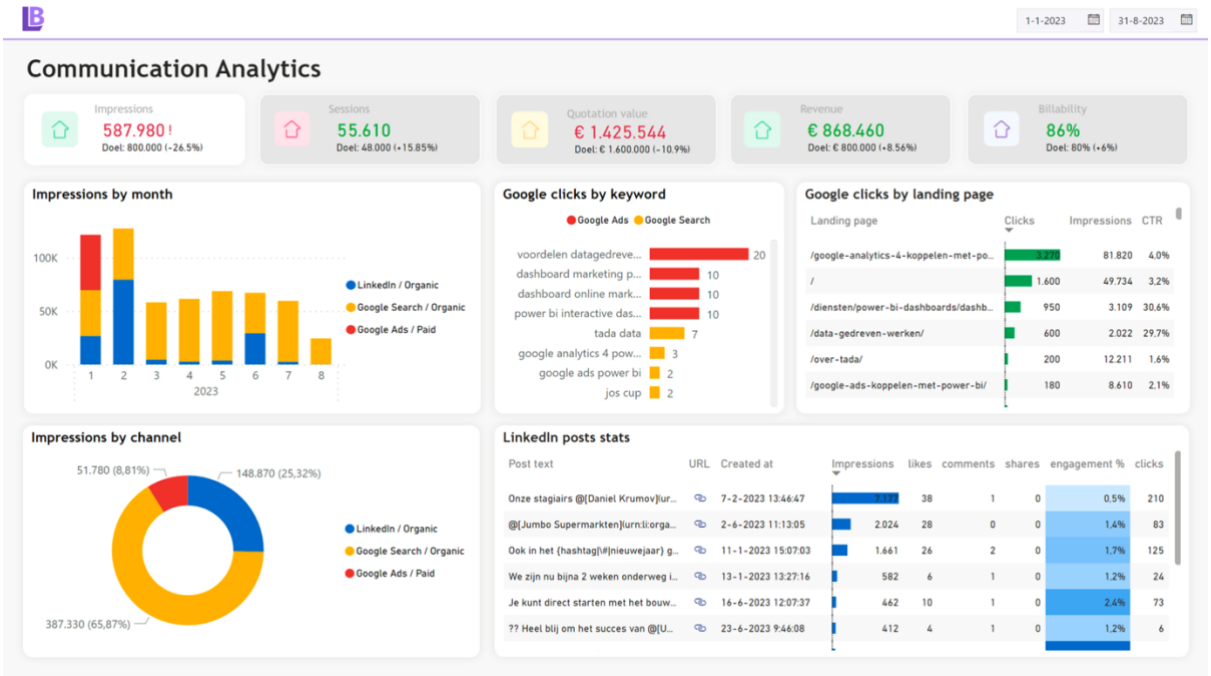
Software	Description	Usability	Features	AI Integration Compatibility	Cost
Tableau	Leading data visualization tool with a user-friendly interface and powerful capabilities.	Intuitive UI	Data connection, Data visualization, Dashboards, Analytics, Collaboration, Mobile access	Yes	Paid
Power BI	Microsoft's business analytics tool enabling the creation of interactive reports and dashboards.	User-friendly interface	Data exploration and visualization, Customizable dashboards, Integration with Microsoft products	Yes	Paid
QlikView/QlikSense	Data visualization and BI platforms known for associative data modeling and dynamic exploration.	User-friendly interface	Associative data model, Dynamic dashboards, Advanced analytics, Responsive design	Yes	Paid
Google Data Studio	Free tool by Google for creating customizable reports and dashboards using data from various sources.	Simple and intuitive design	Free tool from Google, Easy-to-use drag-and-drop interface, Integration with Google products	Limited	Free
Domo	Cloud-based BI platform with an intuitive interface, visual data exploration, collaboration features, and mobile access.	Intuitive interface	Cloud-based platform, Visual data exploration, Collaboration features, Mobile access	Yes	Paid
Looker	Data visualization and BI platform providing centralized access to data and report sharing.	Requires SQL knowledge	Data exploration and visualization, SQL-based queries, Data modeling capabilities	Yes	Paid
Plotly	Python graphing library supporting interactive, web-based visualizations.	Code-based interface	Open-source library for data visualization, Interactive plots and dashboards, Python and R integration	Yes	Free
D3.js	JavaScript library for creating dynamic, interactive data visualizations in web browsers.	Code-based interface	Powerful for custom visualizations, Wide range of chart types and interactions	No	Free
Highcharts	JavaScript charting library offering a wide range of interactive and customizable chart types.	Code-based interface	Rich library of chart types and options, Interactive features, Cross-browser compatibility	Yes	Paid

2.3 Current data visualisation Tada Solutions is using

Examples of current dashboards of Tada Solutions using PowerBI.


