Conestoga College

School of Applied Computer Science & Information Technology

PROG8630 – DASHBOARD REPORT



E-COMMERCE

**[IT Department]**

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**SECTION 1**

**[GROUP- 3]**

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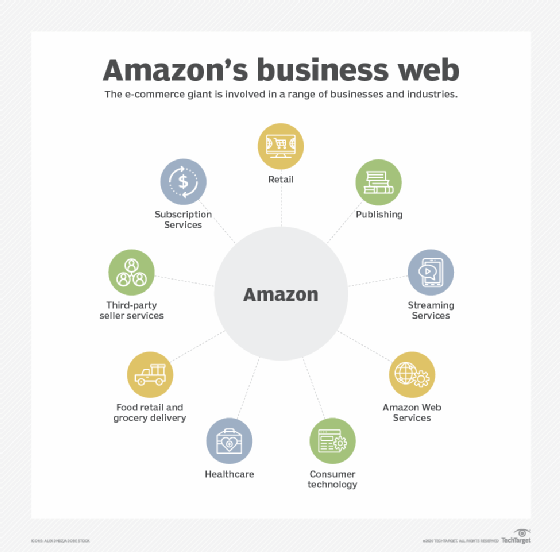
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# Introduction

**Amazon**, founded in 1994, and became a global leader across multiple domains, including **e-commerce**, **cloud computing**, and **digital services**. Amazon began as an online book retailer but soon expanded to offer a wide range of goods, services, and technological advancements. These days, Amazon has operations in more than 20 nations and offers millions of products to consumers via its web store. The modern digital economy has been greatly influenced by its dedication to innovation and customer-centricity (Kantor & Streitfeld, 2019).

In the realm of **e-commerce**, Amazon is the leading player, widely acknowledged as the largest online retailer globally. Through services like **Amazon Prime**, which provides quick shipping and exclusive digital offerings, Amazon has redefined customer service and delivery efficiency (Stone, 2020). While rivals like Walmart and Alibaba hold substantial market shares, Amazon's extensive network and advanced logistics systems play a crucial role in sustaining its competitive advantage.



In the context of **cloud computing, Amazon Web Services (AWS)** is acknowledged as a top supplier of cloud infrastructure. It provides scalable, dependable, and affordable cloud solutions to a wide spectrum of commercial and governmental entities. AWS is a key source of revenue for Amazon and has helped the business flourish. It has also made a name for itself as a leader in cloud computing (Miller, 2021). AWS directly competes with other cloud service providers like Microsoft Azure and Google Cloud, holding a significant market share. Furthermore, the company's wide-ranging influence is highlighted by Amazon's robust e-commerce presence as well as its ventures into digital streaming, artificial intelligence, and smart home technologies. Amazon has achieved success by consistently adjusting to changing market conditions and prioritizing customer satisfaction.

# Dashboard MockUp

Customer Service Department

A screenshot of a customer service

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Dashboard:-

A screenshot of a customer service dashboard

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**Key Questions Answered:**

1. **What is the current inquiry resolution status?**
   * Visualized using a pie chart showing breakdowns of resolved, pending, and escalated cases.
2. **What is the FCR (First Contact Resolution) rate over time?**
   * Displayed using a bar chart to track monthly FCR rates.
3. **Which categories receive the highest volume of inquiries?**
   * Presented through a treemap for better visualization of category distribution.
4. **Who are the top-performing agents based on resolved inquiries?**
   * Visualized using a bar chart showing the count of resolved inquiries by each agent.
5. **What is the average response time for different categories?**
   * Shown with a pie chart, displaying average response times per category.

**Filters Included:**

* **Customer Type**: Filter to segment inquiries by different customer groups (e.g., Corporate, Individual).
* **Inquiry Date**: A date range slider for analyzing data within a specific period.
* **Category Name**: Filter to focus on specific categories like Account Update, Billing Query, Technical Issue, etc.

**KPIs and Formulas**

Here’s a breakdown of the KPIs used in the dashboard and the relevant calculations:

* **Total Inquiries:**

**COUNTA(Inquiry\_ID)**

* **Total Open Inquiries:**

**COUNTIF(ResolutionStatus, "Pending")**

* **Total Resolved Inquiries:**

**COUNTIF(ResolutionStatus, "Resolved")**

* **Escalation Rate:**

**COUNTIF(ResolutionStatus, "Escalated") / COUNTA(Inquiry\_ID)**

* **FCR Rate (First Contact Resolution):**

**COUNTIF(ResolutionStatus, "Resolved on First Contact") / COUNTA(Inquiry\_ID)**

* **Average Response Time by Category:**

**AVERAGEIFS(ResponseTime, CategoryName, "Technical Issue")**

**Comparison Between Mockup and Final Version**

**Differences and Adjustments:**

1. **Visual Layout:** In the original mockup, the focus was on grouping related KPIs together. However, in the final version, additional adjustments were made to improve the visual flow and readability of the dashboard. For instance:
   * The key metrics (Total Inquiries, Open Inquiries, Resolved Inquiries, and Escalation Rate) were moved to the top for easier accessibility, allowing stakeholders to quickly gauge overall performance.
   * The "**FCR Rate by Year-Month**" was redesigned to a bar chart to emphasize monthly trends, making it easier to compare performance over time.
   * In the initial mockup, inquiry categories were displayed in a bar chart, but this was later updated to a treemap for better visual representation of hierarchical data and relative sizes.
2. **Design Changes:**
   * The color scheme was refined to make the dashboard visually appealing and intuitive. For instance, using colors to differentiate resolved, pending, and escalated inquiries.
   * The layout of filters was shifted to the left-hand side to ensure users can easily adjust them without interfering with the main dashboard view.
3. **Added Features:**
   * The final design includes a date range slider for filtering data, which was not initially planned. This change was introduced to provide users more flexibility in analyzing data over specific periods.
   * The Average Response Time by Category visualization was introduced in the final design to address additional insights not captured in the mockup, focusing on response efficiency by category.

