Put Down The Pie (Chart)

A Comprehensive Guide to Data Visualization for Product Managers

PRAGMATIC INSTITUTE

In today's data-driven world, product managers must analyze large amounts of complex information and communicate it quickly and clearly to stakeholders.

Imagine you are on a product team at a network security company. Every second of every day, your company is responsible for a corporate network receiving thousands of hacking attempts from bad actors worldwide over the internet.

What do you do? How do you protect your company?

Some network security teams might log into the firewall and attempt to mitigate every attack as it shows up. But those attacks are showing up faster than any human can respond.

One company Pragmatic worked with faced this challenge, and they used the power of data visualization to solve this issue.

Instead of addressing every individual attack, they used a sophisticated data modeling process to overlay the tens of thousands of attacks on a geolocated map from where they originated.

The data team and network security team found that 98% of their attacks came from three countries. It was the product team that found that those three countries only accounted for .5% of the company's revenue.

With the power of that visualization, the decision was obvious—cut off web traffic from those areas of the world. Data visualization answered a question that could have consumed hundreds or thousands of man-hours.

Protecting your company from cyberattacks isn't the only way data visualization can improve and enhance your company. In today's data-driven world, product managers must analyze large amounts of complex information and communicate it quickly and clearly to stakeholders.

Data visualization is how you can distill spreadsheets and databases into clear, actionable insights for decision-making. These charts and graphs allow you to quickly identify patterns, trends and anomalies that aren't apparent with raw data.

This guide provides an overview of data visualization techniques and best practices for product managers. It covers the fundamentals, including types of visualizations, what you could include in your data dashboard and helpful tools.

Why Product Managers Need Data (And How They Can Use It to Support Just About Everything)

By harnessing the power of data, you can move from a gut feeling to a data-driven decision-making process.

Not only does data help you make better decisions, but it can also help you build trust with stakeholders. By presenting data-backed insights and recommendations, you can demonstrate the value of your product and the effectiveness of your decision-making process, along with a clear expertise of your market and buyers.

And it's exciting to move away from decisions based on the loudest customer (the noisy 20%) or highest-paid person in the room (inside-out thinking). If you're familiar with Pragmatic's philosophies, then you know data is essential to a market-driven, outside-in approach to product.

You can use data to:

- ✔ Identify customer needs, preferences and demographics
- ✔ Track performance metrics
- ✔ Monitor product usage
- ✔ Analyze user behavior
- ✔ Uncover market insights
- ✔ Decide what you should have for lunch

Okay, so maybe that last one isn't as important, but the point is data can play a leading role in everything you do as a product manager.

And the great news is that your company is (probably) already collecting all this data—you just need to find it and use it!

But what do you do with your data once you've collected it? It's doing you no favors by sitting in a pile of messy spreadsheets. Data visualization is the bridge between raw data and decision-making. It lets you quickly identify patterns, trends and anomalies in your data set.

When you finish this ebook, you'll overflow with data visualization ideas (and we'll give you some tools to make them happen).

Data is essential to a market-driven, outside-in approach to product.

Types of Visualizations

Understanding the different types of visualizations and their appropriate use cases is essential for effective data communication.

This section highlights several different kinds of data visualization, starting with the big three (bar graphs, line charts and pie charts) and then providing a few other styles.

Bar graphs

Bar graphs are ideal for comparing data points because length visually represents the value. For example, if you want to compare the revenue generated by different products, you can use a bar graph with each product's revenue.

If you're going to draw attention to one specific product, you could change the color of that bar while leaving the rest a different color like this:

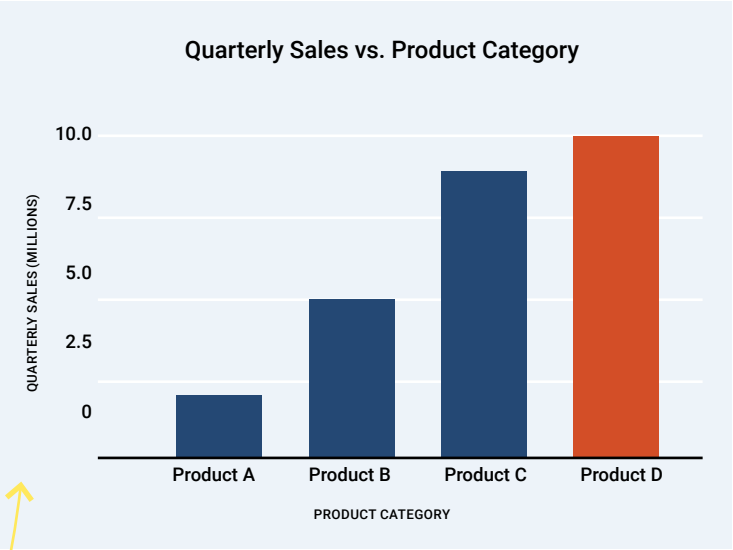
There are four subcategories of bar charts:

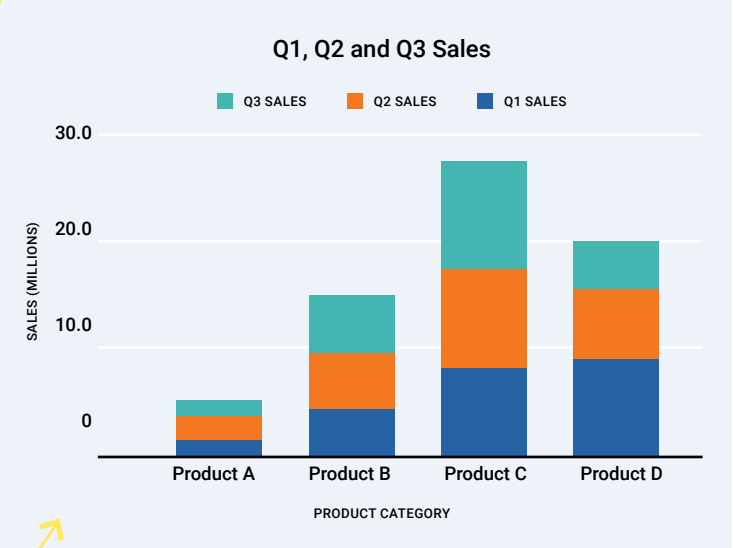
Vertical Bar Charts: The most common type of bar chart, where the bars are aligned vertically. These are great for comparing categories.

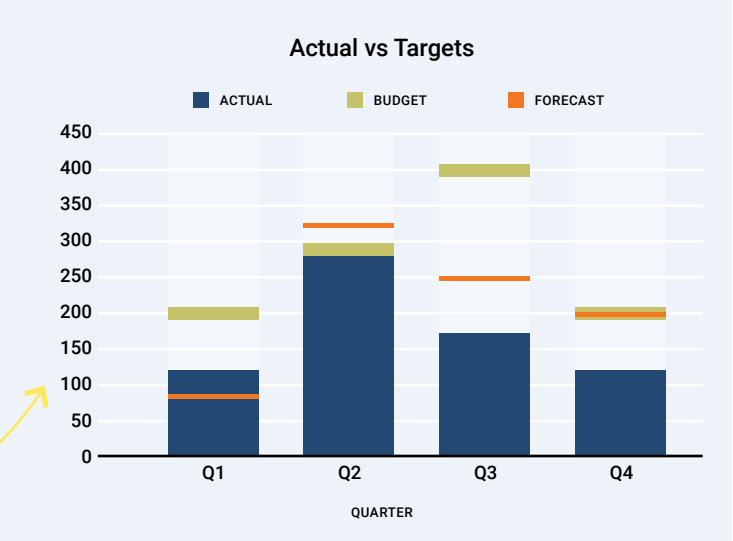
Horizontal Bar Charts: Similar to vertical charts, but with the bars aligned horizontally. These are great for ranking like sales performance or if you have more than seven categories.

Stacked Bar Charts: Where multiple data sets are shown about each other through stacked layers. A quick warning is to keep them simple. A stacked bar chart can quickly become too complicated with too many variables.

Bullet Charts: This chart best measures performance against a set target. They are also great for showing changes over time and progress toward goals. Bullet charts are great if you are comparing several variables within one category. For example, if you have a bar chart that shows forecasted, budget and actual expenses in separate bars for each quarter, then you can combine those bars in a bullet chart like this:







Line graphs

Line graphs display data points connected by lines to show trends or changes over time. They are ideal for visualizing continuous data, such as stock prices, revenue growth, or user engagement over time.