Website Events
20 januari 2023
Selecteer periode: 1-6-2021 31-12-20
Sessies
1.480
Paginaweergaven
3.767
Events
2.606
Events per sessie
1,76
Events per pagina
0,69
Uniek event %
81,96%
Events per kanaalgroep
Direct Instagram Organic Search Paid Search Referral Social
953
252
448
307
201
443
2
6 7 8 9 10 11 12
2021
Per pagina
Weergaven Events
/ 1.116
/over-tada/ 444
/diensten/power-bi-da... 364
/contact/ 289
/diensten/power-bi-da... 279
/diensten/customer-jo... 247
Events per categorie
Link click 1.087
Menu klik 795
Click 296
Footer klik 150
SEE to THINK 92
Klantencases 75
Klik naar dienst 51
Events per pagina
Paginaweergaven Events per pagina
291
1.283
295
512
525
402
459
6 7 8 9 10 11 12
2021
Event details
Pagina Categorie Actie Label Events
/ Link click https://tada-solution... https://tada-soluti... 111
/ Menu klik Over TADA https://tada-soluti... 80
/ Link click https://tada-solution... https://tada-soluti... 66
/klantencases/ Klantencases Lees meer (not set) 56
/ Menu klik Contact https://tada-soluti... 56
/ Menu klik Diensten https://tada-soluti... 53
/ Link click https://tada-solution... https://tada-soluti... 52
/klantencases/ Menu klik Over TADA https://tada-soluti... 43
2021 – Powered by TADA Solutions


1-1-2023
31-8-2023
Marketing Analytics
Impressions
587.980 !
Doel: 800.000 (-26.5%)
Sessions
55.610
Doel: 48.000 (+15.85%)
Quotation value
€ 1.425.544
Doel: € 1.600.000 (-10.9%)
Revenue
€ 868.460
Doel: € 800.000 (+8.56%)
Billability
86%
Doel: 80% (+6%)
Sessions by month
10K
5K
0K
1 2 3 4 5 6 7 8
2023
Page views
/contact-algemeen/ 358
/power-bi-connector/ 343
/kennis/ 341
/connectoren-en-dashb... 312
/facebook-koppelen-me... 263
/diensten/power-bi-das... 242
Contact form submissions by month
94 86 46 14 38 18 14 10
1 2 3 4 5 6 7 8
2023
Sessions by campaign / medium / source
facebook powerbi / social / pow... 1.850
(referral) / referral / facebook.com 1.610
(organic) / cpc / google 1.450
(referral) / referral / l.instagram.c... 1.190
(referral) / referral / linkedin.com 620
(referral) / referral / statics.teams... 360
Sessions by landing page
/data-gedreven-werken/ 540
/e-book-waarde-van-data/ 490
/contact-algemeen/ 460
/diensten/data-as-a-service/ 350
/klantreis-van-coolblue-niet-altij... 340
/power-bi-connector/google-an... 320
Downloads
/wp-content/uploads/2023/03/... 1.800
/wp-content/uploads/2022/04/... 600



3. AI Forecasting Techniques:

3.1 Understand the benefits and limitations of AI forecasting for decision-making processes.

Benefits:

- **Improved Accuracy -** They can analyse large datasets, identify complex patterns, and adjust predictions in real-time based on changing variables.

- **Automated Insights -** AI forecasting can automate the process of generating insights from data, allowing decision-makers to quickly access and interpret relevant information. This can save time and reduce the need for manual analysis.

- **Enhanced Decision-Making -** By providing accurate predictions and insights, AI forecasting can help decision-makers make more informed and timely decisions. It enables them to anticipate trends, identify potential risks, and seize opportunities proactively.

- **Adaptability -** AI forecasting models can adapt to changing data patterns and business conditions. They can continuously learn from new data and adjust their predictions, making them suitable for dynamic and uncertain environments.

- **Scalability -** AI forecasting solutions can scale to handle large and complex datasets, making them suitable for businesses of all sizes. They can analyze historical data, identify trends, and forecast outcomes across various domains and industries.