**Discussion of Each Visualization in the Final Dashboard**

Below is a detailed analysis of each visual element included in the dashboard:

1. **KPIs (Top Panel):**
   * **Total Inquiries, Open Inquiries, Resolved Inquiries, Escalation Rate:**
     + **Data Encoded:** These KPIs represent counts and percentages based on the customer inquiries data.
     + **Visual Encoding:** Displayed as numeric indicators to provide a quick overview of the current status. The escalation rate is additionally highlighted using a semi-donut gauge to emphasize the proportion visually.
     + **Reason for Choice:** Numeric displays with gauges are effective for presenting summary statistics where precise values are essential for decision-making.
2. **Pie Chart - Total Inquiries by Resolution Status:**
   * **Data Encoded:** Counts and percentages of inquiries resolved on first contact, resolved overall, pending, or escalated.
   * **Visual Encoding:** A pie chart with distinct color segments for each resolution status. Labels display both counts and percentages for clarity.
   * **Reason for Choice**: Pie charts are ideal for showing the composition of categorical data and provide a quick snapshot of distribution.
3. **Bar Chart - FCR Rate by Year-Month:**
   * **Data Encoded:** The First Contact Resolution (FCR) rate for each month.
   * **Visual Encoding:** Vertical bars with each bar representing a month's FCR rate. The height of each bar indicates the FCR percentage.
   * **Reason for Choice:** Bar charts effectively show trends over time and make it easy to compare month-to-month changes.
4. **Treemap - Total Inquiries by Category Name:**
   * **Data Encoded:** The number of inquiries for each category, such as Billing Query, Technical Issue, etc.
   * **Visual Encoding:** A treemap where the size of each rectangle corresponds to the number of inquiries in that category.
   * **Reason for Choice:** Treemaps are effective for showing hierarchical data and comparisons between categories, especially when there are multiple categories with varying sizes.
5. **Bar Chart - Top Performers (Agents):**
   * **Data Encoded:** The number of resolved inquiries handled by each agent.
   * **Visual Encoding:** Horizontal bars representing agents, with the length of each bar proportional to the count of resolved inquiries.
   * **Reason for Choice:** Horizontal bar charts are useful for comparing categorical data, especially when labels are longer (e.g., agent names).
6. **Pie Chart - Average Response Time by Category:**
   * **Data Encoded:** The average response time for different categories of inquiries.
   * **Visual Encoding:** A pie chart with sections representing categories. The size of each section indicates the average response time for that category.
   * **Reason for Choice:** This visualization highlights which categories take longer to resolve, which is crucial for optimizing support processes.

**Mock Up**

IT Department

A screenshot of a computer screen

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Dashboard mockup:

1. **Differences Between the Dashboard Mockup and Final Version**

In the design document, I initially planned for the dashboard to focus on just four key KPIs: **Mean Time to Resolution (MTTR)**, **System Uptime Percentage**, **Incident Volume**, and **Infrastructure Utilization**. However, in the final version of the Power BI (PBIX) file, I added more charts to provide a deeper analysis of the IT department's performance.

One major difference is the addition of more visualizations in the final dashboard compared to the initial mockup. The mockup was simpler and only included the four KPIs mentioned above. After working through the data and understanding user needs better, I realized that having more detailed insights would make the dashboard more useful. For example, I added a **scatter plot** to show the relationship between incident counts and resolution times, which wasn’t part of the original plan. This helps in understanding how different types of services affect incident resolution.

Another change was adding **cards** to summarize key metrics such as **Memory Utilization**, **Storage Utilization**, **CPU Utilization**, and **Network Throughput**. These cards give users a quick snapshot of critical values, making it easier to grasp important information without diving into detailed charts. Additionally, the **ribbon chart** and **tree map** were added to show trends over time and incidents by service type, respectively. I also included a **scatter plot** to highlight the relationship between different metrics, and a **line chart** to show average resolution time trends over the years. These additions were made because they provided more specific and actionable insights, which were lacking in the original mockup.

The reason for these changes was to enhance the dashboard's ability to answer important questions in more detail, provide better data exploration, and offer more comprehensive insights into the IT department's operations. The mockup served as a good starting point, but the final version needed these additional elements to be more informative and practical for users.

1. **Discussion of Each Visualization in the Dashboard**

* **Filters (Date, Priority Level, Service Type, Incident Type)**: These filters help users focus on specific data sets, making it easy to analyze incidents based on time, priority, service, or type. This customization allows users to narrow down the information that is most relevant to their needs.
* **Cards (Storage Utilization, MTTR, Memory Utilization, Incident Volume, CPU Utilization, Network Throughput)**: The cards are used to highlight the most important metrics. For example, **MTTR** shows how efficiently incidents are resolved, while **Storage Utilization**, **Memory Utilization**, **CPU Utilization**, and **Network Throughput** provide an overview of resource usage. Cards are a great way to provide quick, at-a-glance information.
* **Gauge Chart (Average Uptime)**: The gauge chart shows the **average uptime** of systems, with a target value to easily visualize whether uptime meets expectations. This type of chart was chosen because it clearly displays progress towards a goal, making it easy to understand system reliability.
* **Clustered Column Chart (Engineer’s Resolution Time)**: This chart shows the **resolution time** for each engineer, using bars to represent the time taken. It allows easy comparison between different engineers, helping identify who is performing well and where there may be delays.
* **Ribbon Chart (Monthly Incident Trends by Type)**: The ribbon chart shows **incident trends** over time, categorized by incident type. This helps users see which types of incidents are becoming more or less frequent. The choice of a ribbon chart was made to clearly show changes over time for multiple categories.
* **Tree Map (Incidents by Service Type)**: The tree map displays the **number of incidents** for each service type. The size of each box represents the volume of incidents, making it easy to identify which services are experiencing more problems. This visual is effective for comparing proportions.
* **Line Chart (Average Resolution Time Over Time)**: The line chart shows how the **average resolution time** changes over the years. This is useful for identifying trends, such as whether resolution times are improving or worsening over time.
* **Line Chart (Incident Count Over Time)**: The line chart shows how **incident counts** change over time. This is useful for identifying patterns, such as whether incidents are increasing or decreasing during specific periods.
* **Scatter Plot (Incident vs. Resolution Time)**: The scatter plot shows the relationship between the **number of incidents** and the **resolution time**, with different service types as legends. This helps users identify if there are correlations between the volume of incidents and how quickly they are resolved, and also compare performance across service types.

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Finance Department

The final dashboard has some changes from the original mockup:

* Layout Adjustments: In the final version, filters are moved to the left side, freeing up more space for other visuals.
* Added KPIs: Extra cards at the top displays more important financial metrics, like total income and free cash flow, so that information can be visible quickly.
* More Visuals: Extra charts at the top displays main financial metrics like expense type and a line chart for monthly income that helps to visualize complete view.
* Colour Update: The final dashboard uses brighter colours that makes dashboard more easier to understand.