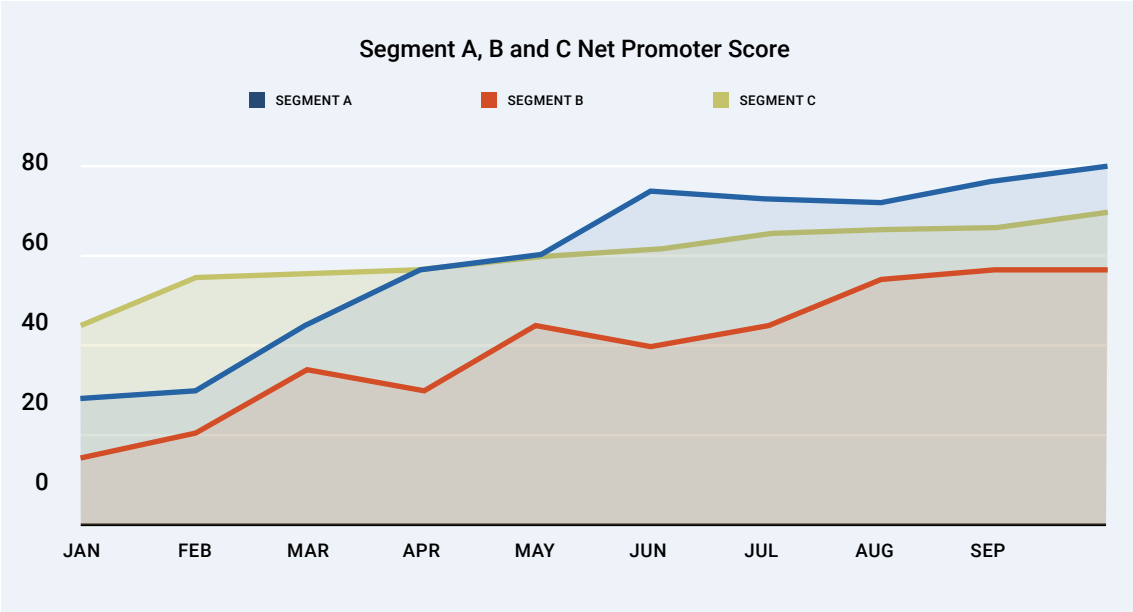
Or for understanding the customer experience at airports:

Source: (we all know it's true)

Area Graphs

An area chart is a type of data visualization that displays data as a series of points connected by lines, where the area below the line is filled with a color or shading. The resulting visual representation looks like a stack of shapes that flow together, showing the data changing over time.

One possible area graph for product managers could be a visualization of customer satisfaction levels over time. The x-axis would represent time, such as months or quarters, and the y-axis would represent net promoter scores.



Pie Charts

The primary purpose of a pie chart is to make it easy to understand the relationship between different categories or groups and the proportion of each category in the whole.

Data scientists love to hate pie charts. And for good reasons.

One major issue is that it can be challenging to compare categories with each other accurately, mainly when there are more than three categories. The human eye has trouble accurately judging angles and areas, making it challenging to make accurate comparisons. And 3D pie charts are even worse at creating clear visualizations that are easy to interpret.