Limitations:

- **Data Quality Issues -** AI forecasting relies heavily on the quality of input data. If the data is incomplete, inaccurate, or biased, it can lead to erroneous predictions. Ensuring data quality and addressing biases require careful preprocessing and validation.

- **Complexity and Interpretability -** AI forecasting models can be complex and difficult to interpret, especially for non-technical users. Understanding how the models make predictions and interpreting their outputs may require specialised knowledge and expertise.

- **Overfitting and Generalisation -** AI forecasting models may overfit to historical data, capturing noise or irrelevant patterns that do not generalise well to new data. Balancing model complexity and generalisation requires careful tuning and validation techniques.

- **Uncertainty and Risk -** Forecasting inherently involves uncertainty, and AI models may not always capture all sources of risk or variability. Decision-makers need to be aware of the limitations of AI forecasts and consider alternative scenarios and risk mitigation strategies.

- **Dependency on Historical Data -** AI forecasting models rely on historical data to make predictions. They may struggle to forecast rare events or phenomena that deviate significantly from historical patterns, especially in rapidly changing environments.

- **Maintenance and Updates -** AI forecasting models require regular maintenance and updates to remain accurate and relevant over time. This includes monitoring model performance, updating data sources, and retraining models with new data.

3.2 What information could be predicted?

Sales Predictions:

- **Sales Forecasting:** An AI-powered dashboard can predict future sales figures for specific products or services based on historical sales data, market trends, seasonality, and other relevant factors.

For example, it may forecast that sales of a particular product will increase by 15% in the next quarter, from $100,000 to $115,000.

- **Cross-Selling and Upselling:** By analysing past purchase history and customer behaviour, the dashboard can predict which additional products or services a customer is likely to be interested in. For instance, it may suggest that customers who purchased a camera are 70% likely to buy camera accessories, resulting in an average additional purchase of $50 per customer.

Marketing Predictions:

- **Customer Segmentation:** The dashboard segments customers into different groups, such as high-value customers, occasional buyers, and first-time purchasers. High-value customers, for example, are those who have made purchases totalling over $500 in the past year.
- **Churn Prediction:** AI algorithms can analyze customer engagement metrics such as frequency of purchases, website visits, and interactions with marketing emails to predict which customers are at risk of churning. For example, the dashboard predicts that 20% of customers who have not made a purchase in the last six months are at risk of churning in the next quarter. The dashboard can then alert the marketing team to take proactive measures to retain these customers.
- **Campaign Performance:** The dashboard can predict the likely success of upcoming marketing campaigns by analysing past campaign data, such as conversion rates, click-through rates, and ROI. For instance, the dashboard predicts that a new email marketing campaign will generate $10,000 in additional revenue with a conversion rate of 3%.

Pricing Predictions:

- **Dynamic Pricing:** The dashboard can analyse market demand, competitor pricing, and other relevant factors to recommend optimal pricing strategies for products or services. For example, it may suggest increasing prices by 10% during peak demand periods, resulting in an expected revenue increase of $20,000.
- **Price Elasticity:** AI algorithms can analyse historical sales data to determine how changes in price affect customer demand for specific products or services. The dashboard can then predict the impact of price adjustments on sales volume and revenue. For instance, analysis shows that reducing the price of a product by 5% is predicted to increase sales volume by 10%, resulting in an additional revenue of $5,000.
- **Competitive Pricing Analysis:** By monitoring competitors' pricing strategies and market dynamics, the dashboard can predict how changes in competitors' pricing will impact the business. For

instance, it may recommend lowering prices in response to a competitor's price drop to maintain competitiveness.

3.3 Implementation

PowerBI

Data Preparation:

- Preprocess your historical data within Power BI, ensuring it's in a suitable format for forecasting.
- Export the preprocessed data to a format compatible with your chosen open-source forecasting library (e.g., CSV, Excel).
- Use Python or R scripts to train your forecasting model using the selected library. This may involve splitting the data into training and validation sets, selecting model parameters, and fitting the model to the data.