Each part of the dashboard has a purpose:

* KPI Cards: The big numbers at the top shows main financial figures properly so that users can watch them at a glance.
* Pie Chart for Expenses: This chart shows the spending breakdown by category, like marketing and equipment. It makes easy to observe the largest costs.
* Profit Margin Bar Chart: This chart displays profit by product category that allows comparison between categories side by side.
* Cash Flow Bar Chart: This shows cash flow by expense type and it helps to observe where funds are allocated.
* Treemap for Income: This shows how much each product category contributes to total income, with larger boxes that represents higher income.
* Line Chart for Monthly Income: This chart illustrates income over time and it makes easy to spot trends or changes month by month.

HR Department

A diagram of a company's performance management

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Difference between the new and old one

**1. Filters and Selection**

* **Mockup**: The mockup included filters for **Department**, **Job Role**, **Date Range**, and **Location**, but they were presented as general options rather than specific employee or department selectors.
* **Final Version**: The final dashboard includes a dedicated **Employee Name** selection filter on the left, enabling users to focus on individual employee performance and metrics.

**Impact**: The addition of an employee-specific filter allows HR managers to drill down into individual performance data, making it easier to track and analyze specific employee metrics. This personalization enables targeted analysis for performance reviews, individual development plans, and customized interventions.

**2. Key Performance Indicators (KPIs)**

* **Mockup**: The mockup outlined questions about overall performance but didn’t specify how these metrics would be visually represented.
* **Final Version**: The final dashboard includes KPIs for **Tasks Assigned**, **Hours Worked**, **Departments Worked**, and **Average Performance Rating** at the top of the dashboard.

**Impact**: The inclusion of KPIs provides a quick snapshot of essential metrics, allowing users to gauge employee activity and performance at a glance. These metrics give HR professionals immediate insight into workload, department engagement, and overall performance, supporting faster decision-making without needing to delve into detailed reports.

**3. Monthly Performance Rating Trend**

* **Mockup**: The mockup suggested a general focus on performance trends but didn’t provide a specific format.
* **Final Version**: The final dashboard includes a line chart for **Monthly Performance Rating**, showing performance trends over time.

**Impact**: The line chart allows users to observe performance fluctuations and identify potential patterns or seasonal trends. By visualizing performance ratings over time, HR can assess whether an employee’s performance is improving, declining, or staying consistent, enabling more effective performance management.

**4. Employee Absence Report**

* **Mockup**: The mockup indicated a need to track absenteeism trends by department, location, and reason but lacked specific visuals.
* **Final Version**: The final dashboard includes a **Employee Absence Report** as a bar chart, showing monthly absence counts over the years.

**Impact**: This visual representation of absenteeism allows HR to quickly identify periods with higher absence rates and investigate potential causes. This feature is particularly useful for managing absenteeism policies, identifying departments with higher absence rates, and planning for staff coverage during peak absence periods.

**5. Workforce Utilization by Shift Type**

* **Mockup**: The mockup mentioned resource allocation but didn’t provide specifics on workforce utilization visualization.
* **Final Version**: The final dashboard includes a **Workforce Utilization by Shift Type** stacked bar chart, segmented by day, night, and weekend shifts across departments.

**Impact**: This chart provides a clear view of how the workforce is distributed across shifts and departments, helping HR managers ensure that shifts are adequately staffed. It highlights potential over- or under-utilization, allowing for better scheduling and more efficient resource allocation across shifts.

**6. Training Completion Rate**

* **Mockup**: The mockup referenced training completion and its impact on performance but did not specify how this would be visualized.
* **Final Version**: The final dashboard includes a **Training Completion Rate** pie chart, segmented by training type (e.g., Communication, Technical, Leadership, Onboarding).

**Impact**: The pie chart offers an overview of training completion across different program categories, helping HR assess employee readiness and identify gaps in skills or training compliance. This visualization enables HR to monitor progress in critical training areas, thereby facilitating better-targeted training programs that align with performance improvements.

# Data Source

Customer Service Department

Below are the data sources through which we can build data model for Customer Service Dashboard

* **Amazon Connect:** Amazon's own cloud-based contact center service that integrates with other AWS services and enables real-time tracking of customer service interactions.(Amazon, 2024)
* **Customer Feedback and Survey Tools**
* **Qualtrics**: A platform for creating customer satisfaction (CSAT) surveys and gathering feedback after customer interactions, helping to measure service quality(Qualtrics,2024).
* **SurveyMonkey**: An online survey tool that can be used to gather feedback from customers regarding their support experience (SurveyMonkey ,2024).
* **Market Research Reports**
* **Gartner**: Provides insights and reports on customer service trends, best practices, and benchmarks in the industry (Gartner ,2023).
* **Forrester Research**: Offers research reports on customer service and experience metrics that can inform decision-making for service improvements (Forrester ,2024).
* **Customer Experience Platforms**
* **NICE inContact**: Offers cloud contact center software and analytics to improve customer experience and operational efficiency (NICE inContact ,2024).
* **Social Media and Online Reviews**
* **Trustpilot**: A platform where customers can leave reviews about their experiences, which can be analyzed to gain insights into customer satisfaction and pain points (Trustpilot ,2023).
* **Social Media Analytics Tools (e.g., Sprout Social, Hootsuite)**: These tools can track customer interactions and sentiment on platforms like Twitter and Facebook, providing valuable feedback on customer experiences (Hootsuite ,2024).
* **Mock Data Generators**: These can create simulated customer interaction data for testing and validating the dashboard functionality.
* **Mockaroo**: An online tool that generates mock data for testing purposes(Mockaroo ,2023).
* **Training Data for AI Models**: Simulated datasets can be used to train models that predict customer inquiries based on historical trends, improving response strategies.