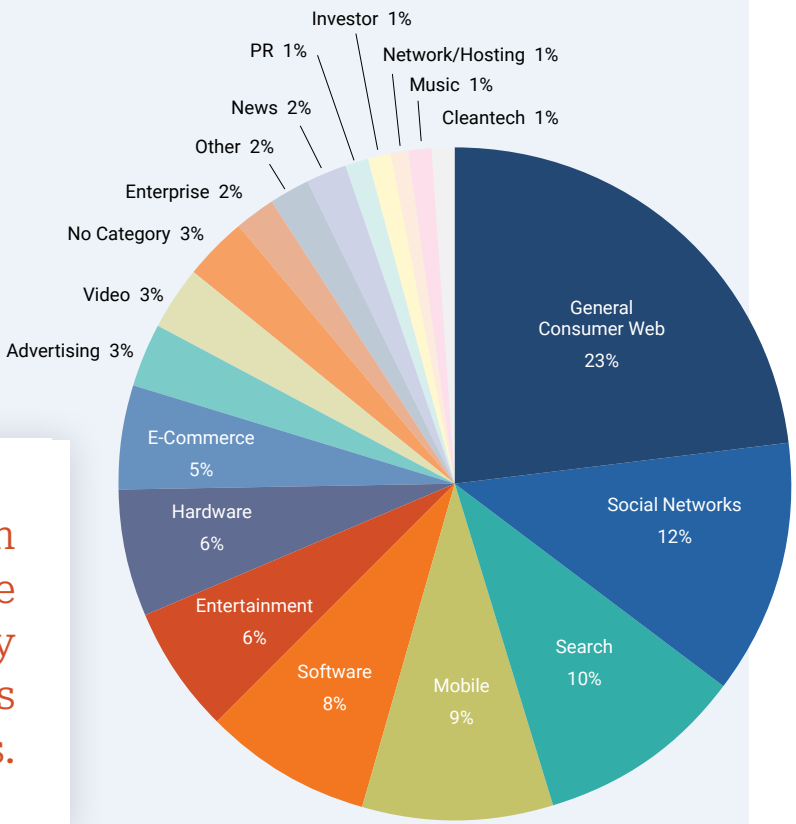
> The human eye has trouble accurately judging angles and areas.

Most pie charts can be transformed into simple bar charts and are easier to understand. If you must use a pie chart, it's best to have three or fewer categories, and the labels are clear.

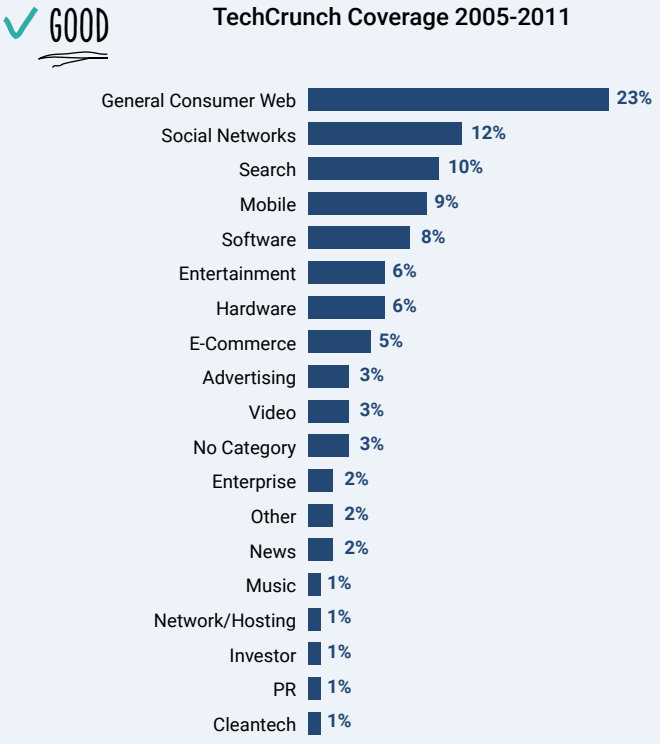
Here is an example (top right) of a bad pie chart from Techcrunch, and Storytelling with Data explains why.

The same data in a bar chart (bottom right) renders a simple and clear chart that's easy to read.

BAD



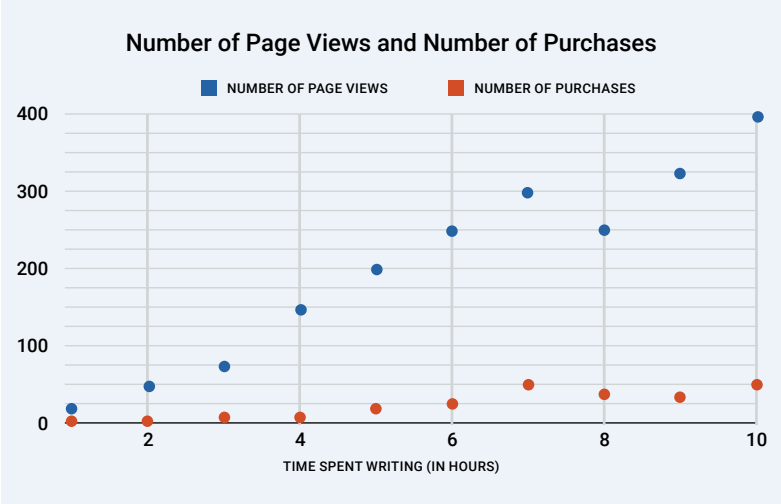
GOOD



Scatter plots

Scatter plots display data points on a two-dimensional plane, with each point representing the relationship between two variables. They help identify correlations, outliers, and trends in large datasets.