Selecting Open-Source Forecasting Libraries:

There are several open-source libraries available for forecasting, such as:

- **Prophet:** Developed by Facebook, Prophet is a forecasting tool designed for time series data with strong seasonal patterns and multiple seasonality.
- **Statsmodels:** A Python library that provides various statistical models and methods for time series analysis and forecasting, including ARIMA, SARIMA, and exponential smoothing models.
- **TensorFlow / Keras:** These machine learning libraries offer flexibility for building custom forecasting models, such as recurrent neural networks (RNNs) or long short-term memory (LSTM) networks.

Integration with Power BI:

- Once the model is trained and validated, export the forecasted values back to Power BI.
- You can use Power BI's built-in Python or R script visuals to execute the forecasting scripts and display the results directly within your dashboard.
- Alternatively, you can export the forecasted values as a CSV or Excel file and import them into Power BI for visualisation.

Visualisation:

- Use Power BI's visualization tools to display both historical data and forecasted values in your dashboard.
- Create interactive elements such as slicers, filters, and drill-downs to enable users to explore the forecasted data dynamically.
- Add annotations or trendlines to highlight key insights or changes in the forecasted trends.

Other Softwares

Dashboard Layout:

- Use HTML and CSS to design the layout of your dashboard. Define elements such as headers, navigation bars, charts, and tables to display data and forecasted results.
- Structure your HTML with appropriate containers and sections to organise the dashboard components logically.

Data Visualisation:

- Utilise JavaScript libraries such as Chart.js, D3.js, or Plotly.js to create interactive charts and visualisations for displaying historical data and forecasted results.
- Import the necessary libraries into your HTML file and use JS to generate charts dynamically based on the data.

Data Retrieval and Preprocessing:

- Fetch historical data from your data source using JavaScript's XMLHttpRequest or fetch API.
- Preprocess the data as needed, including handling missing values, formatting dates, and aggregating data into appropriate time intervals.

AI Forecasting:

- Implement AI forecasting algorithms or utilise pre-trained models using JavaScript libraries such as TensorFlow.js or Brain.js. Or choose an open-source library for forecasting that suits your needs. Libraries like Prophet, Statsmodels, or TensorFlow.js offer various forecasting methods and models.
- Train the forecasting model using historical data and generate forecasted values for future time periods.
- Integrate the forecasted results into your dashboard visualizations, displaying them alongside historical data.

Integration with JavaScript:

- Utilise JavaScript libraries or frameworks such as TensorFlow.js or Brain.js for training and deploying forecasting models directly in the browser.
- Import the chosen library into your HTML file using script tags or npm package installation.
- Use JavaScript to fetch data from your data source, preprocess it, generate forecasts, and update the dashboard visuals dynamically.

User Interaction:

- Implement user interaction features using JavaScript, such as dropdown menus, date pickers, or sliders, to allow users to customise the dashboard views and parameters.
- Enable users to explore the forecasted data dynamically by interacting with the charts and visualisations.

Dashboard Controls and Navigation:

- Implement controls and navigation elements using HTML and CSS to enhance the usability of the dashboard.
- Include features such as buttons, tabs, or links to switch between different views, drill down into specific data subsets, or export data.

Responsive Design:

- Ensure that your dashboard is responsive and accessible across different devices and screen sizes. Use CSS media queries and responsive design techniques to adapt the layout and styling accordingly.

3.4 What problems the AI could find?

Sales and Revenue:

- Predicting sales downturns or identifying declining trends in revenue.
- Detecting patterns of customer churn or declining customer satisfaction scores.
- Highlighting underperforming products or services and suggesting adjustments to pricing or marketing strategies.

Supply Chain and Operations:

- Anticipating supply chain disruptions, such as delays in shipments or shortages of raw materials.
- Identifying inefficiencies in production processes or bottlenecks in the supply chain.
- Optimising inventory management by forecasting demand and recommending appropriate stock levels.

Marketing and Customer Engagement:

- Identifying ineffective marketing campaigns or channels with low return on investment (ROI).
- Predicting customer preferences and behaviour to personalise marketing efforts and improve customer engagement.
- Analysing social media sentiment and online reviews to identify issues affecting brand reputation.

Finance and Risk Management:

- Detecting anomalies or fraudulent activities in financial transactions.
- Predicting cash flow shortages or financial risks associated with market fluctuations.
- Assessing credit risk and predicting the likelihood of default for loans or credit accounts.

Product Development and Innovation:

- Analysing market trends and customer feedback to identify opportunities for new products or features.
- Predicting the success of new product launches or innovations based on historical data and market analysis.
- Identifying areas for product improvement or optimisation based on customer usage patterns and feedback.