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Here’s how each table is used and how they are mapped to each other in the context of the customer service department:

* **CUSTOMERS Table**
* **Purpose**: This table stores the basic information about the customers, such as their first\_name, last\_name, email, and customer\_type (which could be regular or prime).
* **Relationships**:
* **One-to-Many with Inquiries:** Each customer can have multiple inquiries. This is represented by the CUSTOMER\_ID foreign key in the inquiries table.
* **Data in Customer Service Context:** The customer information is essential for identifying who is making inquiries, tracking customer history, and segmenting based on customer type.
* **AGENTS Table**
* **Purpose**: This table holds details about customer service agents, including their first\_name, last\_name, and email.
* **Relationships**:
* **One-to-Many with Inquiries:** An agent may be assigned multiple inquiries, as captured by the ASSIGNED\_AGENT\_ID foreign key in the inquiries table.
* **One-to-Many with Responses**: An agent can respond to multiple inquiries, tracked through the responses table by the AGENT\_ID.
* **Data in Customer Service Context:** The agent table is vital for assigning customer inquiries to the correct customer service representative and tracking their performance (such as response and resolution times).
* **INQUIRIES Table**
* **Purpose**: This table records all customer inquiries, with details such as inquiry\_type, inquiry\_date, status, and response\_time. Each inquiry is linked to a customer and an agent.
* **Relationships**:
* **Many-to-One with Customers:** Each inquiry is associated with a customer through CUSTOMER\_ID.
* **Many-to-One with Agents**: Each inquiry is assigned to an agent for handling through the ASSIGNED\_AGENT\_ID.
* **One-to-Many with Responses**: Each inquiry can have multiple responses, tracked via the responses table.
* **One-to-One with Feedback:** Each inquiry can have one piece of feedback associated with it, via the feedback table’s INQUIRY\_ID.
* **Data in Customer Service Context:** This is the central table that tracks customer interactions, allowing customer service teams to understand the types of problems customers are facing and who is working on resolving them.

5. **RESPONSES Table**

* **Purpose**: This table captures responses to inquiries by agents, including the response\_time, resolution\_time, and resolution\_status.
* **Relationships**:
* **Many-to-One with Inquiries**: Each response is linked to an inquiry via the INQUIRY\_ID.
* **Many-to-One with Agents:** The response is handled by an agent, linked through the AGENT\_ID.
* **Data in Customer Service Context:** This table helps monitor the response time of agents, ensuring that customer inquiries are being addressed in a timely manner. The resolution\_time and resolution\_status fields help track how long it takes to resolve inquiries.

6. **FEEDBACK Table**

* **Purpose**: This table stores feedback for resolved inquiries, including the customer\_satisfaction\_score (which could range from 0 to 10) and any additional comments in the feedback\_comments.
* **Relationships**:
* **One-to-One with Inquiries:** Each inquiry can have one feedback entry, tracked by the INQUIRY\_ID.
* **Data in Customer Service Context:** Feedback is essential for assessing customer satisfaction after an issue is resolved. This helps the company monitor agent performance and identify areas for improvement.

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IT Department

Data Source and data model:

I used **simulated data** for building the dashboard. The data was created to represent realistic scenarios that the Amazon IT department might face, allowing me to develop and test the functionality of the dashboard before using any live data.

* **Incident Data**: This dataset included information about incidents, such as **Incident ID**, **Time Logged**, **Time Resolved**, **Incident Type**, **Priority**, **Resolved By**, and **Mean Time to Resolution (MTTR)**. This data helped analyze incident resolution efficiency and volume trends.
* **System Uptime Data**: This dataset simulated system availability over a set period. It included fields like **Date**, **System ID**, **Uptime Percentage**, **Downtime in Minutes**, and **Number of Downtime Events**. This data was used for the **gauge chart** and other uptime-related metrics.
* **Infrastructure Utilization Data**: The dataset provided simulated information on resource usage, such as **CPU Utilization**, **Memory Utilization**, **Storage Utilization**, and **Network Throughput** for different servers. This data helped monitor resource efficiency.
* **Customer Satisfaction Data**: This dataset included **Date**, **Service Used**, **Satisfaction Score**, and **Comments**. It provided insights into customer feedback on IT services.  
    
  The data model was built to integrate these different datasets, allowing for effective relationships and visual representation across various KPIs. Each dataset was linked by common fields like **Date**, **Service Type**, and **Incident ID**, which helped in establishing relationships to provide meaningful analysis throughout the dashboard. Simulating this data allowed me to iterate and refine the dashboard design without relying on actual operational data.

Finance Department

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Data Source

1. Internal Financial Systems:

* Description: These systems provide data on sales, expenses, revenue, and profit margins from Amazon's accounting software.
* Examples: Oracle Financial Services, SAP ERP.

2. Sales Reports:

* Description: These reports provides monthly or quarterly reports that shows total revenue and product performance.
* Examples: Reports created from Amazon's e-commerce platform & Amazon Redshift.

3. Expense Tracking Tools:

* Description: These tools allows tracking operational and capital expenses that helps to calculate total expenses.
* Examples: Opinion on expense management tools.

4. Cash Flow Statements:

* Description: These detailed statements shows coming in and going out cash which is crucial for calculation of Cash Flow Status.
* Examples: Financial statements generated at the end of each fiscal period.

5. Market Research and Analytics Platforms:

* Description: These external platforms provide data and context for performance metrics and KPIs.
* Examples: Nielsen, Statista.

6. Historical Financial Data:

* Description: These important data analyze trends and predict future performance.
* Examples: Old financial reports and historical sales data available on Amazon’s investor relations website.

HR Department

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**Data Source and Data Model**

The Power BI dashboard utilizes mock data to simulate key aspects of Amazon's HR operations. This data has been crafted to reflect realistic HR scenarios Amazon might encounter, allowing for the analysis of employee metrics, departmental insights, and workforce trends to refine HR strategies before implementing changes in live environments.

**Employee\_Performance Data**

* **Columns:** Employee ID, Evaluation Date, Performance Score, KPI Score, Goals Met, Feedback
* **Purpose:** Offers insights into employee performance evaluations over time, enabling the measurement of key performance indicators (KPIs) and goal completion.
* **Key Questions it Helps Answer:**
  + How well are employees meeting established goals and KPIs over different evaluation periods?
  + Are there specific patterns or trends in performance scores that indicate departmental or positional differences?
  + Which employees are consistently rated as high performers, and what feedback themes emerge from evaluations?

**EmployeeDetails Data**

* **Columns:** Employee ID, Name, Age, Gender, Department, Position, Hire Date, Termination Date
* **Purpose:** Holds demographic and employment details for workforce analysis, tracking tenure, turnover, and role-based trends.
* **Key Questions it Helps Answer:**
  + What is the overall employee turnover rate, and which departments or roles have the highest rates of attrition?
  + How do demographics like age and gender vary across departments or positions?
  + What is the average tenure for employees by department, and are there trends in hiring and termination dates?