These charts are incredibly persuasive if you are trying to show a relationship between two variables. For example, suppose you want to demonstrate how the number of hours spent working on a project relates to its overall success. In that case, a scatter plot can show that more time spent on the project is associated with better outcomes.



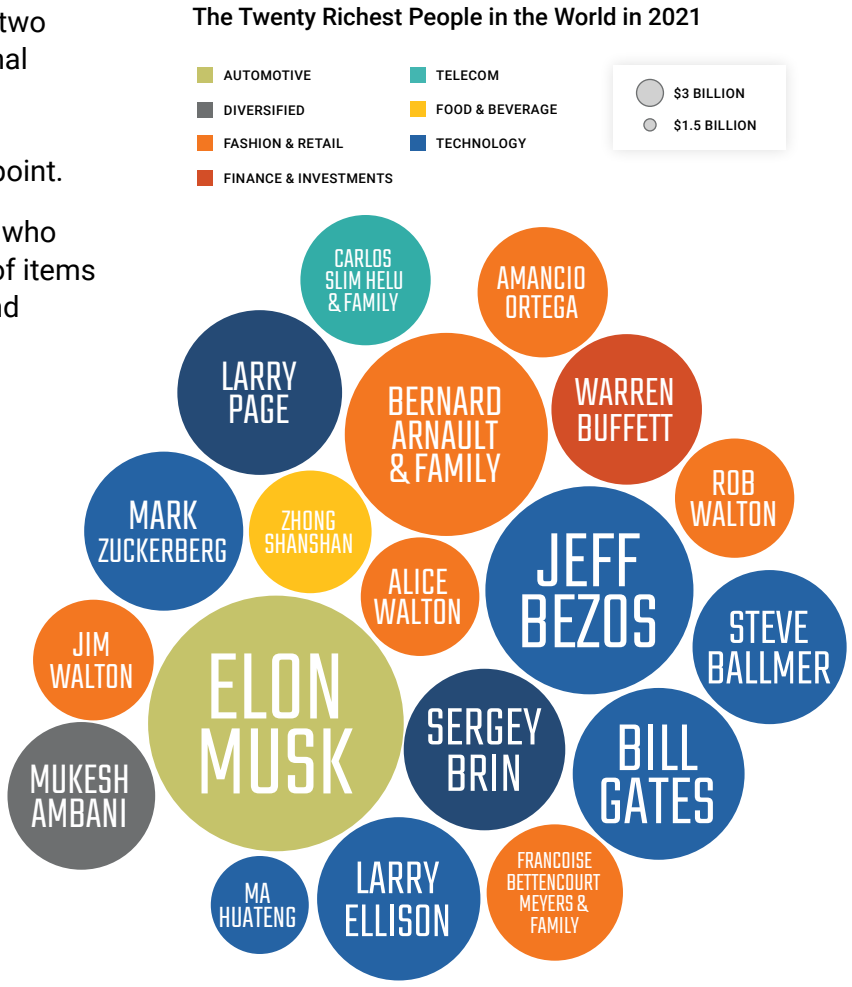
Bubble Chart

A bubble chart is similar to a scatter plot, using two variables to plot data points on a two-dimensional plane. The distinction is that each data point in the bubble chart includes an additional variable, represented by the size of the "bubble" at each point.

Bubble charts are helpful for product managers who want to examine multiple variables for a group of items or users. It's easier to comprehend the scope and weight of each variable when you can visualize how those variables interact with one another.

For example, if you wanted to compare the number of subscribers, churn rate and average revenue per user (ARPU) for five different product lines, you could use a bubble chart to identify any outliers or correlations quickly.

Flourish created a bubble chart to show the twenty richest people in the world based on the Forbes Billionaires List. You could do the same and showcase your most profitable segments, products or marketing campaigns.



Heat maps

Heat maps use color intensity to represent the density or magnitude of data in a matrix format.

Product managers can use heat maps to visualize how users interact with their products or how websites lead users to purchase a product.