3.5 What solutions the AI could suggest?

- **Sales and Revenue -** suggest targeted marketing campaigns, pricing adjustments, and promotions to increase sales and revenue.

- **Supply Chain and Operations -** recommend diversifying suppliers, optimising production schedules, and implementing inventory optimisation techniques to enhance supply chain efficiency.

- **Marketing and Customer Engagement -** propose personalised marketing messages, new marketing channels, and improved customer service processes to boost engagement and retention.

- **Finance and Risk Management -** advise on fraud detection measures, risk hedging strategies, and contingency planning to mitigate financial risks.

- **Product Development and Innovation -** recommend prioritising product features, accelerating time-to-market, and fostering innovation within the organisation to drive product development and innovation.

4. Dashboard Design

The designer's purpose in designing a data visualization is to create a deliverable that will be well received and easily understood by the reader. All design choices and particular implementations must serve this purpose.

4.1 Key Characteristics of Great Dashboards

Great dashboards are clear, intuitive, and customisable.

- They communicate information quickly.
- They display information clearly and efficiently.
- They show trends and changes in data over time.
- They are easily customisable.
- The most important widgets and data components are effectively presented in a limited space.

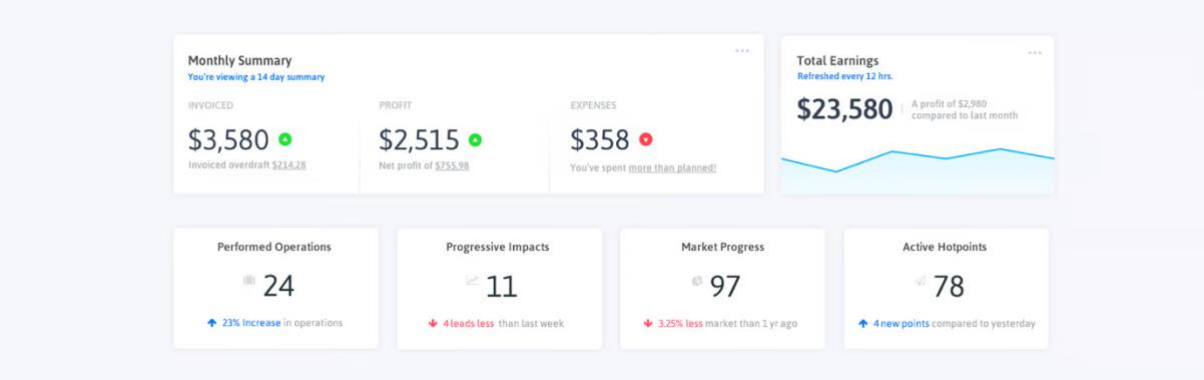
Great dashboards provide everything one click away.

- All essential information is immediately accessible.
- Data is prioritized.
- Information is displayed clearly in a visual hierarchy on one screen.
- The design provides a coherent overview that includes sparse, clear initial data with additional opportunities to drill down for more.
- Elements (chart, table, form) are displayed in a minimized view with the ability to bring up more details in a modal window or go to a page with more detail.
- The design improves usability with filters allowing users to customise how data is displayed and filters content using labels, categories, and KPIs.
- Reduced Complexity Provides Clarity

In a world overwhelmed with data, providing clear information is one of the most difficult things to accomplish. Presenting only the most relevant data on dashboards is essential—the more information we display, the harder it is for users to find what they need.

Effective dashboard design decisions should be guided by:

- the project goals
- the nature of the data
- the needs of users



4.2 Determining Dashboard Goals and Displaying Appropriate Data

When designing dashboards, successful dashboard designers start with a well-defined set of goals focusing on the problem to solve and the key, actionable insights people need to take away from the data.

Good design goals promote efficient and precise execution. Employing the S.M.A.R.T framework for goal setting puts the focus on **specific**, **measurable**, **actionable**, **realistic**, and **time-based** objectives.