**Departments Data**

* **Columns:** Department ID, Department Name, Manager, Budget, Location
* **Purpose:** Defines each department’s structure, resources, and location, enabling budgeting and management tracking.
* **Key Questions it Helps Answer:**
  + How is the HR budget distributed across various departments, and which departments operate with the highest or lowest budgets?
  + Who are the managers for each department, and is there a correlation between management and employee retention rates?
  + What departments are associated with specific locations, and how might this impact workforce distribution?

**TrainingProgress Data**

* **Columns:** Employee ID, Training Program, Completion Date, Score, Status
* **Purpose:** Tracks the completion and scores of employee training programs, offering insights into training progress and success.
* **Key Questions it Helps Answer:**
  + What percentage of employees have completed mandatory or optional training programs?
  + Are there specific departments or roles where training completion rates are lower?
  + Which training programs yield the highest scores, and are there patterns in training completion among high-performing employees?

**WorkforceUtilization Data**

* **Columns:** Department, Date, Total Employees, Active Employees, Absent Employees
* **Purpose:** Monitors the workforce attendance and active employee rates by department and date, providing a real-time view of workforce availability.
* **Key Questions it Helps Answer:**
  + What are the trends in employee absenteeism by department, and are there seasonal patterns?
  + How does the active workforce size vary by department over time, and what is the impact on productivity?
  + Are there departments consistently operating with higher workforce utilization, indicating potential areas for resource redistribution?

**Data Model and Integration**

The Power BI dashboard links data primarily through **Employee ID** and **Department ID** fields, creating a robust model that allows HR teams to analyze interconnected KPIs and insights across employee performance, departmental budgets, training outcomes, and workforce utilization. By integrating these datasets, the dashboard provides a unified view for HR management, allowing for data-driven decisions on employee engagement, training effectiveness, and departmental resource management, ultimately aligning with Amazon’s strategic HR goals.

# Tool Selection

**Tool Selected: Power BI**

Power BI was chosen as the main tool for this dashboard due to its powerful features, user-friendliness, and capacity to manage intricate data representations. Power BI is perfect for visualizing KPIs pertaining to Amazon's HR and Operations divisions because it allows users to construct dynamic and informative dashboards.

Advantages:

* Interactive Visualizations: Enables users to examine data from multiple angles by supporting dynamic charts and graphs.
* Automated Data Refresh: Guarantees that real-time data is always displayed on the dashboard.
* Smooth Integration: Connects to other Microsoft products, including SQL Server, Excel, and Azure, with ease.
* User-friendly: A straightforward drag-and-drop interface makes it possible for non-technical people to create and interact with dashboards.
* Collaborative and cloud-based: Enables numerous people to access and work together on the dashboard from any location.

Disadvantages:

* Performance Problems with Big Datasets: When working with complicated or very large datasets, performance may suffer.
* Limited Advanced Statistical Analysis: In contrast to R or Python, it has strong skills for intricate analytics.
* High Data Preparation Requirements: Prior to visualization, a substantial amount of time is needed for data cleaning and preparation.
* Limited Custom Visualizations: For more specialized graphics, there are less customization possibilities available than with rivals like Tableau.
* Cost considerations: Pro or Premium licenses are needed for advanced functionality, which could make things more expensive for big businesses.

# Update Plan

Customer Service Department

This section outlines how the dashboard will be updated to ensure that it remains current and reflects the latest customer service performance data for Amazon.

**1. Data Update Frequency**

* **Monthly Data Refresh**: The dashboard is designed to be updated on a **monthly basis** with new customer inquiry data. This includes adding the latest inquiries, resolution statuses, response times, and other relevant metrics.
* **Potential for Weekly Updates**: Depending on the volume of inquiries and the need for more real-time monitoring, it may be possible to transition to **weekly updates** in the future.

**2. Data Source and Format**

* The data will be sourced from Amazon’s **customer service database** or internal systems, which export data in formats such as CSV, Excel, or SQL databases.
* For this project, simulated data has been used, but the dashboard can be configured to connect directly to Amazon’s internal database if access is provided.

**3. Manual vs. Automated Updates**

* **Manual Updates**:
  + Currently, new data needs to be **manually imported** into the Excel file. The process involves downloading the latest data from the customer service system and refreshing the data tables and pivot charts in the dashboard.
  + This manual update process requires about **10-15 minutes** each month, ensuring data integrity before the dashboard refreshes.
* **Automation Potential**:
  + **Data Import Automation**: The process can be partially automated using **Excel Power Query** or **VBA scripts**. Power Query can be set up to pull data directly from a CSV file or database connection, reducing manual intervention.
  + **Scheduled Data Refresh**: If the data is stored in a shared network drive or cloud service (like SharePoint or OneDrive), Excel can automatically refresh data connections upon file opening. This can ensure the latest data is pulled in whenever the dashboard is accessed.
  + **Using Power BI**: Migrating the dashboard to Power BI would allow for fully automated data refreshes, leveraging scheduled data imports from databases or cloud sources. This would eliminate manual updates altogether and support more real-time analytics.

**4. Strategies for Automating Updates**

* **Excel Power Query**:
  + Utilize Power Query to automatically connect to the data source, clean data, and load it into the dashboard.
  + Set up a **scheduled task** (if using Windows) to open the Excel file at a predefined interval to refresh the data.
* **Using VBA**:
  + Implement VBA macros to automate repetitive tasks, such as refreshing pivot tables and charts once new data is imported.
  + A macro button can be added to the dashboard to trigger an instant refresh, which would be particularly useful if data is being updated more frequently.
* **Power BI Migration** (Future consideration):
  + If the dashboard evolves and requires real-time data monitoring, migrating to Power BI would be ideal. Power BI supports **automatic refresh schedules** from multiple sources, including databases and cloud services.

**5. Potential Challenges and Pitfalls**

* **Data Accuracy**: Relying on automated updates can sometimes lead to data discrepancies if there are changes in the source data structure or format. Manual checks may still be necessary during the initial phases.
* **File Size and Performance**: As more data accumulates over time, the Excel file may become large and slow to refresh. Using tools like Power BI or optimizing data models in Excel can mitigate this issue.
* **User Access and Permissions**: If automated data sources are set up (e.g., SQL databases), ensuring proper user permissions and secure access is crucial to prevent unauthorized changes or data leaks.
* **Training**: Users managing the dashboard updates may need training on Power Query, VBA, or Power BI, depending on the level of automation implemented.