For example, if you want to understand user behavior on a website, you can generate a heatmap of visitors' clicks on each page. You can use this data to identify which parts of the site drive engagement and sales and which areas may need improvement.

Netflix used heat maps to understand user behavior and optimize viewing experiences.

Tree diagrams

Tree diagrams visually represent hierarchical structures, such as organizational charts, file structures, or decision trees. They help display relationships between different levels or categories within a dataset, helping viewers understand complex systems and relationships more easily.

For product managers, tree diagrams can help visualize complex customer journeys. Using a tree diagram, you can track how customers interact with your products in each stage of their journey and identify any improvement opportunities.

Here is a simple one by Visme to get you started:

Learn more about how to avoid data visualization mistakes in our latest article.

The Purpose of a Data Dashboard

A dashboard is when you create a collection of data visualizations that together tell a story. You can use various types of visuals outlined in the previous section to create an effective dashboard that conveys essential information quickly.

The goal of a data dashboard for product managers is to provide a comprehensive and actionable view of product performance metrics that enable them to make informed decisions about product strategy and development.

Here are some data visualizations you might include on your dashboard:

User Engagement Metrics

- Line charts demonstrating user engagement over time.
- Bar charts comparing user engagement across segments.
- Heat maps to identify areas of high and low engagement within the product.
- Scatter plots to show the relationship between two different user engagement metrics, such as the relationship between the number of sessions per user and the duration of sessions.

Retention Metrics

- Stacked bar charts to show the retention rate broken down by different time periods, such as the first week, the first month and the first year.
- A cohort analysis chart to show how retention rates differ by user cohort. This chart can also identify which cohorts are most valuable and which need improvement.
- Survival analysis charts to track the survival rate of users over time. It can show how long users stay engaged with the product and can be used to identify when users are most likely to drop off.

Conversion Metrics

- A funnel chart for tracking conversion rates through different stages of the conversion process. It can show how many users move through each funnel step and where drop-offs occur.
- A stacked bar chart can compare conversion rates across segments by user type or location. It can also show how conversion rates differ between segments and identify optimization opportunities.
- A line chart can track conversion rates over time.

Customer Feedback Metrics

- A Net Promoter Score (NPS) chart can track customer satisfaction. It can show how the NPS score has changed over time and help identify trends or patterns in user sentiment.
- A bar chart can compare customer feedback metrics, such as Customer Satisfaction (CSAT) scores or complaints.
- Word clouds can visualize customer feedback more creatively. It can show customer feedback's most commonly used words or phrases and help identify common themes or issues.
- Heat maps can visualize customer feedback by location or user segment. It shows which segments have the most positive or negative feedback and helps identify improvement opportunities.

Market Metrics

- A line chart is a standard option for tracking market trends over time. It can show how the market has changed and help identify trends or patterns in customer behavior or market conditions.
- A bar chart can compare market trends across different segments, such as by product category or geography.
- A heat map can visualize market trends across different segments or locations. It can show which segments or locations have the highest or lowest market growth or market share.
- A scatter plot can show the relationship between different market trends metrics, such as the relationship between market size and market growth rate.

You wouldn't create a dashboard with every visualization on this list. Instead, you'd choose your visualizations based on your goals for a specific time period, like quarterly or annually. The goal is to track changes over time. Combining the right visualizations and data allows you to create an informative dashboard to help you make better decisions and understand your product's performance.

Performance metrics enable product managers to make informed decisions about product strategy and development.

Principles of Effective Data Visualization

Your data visualizations should be easy to understand, communicate the intended message and engage the audience. And these principles will help you achieve that.

Principle #1: Strive for Clarity

Your visualizations should present information in a way that is easy to comprehend, without ambiguity or confusion. You'll achieve this principle by starting with the appropriate visualization type that best represents the data and intended message. Then, you'll use clear labels, legends and titles to provide context.

Oftentimes, it's appropriate to eliminate the need for legends by incorporating contextual information into the visualization. The goal is to keep your audience from having to scan back and forth between the legend and the data visualization to make sense of the insights.

Finally, you'll create a clean, organized layout that avoids clutter, omits unnecessary information and helps the viewer focus on relevant insights.

Principle #2: Choose Simplicity

Sometimes, a novel visualization style is tempting because it seems more interesting than a bar graph. But maybe a bar graph is the best choice.