A few key questions to ask when determining dashboard design goals:

- **How many steps do users need to take to achieve a specific goal?**
- **Is the interface intuitive enough for the user to reach their goal on their own?**
- **What information does the user need to successfully achieve their goal?**

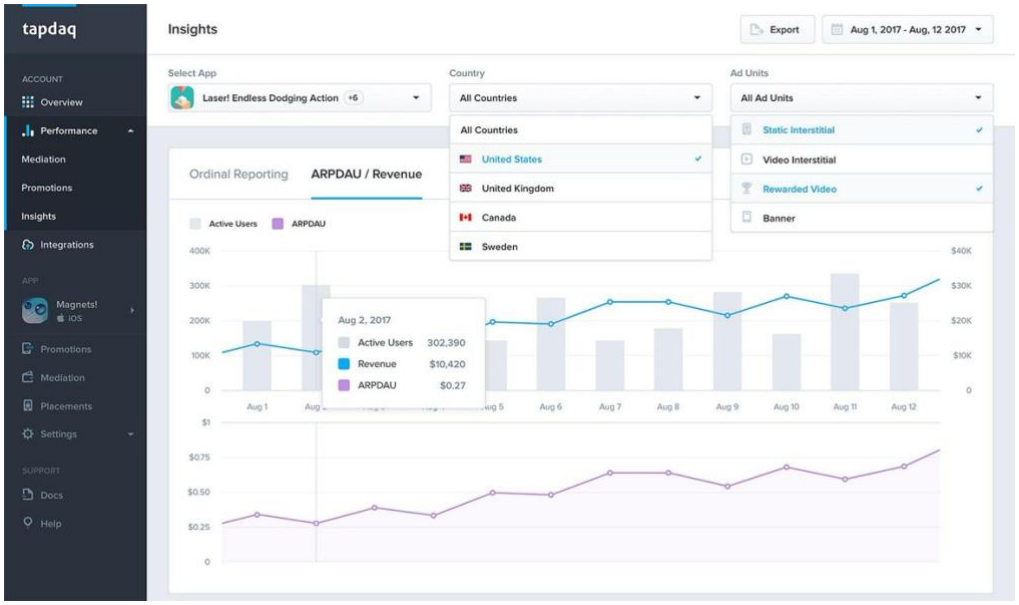
To determine what the goal of a specific dashboard design may be, define it by asking, **"What specific problem is this design going to solve for the user?"** The answer will provide insights on what metrics, properties, values, visuals, and data are of consequence.

Goal-centric design focuses on solutions to real problems and is the foundation for all great dashboard design. Start with a clear understanding of business objectives, consider user goals, and then convey the key information that needs to be communicated.

4.3 Progressive Disclosure in Dashboard Design

Progressive disclosure is a technique used to maintain a user's attention by reducing clutter. Creating a system of progressive disclosure assists in creating a user-centric environment, which helps prioritise user attention, avoid mistakes, and save time. It also allows users to focus on the key features that matter to them and not be forced to go through all of the features—including the ones they don't need or are not interested in.

Progressive disclosure is a dashboard design best practice that will also reduce error rates considerably; it will improve efficiency and help users improve their understanding of dashboards when a system is based on feature prioritisation.



Animation is a great way to satisfy a variety of user needs while also fulfilling multiple functions. It a great option to use while data and visuals are being loaded and is an advanced progressive disclosure solution.

Animation is the process of creating the illusion of motion; it is a dynamic that creates a sense of progress and constant feedback, thereby reducing user uncertainty and increasing perceived performance.

Advantages of using progressive disclosure in dashboards:

- Reducing user uncertainty and anxiety (by displaying signs of progress, the users are assured that everything is working as intended)
- Providing users with something to look at (partial display of data) rather than make them wait
- Providing users with a clear expectation of the upcoming steps, and creating an understanding of the way information is presented hierarchically

Potential issues with progressive disclosures and loading of data includes:

- Using indicators and disclosures in an inappropriate manner. Short loading times and useless steps will create distraction and work against usability principles.
- A lag in the retrieval of data without a clear indicator of progress can lead to user uncertainty and higher bounce rates.
- Using static progress indicators is a solution with little meaning, and does not offer enough information about progress, which can also lead to user uncertainty and higher bounce rates.

Explore concepts such as visual hierarchy, colour theory, and storytelling through data.

- Colour theory - https://medium.com/@mokkup/how-to-select-colors-for-data-visualizations-75423140c554
- Visual hierarchy - https://medium.com/@moonkapil/creating-a-visual-hierarchy-in-dashboard-7afcfae44711

5. Summary

Data Visualisation Trends:

- The exploration of current data visualisation trends reveals a notable shift towards more interactive and dynamic visualisations across various industries. Businesses are increasingly adopting animated and interactive visualisations, embracing data storytelling techniques, and leveraging artificial intelligence and machine learning for enhanced insights.
- Additionally, the emphasis on mobile-friendly visualisations and real-time data visualisation reflects the growing need for accessibility and immediacy in data-driven decision-making processes.