**Summary**

The current approach involves monthly manual updates with potential for partial automation using Excel Power Query and VBA scripts. As the dashboard matures, transitioning to a tool like Power BI for full automation could provide better scalability and efficiency.

IT Department

The dashboard will be updated regularly to ensure that the metrics are accurate and up to date. Here is the update plan:

* **Monthly Data Refresh**: The dashboard will receive monthly updates from the data sources to reflect the most recent incidents, uptime statistics, and resource utilization. This ensures that stakeholders always have access to the latest information.
* **Automated Data Connections**: Whenever possible, data connections will be automated using tools like Power BI's scheduled refresh feature. This will reduce manual intervention and keep the data current with minimal effort.
* **Testing Before Deployment**: Before any updates are applied to the live dashboard, they will be tested in a staging environment to verify that all new data is integrated correctly, and the calculations and relationships work as expected.
* **Error Tracking and Adjustment**: Any errors identified during data refreshes will be documented and addressed immediately. Continuous improvement will be prioritized by tracking any issues and ensuring they do not reoccur.

HR Department

**Future Plan and Scope for the Dashboard**

* **Automate Monthly Data Updates:** Set up scheduled refreshes or direct data integrations to reduce manual uploads and ensure timely data availability.
* **Expand Metrics and Predictive Insights**: Add new KPIs and predictive analytics (e.g., attrition risk) for a deeper understanding of workforce trends.
* **Enhance User Access and Mobile Compatibility:** Implement role-based access controls and optimize for mobile use to increase accessibility.
* **Integrate with HR Systems:** Connect with HRMS for seamless data flow and real-time updates, reducing manual data management.
* **Continuous Feedback and Training:** Collect regular user feedback and provide ongoing training to ensure relevance and usability as the dashboard evolves.

This approach ensures scalability, efficiency, and adaptability for the dashboard’s long-term success in supporting HR operations.

# Testing Strategy

Customer Service Department

### **1. Functional Testing**

**1.1. Validation of Data and Calculations**

* **Objective**: Verify that the data imported into the dashboard is accurate, and the formulas and aggregations used are correct.
* **Testing Method**:
  + Manually cross-checked the data imported into Excel with the source data (CSV files).
  + Verified that calculations such as Total Inquiries, Escalation Rate, FCR (First Contact Resolution) Rate, and Average Response Time were correct.
  + Checked all formulas used in pivot tables, charts, and KPI metrics.
* **Results**:
  + Identified a discrepancy in the **escalation rate calculation** due to missing data in the escalated inquiries field. The formula was corrected to accurately capture escalations.
  + Adjusted the **FCR Rate** formula to ensure it was calculated using only resolved inquiries instead of total inquiries.
* **Improvements Added**:
  + Added conditional formatting to highlight any cells with missing or unexpected values, ensuring future data integrity.

**1.2. Filters and Triggers**

* **Objective**: Ensure that all filters and triggers work correctly and interact seamlessly with the dashboard components.
* **Testing Method**:
  + Tested the **Customer Type** and **Inquiry Date** filters to confirm that they filter all related visualizations correctly.
  + Verified that the **Category Name** filter dynamically updates the treemap, pie charts, and bar charts.
  + Confirmed that the date range slider accurately filters the data within the selected time period.
* **Results**:
  + Initially, the **Customer Type filter** did not update the “Top Performers” chart correctly due to a misconfigured data link. This was resolved by correcting the filter parameters.
  + Some visual elements did not refresh automatically after applying the date range filter. This was fixed by adjusting the pivot table connections.
* **Improvements Added**:
  + Introduced a **reset button** to clear all filters, making it easier for users to return to the default view.
  + Added dynamic titles to charts that change based on the applied filters to enhance clarity.

### **2. Non-Functional Testing**

**2.1. User Interface (UI)**

* **Objective**: Ensure that the dashboard layout is user-friendly, visually appealing, and responsive to various data inputs.
* **Testing Method**:
  + Checked the alignment of all dashboard components (charts, filters, KPIs) to ensure consistency.
  + Reviewed formatting across different filters to verify that dropdown menus, charts, and slicers were appropriately sized.
  + Simulated different data volumes to see how the dashboard handled larger datasets.
* **Results**:
  + The layout was initially cluttered due to overlapping visual elements. Adjustments were made to the spacing and alignment for a cleaner appearance.
  + The **treemap** required resizing to accommodate different category names, ensuring labels were fully visible.
* **Improvements Added**:
  + Adjusted font sizes and color schemes to improve readability.
  + Ensured that all dropdown menus and filters are properly aligned, with enough space for longer text entries.

**2.2. Compatibility Testing**

* **Objective**: Confirm that the dashboard works well across different platforms, screen resolutions, and devices.
* **Testing Method**:
  + Tested the dashboard on multiple laptops with varying screen sizes and resolutions.
  + Simulated browser environments using Excel Online to check compatibility.
  + Opened the dashboard on mobile devices to verify its responsiveness.
* **Results**:
  + The dashboard performed well on laptops but had alignment issues on smaller mobile screens. Since Excel is not optimized for mobile dashboards, these issues were expected.
  + Minor formatting inconsistencies were noticed in Excel Online, especially with fonts and chart sizes.
* **Improvements Added**:
  + Updated the layout to be more flexible for different screen sizes, ensuring it remains functional on smaller laptop displays.
  + Added instructions for best viewing (e.g., using full-screen mode) to improve the user experience.

**Summary of Testing Outcomes**

* The testing process helped identify critical bugs, especially related to data accuracy and filter functionality, which were promptly resolved.
* Enhancements were made to improve both the functionality and user experience of the dashboard, including better filtering options, dynamic chart titles, and a reset button.

1. Functional

Finance Department

1.1. Validation

We verified that all data, calculations, and formulas were accurate. It includes to ensure totals, averages, and other metrics were computed and displayed correctly across the dashboard.  
Results: All calculations and data were accurate, with no issues identified.

1.2. Filters, Triggers

We tested each filter (like date and region) to confirm they worked correctly, updating data instantly. We also checked that applying multiple filters didn’t cause any issues.  
Results: Filters performed as expected, accurately updating all visuals.

