CKD Cost Analysis Dashboard App

**Introduction**

Mercedes Benz Operations IT team for CKD plants lies under one umbrella which is managed by central management at Germany. Each of the plant’s budgets are planned on a quarterly reporting cycle divided into four periods: MBBP, FC03, FC06, and FC09.

Every CKD plant creates a list of the IT services that are utilized in the production process. To ensure precise tracking and reporting across all plants, this data is combined into a single file that is overseen by the headquarters.

At present, inputs come in different formats from different locations, and the data collection process is manual and vulnerable to inconsistencies. This hinders stakeholders' ability to promptly evaluate IT service costs and their effect on production, slows down reporting, and raises the possibility of errors.

The purpose of this project is to digitize and streamline the IT services reporting process for all CKD plants by developing a centralized application.

The app will allow each plant to submit their quarterly IT service usage data through a standardized dashboard. This data will feed directly into the centralized sheet, eliminating manual input and ensuring real-time accuracy.

The centralized data will then be visualized in a Power BI dashboard, enabling the management team in Germany to:

* Monitor the total cost of IT services used by each plant.
* Calculate the cost of IT services per vehicle produced.
* Track total production volumes per plant and quarter.

This solution will improve data accuracy, reduce manual effort, and support better, faster decision-making across the CKD network.

**Tools Used**

* Microsoft Power Platform
* Power Apps
* Power BI
* Power Automate
* Excel Database

**App Interface**

**Home Screen**

The Home Screen is the application’s landing page and serves as a central navigation hub. It has three main interactive buttons:

* **Add New Data:** directs users to the Data Entry Screen to submit quarterly IT service usage.
* **View Dashboard:** opens the consolidated Excel workbook containing detailed cost data for each quarter.
* **Visualize:** launches the Power BI dashboard for interactive data analysis.

**Add New Data**

Upon selecting **Add New Data**, users are taken to the Data Entry Screen designed for efficient data entry. The form includes:

* **Text Boxes:** For entering data like Year, New Items and Cost.
* **Dropdown Menus:** To ensure standardized selection of CKD Plant, Currency, Cost Category, Category, Sub-Category, Items and Milestones from predefined options, enhancing data consistency and reducing input errors.

The form is connected via Power Apps to an Excel file stored on OneDrive. When the user clicks the submit button, the app appends the new record as a row in the Excel spreadsheet eliminating the need for manual data entry, reducing errors and saving time.

**View Dashboard**

This button has been implemented to provide users with quick access to a comprehensive Excel spreadsheet containing detailed cost data. Clicking this button navigates users directly to the Excel file, which serves as a centralized repository for cost information across all CKD plants (India, Thailand, Malaysia, Indonesia, Vietnam) for each quarter.

The button’s primary purpose is to facilitate seamless access to critical cost data without requiring users to search for the file externally. This ensures that users can effortlessly review cost details related to various services, organized by multiple hierarchical categories.

**Excel Workbook Structure**

The Excel workbook for a particular year is organized into multiple tabs to support structured data management across various dimensions:

* **Quarterly Data Entry Tabs:** Separate tabs are maintained for each quarter of the year (FC03, FC06, FC09, MBBP). These tabs allow for segmented data entry, ensuring that cost data related to each quarter is accurately recorded and easily accessible.
* **Foreign Exchange (FX) Rates Tab:** This tab stores the currency exchange rates used to convert local currency values into euros and Singaporean dollars. Keeping FX rates centralized allows consistent and accurate multi-currency cost calculations across all CKD plants.
* **Production Volume Tab:** A dedicated tab captures the volume of cars produced by each CKD plant for the current year. This operational data provides essential context for cost analysis and benchmarking.

**Data Fields Included**

Within the quarterly tabs, the Excel workbook captures detailed cost-related data including:

* Cost Category
* Category
* Sub-Category
* Item
* Cost in local currency and euros for each CKD Plant

This structured layout supports detailed financial analysis, multi-currency comparisons, and benchmarking against production volumes.

**Adding Data for the New Year**

If users need to create a new sheet for a different year, this cannot be done manually within the app. Instead, a **Power Automate script** designed to generate the necessary tabs and structure for the new year’s data will automatically run at the end of the current year. Details of this automated process and instructions for running the script are outlined later in this report.