- By merging data visualisation tools and building a robust reporting ecosystem, organisations can streamline data processing, analysis, and communication, thereby facilitating faster growth and improved performance tracking.

AI Forecasting Techniques:

- The benefits of AI forecasting for decision-making processes are evident in its ability to provide improved accuracy, automated insights, enhanced decision-making, adaptability, and scalability.
- However, challenges such as data quality issues, complexity, and interpretability must be addressed to maximize the effectiveness of AI forecasting solutions.
- AI forecasting holds immense potential in predicting various aspects such as sales, marketing campaigns, pricing strategies, supply chain disruptions, and financial risks. By leveraging AI-powered predictions, organizations can anticipate trends, mitigate risks, and capitalize on opportunities proactively.

Dashboard Design:

- Effective dashboard design is characterised by clarity, intuitiveness, and customizability, ensuring that users can access and interpret data quickly and efficiently.
- Progressive disclosure techniques play a crucial role in maintaining user attention, reducing clutter, and improving usability. By prioritising essential insights and employing goal-centric design principles, designers can create user-centric dashboards that drive actionable decision-making.
- Insights from dashboard design highlight the importance of presenting information in a clear and hierarchical manner, leveraging visual hierarchy, color theory, and storytelling techniques to enhance user understanding and engagement.

6. Insights and Considerations/ Addressing Key Research Questions

The research conducted addresses the main research question and sub-questions comprehensively, providing valuable insights into how current data visualization practices can be improved to enable clients to make better-informed decisions.

- **Current Data Visualization Techniques and Tools** - The research identifies popular data visualisation tools and platforms used by the company, providing insights into the specific tools and techniques employed to visualise data effectively.

- **Client Needs and Preferences** - Through exploration of current data visualisation trends and techniques, the research sheds light on the specific needs and preferences of clients regarding data visualization for decision-making. This includes trends such as interactive and dynamic visualisations, real-time data visualisation, and mobile-friendly interfaces.

- **Challenges and Limitations** - By discussing the challenges and limitations associated with current data visualization approaches, such as data quality issues and complexity, the research highlights areas for improvement and optimisation in data visualisation practices.

- **Capabilities and Limitations of AI Forecasting** - The research delves into the capabilities and limitations of AI forecasting techniques relevant to the company's data, providing insights into how AI forecasting can enhance decision-making processes.

- **Integration of AI Forecasting** - Insights on how AI forecasting can be effectively integrated into existing data visualisation systems are provided, offering guidance on leveraging AI technologies to improve decision-making processes.

- **Impact of Visualisation Techniques** - The research explores how different data visualisation techniques impact clients' understanding and interpretation of data, emphasising the role of interactivity and user experience in enhancing effectiveness.

- **Risks and Drawbacks** - Potential risks or drawbacks associated with implementing new data visualisation techniques are discussed, providing a balanced perspective on the challenges and considerations involved in adopting innovative visualisation methods.

- **Evaluation of Effectiveness** - The research suggests methods for measuring and evaluating the effectiveness of improved data visualisation, offering insights into how the success of visualisation enhancements can be assessed and monitored over time.

Overall, the research effectively addresses the main research question and sub-questions by synthesising insights from current trends, industry practices, and technological advancements in data visualization and AI forecasting. These insights provide a foundation for enhancing data visualisation practices to empower clients with the tools and insights needed to make informed decisions.

7. Resources

- Data visualization trends:
  - Orient Software Blog: Data Visualization Trends
  - Synodus Blog: Big Data Data Visualization Trends
  - Tada Solutions: Power BI Dashboards
  - WPDataTables Blog: Data Visualization Trends
- AI forecasting techniques:
  - Improvado Blog: AI Marketing Analytics
  - o9 Solutions Knowledge Base: Everything About AI Forecasting
  - MobiDev Blog: Building AI Data Analytics Forecasting Business Intelligence Software
- Dashboard design:
  - Toptal Article: Dashboard Design Best Practices
  - Toptal Article: UX Projects: Think Smart
  - Delivering Data Analytics: The Power of Dashboard Wireframes: Driving Actionable Business Value