2. Non-Functional

2.1. User Interface

We checked the layout to ensure proper alignment and spacing, and tested dropdowns to ensure they displayed clearly.  
Results: The layout was consistent, with some minor adjustments made to improve alignment. 2.2. Compatibility

We tested the dashboard on different devices, browsers, and screen sizes. While designed mainly for desktop, we ensured it looked acceptable on smaller screens.  
Results: The dashboard functioned well on most devices and major browsers. Key data remained accessible on smaller screens, meeting compatibility requirements.

IT Department

The testing strategy is essential to ensure that the dashboard performs as intended and provides accurate information to users. The testing strategy includes both functional and non-functional testing:

* **Functional Testing**:
  + **Data Validation**: Ensure that the data loaded in the dashboard is accurate and matches the simulated source data. This involves checking incident counts, uptime percentages, and other metrics to confirm they are being calculated correctly.
  + **Filters and Interactions**: Verify that all filters (e.g., date, priority, service type) work correctly and update the visuals accordingly. Ensure that interactions between charts are functioning as intended.
  + **Calculation Verification**: Validate calculations for metrics such as MTTR, uptime percentage, CPU utilization, and other KPIs to make sure they are accurate.
* **Non-Functional Testing**:
  + **Performance Testing**: Test the dashboard's performance, particularly focusing on load times. Ensure that even with large datasets, the dashboard loads promptly without lag.
  + **Usability Testing**: Confirm that the dashboard layout is easy to use and understand. Test with users to make sure they can navigate the dashboard easily and find the information they need without confusion.
  + **Compatibility Testing**: Check that the dashboard works well across different devices (e.g., desktop, tablets) and browsers (e.g., Chrome, Firefox). Ensure that all visuals are appropriately responsive and readable on various screen sizes.
* **User Acceptance Testing (UAT)**: The final step will involve getting feedback from potential users, such as IT team members. They will be asked to use the dashboard and provide input on its usability, accuracy, and any additional features they would like to see.

HR Department

1. Functional Testing

1.1 Validation

Objective: To ensure data accuracy and correct functionality of calculations, formulas, and aggregations.

Testing: Verified that all metrics are accurately calculated and ensured logical data flow.

Results: All calculations were correct, with aggregations matching to the expected totals across departments and time periods.

Enhancements Added: Adjusted certain formulas to improve performance on large datasets, ensuring consistent results during data aggregation.

1.2 Filters and Triggers

Objective: To confirm that filters and triggers work correctly, updating data without errors or lag.

Testing: Applied filters across all dimensions to check for accurate data display and functionality.

Results: Filters worked as expected with smooth transitions between views, allowing users to customize perspectives without lag.

Enhancements Added: Optimized filter performance by reducing excess data queries, making interaction seamless.

2. Non-Functional Testing

2.1 User Interface

Objective: To validate layout alignment, formatting, and visual consistency across different data volumes and filters.

Testing: Checked dashboard alignment, color consistency, and layout compatibility when all filters were applied. Ensured font sizes and colors met accessibility standards.

Results: The layout was visually consistent, and color schemes were maintained across the dashboard. Font sizes and contrast were accessible.

Enhancements Added: Adjusted some font sizes and spacing in dropdowns to enhance legibility and better fit the screen.

2.2 Compatibility

Objective: To ensure reasonable compatibility on various laptops, browsers, and mobile devices.

Testing: Tested the dashboard on different screen sizes, including desktops, laptops, and mobile devices.

Results: The dashboard was responsive on desktops and laptops, adjusting layout well on smaller screens. Some elements needed refinement for optimal mobile viewing.

Enhancements Added: Tweaked the mobile layout to ensure key metrics were still visible and that dropdowns and filters were functional.

# Project Timeline

|  |  |  |
| --- | --- | --- |
| **Date** | **Deliverable** | **Responsible** |
| Oct 20 | Data Collected and planned | Jyoti,Smruti,Diksha,Urvi |
| Nov 4 | 1st Draft of Dashboard Circulated to Team | Jyoti,Smruti,Diksha,Urvi |
| Nov 4 | 1st Draft of Presentation Circulated | Jyoti,Smruti,Diksha,Urvi |
| Nov 7 | User testing by the team and errors/refinements identified. | Jyoti,Smruti,Diksha,Urvi |
| Nov 08 | Final Adjustments made and checked | Jyoti,Smruti,Diksha,Urvi |
| Nov 09 | Dashboard and Report Due at 10pm | Jyoti,Smruti,Diksha,Urvi |

# Guidelines for How to Use the Dashboard

Customer Service Department

Welcome to the Amazon Customer Service Dashboard! This guide will walk you through accessing, interacting with, and interpreting the various components of the dashboard to help you gain insights into customer service performance.

**1. Accessing the Dashboard**

* **Location**: The dashboard is available as an **Excel file**. Please ensure that you have Microsoft Excel (2016 or later) installed on your system for optimal performance.
* **Opening the Dashboard**:
  + Open the Excel file, and if prompted, enable **“Editing”** and **“Content”** to allow for data refreshes and interactive elements.
  + For best results, maximize the window or set your screen to **full-screen mode** to view all elements clearly.

**2. Interacting with the Dashboard**

The dashboard is designed to be **interactive and user-friendly**, with various filters and visualizations that allow you to drill down into specific data points. Here’s how you can interact with the different components:

**A. Filters and Slicers**

* **Customer Type Dropdown**:
  + Located on the left side, this filter allows you to view data for specific customer types, such as “Corporate” or “Individual.”
  + Simply click on the dropdown arrow and select your desired customer type to update all dashboard metrics.
* **Inquiry Date Slider**:
  + Use this slider to **adjust the date range** for which you want to analyze customer inquiries.
  + Drag the slider handles to select a custom range or use the default range provided.
* **Category Name Filter**:
  + This multi-select filter enables you to filter inquiries by categories such as “Account Update,” “Billing Query,” “Technical Issue,” etc.
  + You can select one or multiple categories to focus on specific types of inquiries.
* **Reset Button**:
  + If you have applied multiple filters and wish to return to the default view, click the **reset button** to clear all applied filters.

**3. Understanding the Visualizations**

The dashboard uses various charts and KPIs to provide insights into customer service performance. Here’s a breakdown of each section:

**A. Key Performance Indicators (KPIs)**

* **Total Inquiries**: Shows the total number of customer inquiries received within the selected date range.
* **Total Open Inquiries**: Displays the number of inquiries that are currently unresolved.
* **Total Resolved Inquiries**: Indicates how many inquiries have been successfully resolved.
* **Escalation Rate**: Represents the percentage of inquiries that were escalated to higher levels.