The goal is to minimize using colors, shapes and other visual elements if they don't serve an obvious purpose, like highlighting important information or demonstrating patterns.

It's common to click on your software's default chart or graph feature and consider a visualization "complete." The problem with this approach is these features on platforms like Excel assign each data category a color. You'll end up with a colorful pie chart that is hard to understand or a bar chart that doesn't highlight the most critical elements. Defaults should be a starting point not the final version.

Finally, avoid unnecessary embellishments and chartjunk. You don't want to add noise because it distracts the viewer from the intended message. And if you have significant amounts of complex data in one chart or graph, break it into smaller, more manageable visualizations.

If you have significant amounts of complex data in one chart or graph, break it into smaller, more manageable visualizations.

Principle #3: Consistency

Consistency in data visualization helps establish a visual language that viewers can easily follow and understand.

To maintain consistency:

- Use a consistent color scheme and visual elements throughout your visualizations, especially when presenting multiple charts or graphs in a single presentation or dashboard.
- Establish a consistent design pattern for similar data types or metrics, making it easier for the viewer to compare and contrast information.
- Stick to established conventions for specific visualization types.

Principle #4: Focus on the Story

Compelling data visualizations tell a story, guiding the viewer through the information and revealing insights that support your narrative. You'll Identify the key message or insight you want to convey through the visualization and ensure the design highlights this message. Then, you'll provide context by including relevant background information, annotations or explanations.

For example, as a product manager, you might want to present data to your team to gain support for your decision about a product roadmap. To focus on the story, you would identify the key message or insight you want to convey, which could be something like, "Our product's user engagement has been steadily decreasing over the past six months."

Next, you would ensure that the visualization design highlights this message. You might include a line chart showing the user engagement metrics over the past six months, with annotations to draw attention to any significant dips or changes.

To provide context, you could include relevant background information, such as the features released during this period or any significant events that may have affected user behavior. You could also provide explanations of any significant fluctuations in the data, such as a dip in engagement due to a technical issue or a surge in engagement due to a marketing campaign.

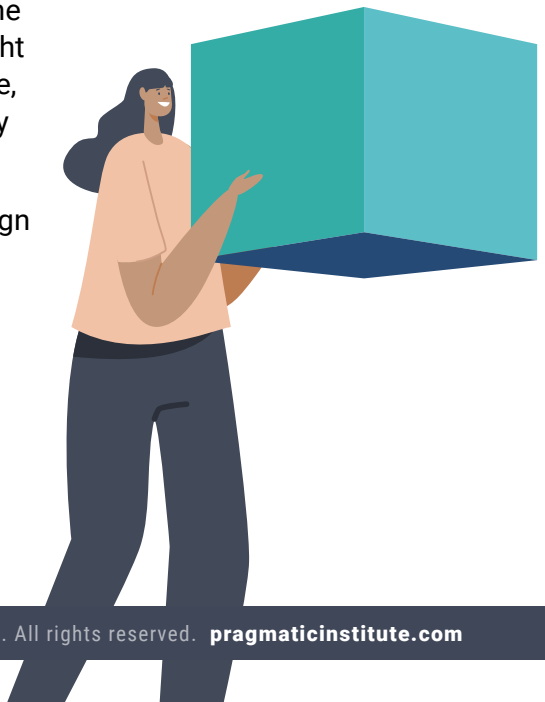
The visualization will guide your team through the information and reveal insights that support your narrative, making it easier for them to understand and support your decision.

Principle #5: Accessibility

Creating accessible data visualizations ensures anyone can understand the information regardless of their abilities.

To improve accessibility:

- Use high-contrast colors and clear fonts to make the visualization easy for people with visual impairments to read and understand.
- Provide alternative text descriptions for visualizations to make them accessible to people who use screen readers.
- Design your visualizations with flexibility in mind, allowing for adjustments in size or layout to accommodate different devices or user preferences.



Data Visualization Tools

You might be ready to jump in and start making charts and graphs, but what are the best tools for data visualization?

Of course, you always have Excel and Google Sheets, which is great for getting started. However, we've outlined a few options to take your data visualization to the next level. Some are great for beginners, and others might require some training and practice to start using.

Google Data Studio

While Google Data Studio may not offer as many advanced features, it is a free data visualization tool from Google that is great for beginners looking to get started with data visualization. It provides a user-friendly interface and drag-and-drop functionality, making creating interactive dashboards and reports easy without requiring advanced technical skills.