**Visualize**

When this button is clicked, it takes the users to a linked Power BI dashboard that presents interactive visualizations related to the CKD cost and production data. This integration allows users to explore key performance indicators, trends, and comparisons in an intuitive, graphical format.

**Purpose and Benefits:**

* **Enhanced Data Insights:** Users can analyze complex datasets through intuitive visualizations.
* **Real-Time Analytics:** The Power BI dashboard is dynamically connected to the backend excel database, ensuring that visualizations reflect the updated information.
* **User-Friendly Interface:** The dashboard offers filtering and drill-down capabilities, enabling users to customize views according to specific plants, categories, time periods, or other relevant criteria.

The image below shows the layout of the Home Screen on the application.

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**Data Entry Screen**

This screen allows users to submit the cost of each item per CKD plant, categorized by various filters such as cost category, category, subcategory, currency type and quarter of the year. It ensures consistency of data entry and conditional logic for adding new items when needed.

**UI Components & Logic**

**Dropdowns:**

1. **CKD Plant**
   * Allows the user to select a CKD Plant from a predefined list.
   * **Options:** India, Thailand, Malaysia, Indonesia, Vietnam.

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1. **Currency Type**
   * Used to specify the currency in which the cost is to be calculated and recorded.
   * **Currency options:** Euros, Singapore Dollars, Local Currency of respective CKD Plant (Indian Rupee, Thai Bhat, Malaysia, Ringgit, Indonesian Rupiah, Vietnamese Dong).

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1. **Cost Category**
   * Defines the high-level grouping of cost.

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1. **Category**
   * Mid-level classification under the cost category.
   * Filters available options based on the selected Cost Category.
   * A close-up of a black background

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2. **Sub-Category**
   * More specific classification under a category.
   * Filters options based on the selected Category.

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1. **Item**
   * Allow users to select a predefined item from the list.
   * Filters options based on the selected Sub-Category.
   * **Special Logic**: If the user selects "Add New Item" from the dropdown:
     + A **Text Input Box** becomes **visible** to allow entry of the new item name.

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1. **Milestone**
   * Dropdown to select the relevant fiscal quarter.
   * **Fiscal Quarters:** FC03, FC06, FC09, MBBP

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**Text Inputs**

1. **Year**

* Used to record the year for which the data needed to be added.

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1. **Cost**
   * This is used to enter the cost of a particular selected item in the selected currency unit.
   * If the cost is entered into Euros, it is converted to Local currency value and vice versa. If cost is entered in Singaporean Dollars, it is converted to the corresponding Euros value and Local Currency value.

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1. **Add New Item**
   * This text box is only visible when the item selected is ‘Add New Item’.
   * It is used to add an item which is not present under the selected group of Cost Category, Category and Subcategory.
   * The new item added will be visible in the item dropdown the next time we do any entry.

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**Buttons**

1. **Enter**
   * Adds the data entered to the backend excel file.
   * If a new item is created, it adds it to the dataset containing the items.
   * Resets the dropdowns and text boxes to their default value.
2. **Back**
   * Directs the user back to home page.
   * Resets the dropdowns and text boxes to their default value.
3. **Clear**

* Clears all the data entered in the dropdowns and text boxes and returns them to default values.

**Data Submission Workflow**

When a user completes filling out the data entry form and clicks the **Enter** button, the app follows this process to securely and accurately save the new cost record:

* **Input Validation**
* The app immediately checks that all required fields (Year, CKD Plant, Currency Type, Cost Category, Category, Sub-Category, Item, Milestone, and Cost) are filled. If any of the field is left blank, the enter button will be disabled.
* **Currency Conversion**
* Based on the selected **Currency Type**, the app fetches the current exchange rates from the **FX Rates tab** in the connected Excel backend.
* It automatically converts the entered cost value into the other relevant currencies (Euros and/or Local Currency) to maintain consistency across records.
* **Patch Data to Relevant Quarterly Excel Table**
* Based on the selected milestone (FC) and Year, the app inserts the data into the corresponding Excel table.
* The patch operation:
  + Creates a new record in the respective table.
  + Inserts cost values **only** for the selected CKD Plant in both Euros and Local Currency; for other plants it stores zeros.
  + Also adds values for Cost Category, Category, Sub-Category, and Item in the correspond row.
  + If the user selected **"Add New"** in the Item dropdown, the new item name stored instead of the dropdown value.
* **Add New Item to the Master List**
  + If the user entered a new item (selected "Add New"), the app patches this new item to the Cascading\_data data source.
  + This ensures that the new item becomes available in the item dropdown for future data entries.
  + The new item is associated with the selected Cost Category, Category, and Sub-Category.
* **Reset Input Controls**
* After data submission, all input controls (dropdowns and text inputs) are reset to their default states.