These KPIs give you a quick overview of overall performance.

**B. Total Inquiries by Resolution Status (Donut Chart)**

* This chart visualizes the breakdown of inquiries by their current status:
  + **Resolved**: Inquiries that were closed successfully.
  + **Pending**: Inquiries that are still awaiting resolution.
  + **Escalated**: Inquiries that were escalated for further review.
* **Interpretation**: Use this chart to understand how efficiently the customer service team is handling inquiries.

**C. FCR Rate by Year-Month (Bar Chart)**

* **FCR (First Contact Resolution) Rate** shows the percentage of inquiries resolved during the first interaction.
* The chart tracks FCR rates over time, allowing you to identify trends or fluctuations.

**D. Top Performers (Bar Chart)**

* This chart highlights the **top customer service agents** based on the number of inquiries they have resolved.
* Use this visualization to recognize high-performing agents or identify areas for further training.

**E. Total Inquiries by Category (Treemap)**

* This treemap breaks down inquiries into categories (e.g., Account Update, Billing Query, Technical Issue).
* The size of each block corresponds to the **volume of inquiries** in that category.
* **Interpretation**: This helps identify which types of inquiries are most common and may require further attention.

**F. Average Response Time by Category (Pie Chart)**

* This chart displays the **average response time** for resolving inquiries in each category.
* Categories with longer response times may indicate areas where customer service processes can be optimized.

**4. Tips for Using the Dashboard Effectively**

* **Drill Down into Details**: Use the filters and slicers to narrow down specific segments, such as analyzing the performance of agents over a particular period or understanding the nature of escalated inquiries.
* **Monitor Trends**: Keep an eye on the FCR rate and escalation rate over time to spot trends that may require management intervention.
* **Performance Benchmarking**: Compare the top performers chart to average response times to identify which agents may need additional support or resources.

**5. Troubleshooting and Support**

* If you encounter any issues with the dashboard (e.g., charts not updating correctly), try clicking the **“Refresh All”** button under the “Data” tab in Excel.
* For further assistance or questions, please contact the dashboard administrator or your IT support team.

By following these guidelines, you will be able to efficiently use the customer service dashboard to analyze data, identify key areas for improvement, and make informed decisions to enhance customer satisfaction.

IT Department

**Guidelines for How to Use the Dashboard**

1. **Accessing the Dashboard**:
   * Open the Power BI platform and navigate to the shared workspace.
   * Locate and open the IT Department Performance Dashboard.
2. **Interacting with Filters**:
   * At the top of the dashboard, you will find filters for **Date**, **Priority Level**, **Service Type**, and **Incident Type**.
   * Select the filter options to narrow down the data to a specific time period, priority level, or incident type that you are interested in.
3. **Understanding Visuals**:
   * Each chart in the dashboard represents specific metrics:
     + **Cards** provide a snapshot of key metrics like **MTTR**, **Memory Utilization**, **CPU Utilization**, etc.
     + The **gauge chart** shows whether system uptime meets the target value.
     + **Clustered column chart** displays resolution time for each engineer.
     + **Line charts** depict trends over time for incident counts and average resolution time.
     + The **tree map** shows incidents by service type for a quick comparison.
4. **Navigating Between Visuals**:
   * Click on a visual to filter data across other charts on the dashboard.
   * For example, selecting a specific **Service Type** in the **tree map** will adjust the rest of the visuals to focus only on that service type, making it easy to analyze the selected data set.
5. **Getting Insights**:
   * Look at **cards** for quick overviews of key metrics.
   * Use the **scatter plot** to understand the relationship between the number of incidents and the resolution time, and see how different service types affect incident resolution.
   * Explore the **line charts** to observe trends, such as whether incidents are increasing or average resolution times are improving over the years.
6. **Exporting Data**:
   * To analyze the underlying data further, right-click on a visual and select the option to export data.
   * This allows you to work with the data in tools like Excel if you need more detailed analysis.
7. **Cross-Filtering**:
   * Use cross-filtering to interact with multiple visuals simultaneously. Clicking on a bar in the **clustered column chart** for an engineer will update other visuals to show only incidents handled by that engineer.

Finance Department

1.Date Range Filter (Top Left)

* Purpose: Use this slider to filter the data displayed on the dashboard by date range.
* How to Use: Drag the start and end points to select the desired date range. All data will automatically adjust to reflect values within the chosen period.

2. KPI Cards (Top Row)

* Sum of Net Income: Displays the total net income within the selected date range.
* Sum of Total Operating Expenses: Shows the total operating expenses for the selected period.
* Sum of Free Cash Flow: Represents the free cash flow available within the date range.
* Sum of Net Profit Margin: Shows the net profit margin figure.

These metrics provide a quick overview of the financial health of the business for the selected period.

3. Filters (Left Panel)

* Product Category: Filter data by product category (e.g., Clothing, Electronics, Furniture).
* Region: Filter by specific regions (e.g., East, South, West).
* Expense Category: Filter by categories such as Marketing, Equipment, and Payroll.

Use these filters to refine the data and analyze specific segments.

4. Donut Chart (Middle Left) - Sum of Total Operating Expenses by Expense Category

* Purpose: Shows the breakdown of total operating expenses by category.
* How to Use: Hover over each segment to see the percentage and total amount for each expense category (e.g., Marketing, Equipment, Payroll).

5. Bar Chart (Middle Center) - Sum of Net Profit Margin by Product Category

* Purpose: Compares net profit margin across different product categories.
* How to Use: Hover over each bar to see the exact net profit margin for each category.

6. Horizontal Bar Chart (Middle Right) - Sum of Free Cash Flow by Expense Category

* Purpose: Shows free cash flow associated with each expense category.
* How to Use: Hover over each bar to see the cash flow amount allocated to categories such as Marketing, Equipment, and Payroll.

7. Treemap (Bottom Left) - Sum of Net Income by Product Category

* Purpose: Visualizes the distribution of net income across product categories.
* How to Use: Each block represents the income generated by a category. Hover over a category to view the net income.

8. Line Chart (Bottom Right) - Sum of Net Income by Month

* Purpose: Shows the trend of net income over time (by month).
* How to Use: Hover over each data point to see the net income for a specific month, helping you identify trends and seasonal patterns.

# 

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