Google Data Studio also integrates seamlessly with other Google products, such as Google Sheets and Google Analytics, making it easy to pull data from these sources and create visualizations with just a few clicks.

It also allows for easy sharing and collaboration on reports, allowing you to share your findings and insights with stakeholders.

Power BI

Power BI is a business intelligence and data visualization tool from Microsoft that is well-suited for beginners. It offers a user-friendly interface and drag-and-drop functionality, making creating interactive dashboards and reports easy without requiring advanced technical skills.

Power BI also integrates seamlessly with other Microsoft products, such as Excel and SharePoint, making it easy to pull data from these sources and create visualizations.For beginners, Power BI offers several resources, including online training courses, tutorials, and a large user community. It also provides a free version, allowing users to get started with the tool without investing in a paid subscription.

While Power BI may not offer as many advanced features as other dedicated data visualization tools, it is an excellent option for beginners looking to get started with data visualization and analysis.

Looker

Looker is a cloud-based business intelligence and data analytics platform that allows users to explore, analyze, and visualize data. It offers a range of data visualization and analysis features, including dashboards, reports, and visualizations, making it a powerful tool for data-driven decision-making.

Looker's user-friendly interface and intuitive drag-and-drop functionality make it a good option for beginners who are new to data analysis and visualization.

One of the benefits of Looker is that it offers a scalable platform, allowing you to easily add new data sources and customize visualizations to meet your specific needs. It also provides a range of integrations with other popular business applications, including Google Analytics, Salesforce, and Marketo.

Tableau

Tableau is a powerful data visualization tool popular among data analysts and product managers. While it has a steeper learning curve than other data visualization tools, it offers various advanced features and options for creating interactive dashboards and visualizations.

For beginners, Tableau may be more challenging to use than other tools.

However, Tableau has learning resources, such as online training courses and a large user community, to help new users get started with the tool. Additionally, Tableau offers a drag-and-drop interface that makes it easy to create visualizations without needing to write code.

One benefit of Tableau is that it can easily handle large datasets, allowing you to quickly explore and analyze data from multiple sources. It also offers a variety of customization options for visualizations, allowing you to create reports and dashboards tailored to your specific needs.

Domo

Domo is a cloud-based business intelligence and data visualization tool designed to help businesses and organizations make data-driven decisions. It offers a wide range of features and options for creating interactive dashboards and visualizations, making it a powerful tool for data analysis and reporting.

Domo is not the easiest tool for beginners, as it requires some technical knowledge and experience with data analysis and visualization. However, it also offers training courses and a user community.

One benefit of Domo is that it easily integrates with many data sources, including cloud-based databases and popular business applications. It also offers advanced analytics capabilities, such as predictive modeling and machine learning, allowing users to gain insights and identify trends in their data.

It's common to click on your software's default chart or graph feature and consider a visualization "complete." ... Defaults should be a starting point not the final version.

LEARN HOW TO

Incorporate Data Into Your Product Strategy with *Insight*

Enroll now to learn a grounded and actionable approach for incorporating data into your product practices and decisions.

With this course, you'll learn how to identify patterns within your data, prioritize the problems you should be solving, and employ a scalable and repeatable process for successful data projects.

INSIGHT COURSE MODULES

MODULE 1:

Defining Data

Partner with stakeholders across the business to build a data repository to leverage external and internal data sources to find opportunities.

MODULE 2:

Data Patterns

Learn methods for pattern finding in qualitative and quantitative data sets and how to establish best practices for your product team.

MODULE 3:

Asking Data Questions

Craft straightforward questions your data can answer and provide the needed market context to the project team. Learn how the complexity of questions affects the type of analysis needed to answer them.

MODULE 4:

Executing Data Projects

Understand data project types and how to use the Pragmatic Data Insights Model to move through a project to find actionable value. Understand how your data partners and data science teams approach projects and the tradeoffs you may need to make. As well as how to take into account data bias and assumptions.

MODULE 5:

Data-driven Recommendations

Translate data analysis into actionable value and clear recommendations. Use the Pragmatic Insight Report to tell your data story and bring

LEARN MORE & ENROLL

PRAGMATIC
INSTITUTE