The image below shows the layout of the Data Entry Screen of the application when ‘Add New Item’ is selected.

**A screenshot of a computer screen

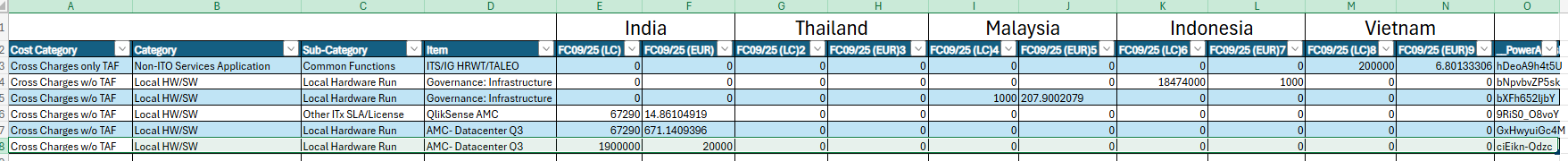
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The image below shows the layout of the Data Entry Screen of the application when an item other than ‘Add New’ is selected.

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When the enter button is clicked, the data get appended to the backed excel sheet of the selected quarter in following format.



**Year End Automated Workflows**

At the end of each FC year, two power automate scripts will run one after the another.

1. **Annual Excel Data Archive**

**Schedule:** 1st October at 12:00 AM

**Steps:**

* Reads all the data from all the worksheets of the main excel file (CKD Cost Analysis Dashboard.xlsx) that is connected to the app.
* Create a new excel file in the folder with the name CKD Cost Analysis Dashboard - <Current Year +1>.xlsx.
* Pastes all the extracted data from the original excel file (CKD Cost Analysis Dashboard.xlsx) to the newly created excel file CKD Cost Analysis Dashboard - <Current Year +1>.xlsx).

A screenshot of a computer flowchart

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1. **Data Cleanup and Update**

**Schedule:** 1st October at 12:30 AM

**Steps:**

* Deletes all data from **FC03, FC06, FC09** & **MBBP** tables to clear outdated records.
* Deletes data from the columns **EUR\_LC** and **SGD\_LC** from a **Fx\_Rates** table to remove the exchange rates from Euros and SGD to Local Currency.
* Deletes data from the column **Volume of Cars** from **Volume\_of\_cars** table and updates the **year** column in the same table to the **next year**.

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With Power Apps and Power Automate working together, the system takes care of everything from entering data to cleaning up old records and getting ready for the new year without manual effort. It's fast, accurate, and easy to use.

**BI Dashboard Interface**

To help users understand and visualize the data, a Power BI dashboard is connected to the app. Users can navigate to the dashboard by clicking the Visualize button on the Home Screen.

The Power BI dashboard is an interactive visual interface connected directly to five core tables from the Excel backend: FC03, FC06, FC09, MBBP, and Volume of Cars Produced. It transforms raw data into dynamic, easy-to-understand visuals that allow users to analyze CKD cost performance across all plants and Milestones.

The creation of the dashboard involved two main parts:

* Data Modeling: This focused on organizing and connecting the data from the five key tables (FC03, FC06, FC09, MBBP, and Volume of Cars Produced). It involved creating relationships, calculated columns, and measures to ensure the data is accurate, consistent, and easy to analyze.
* Visual Design: After the data was properly modeled, the next step was to build interactive visuals — charts, slicers, and tables — that effectively communicate the insights. The design ensures users can explore the data intuitively, filter by milestones, and quickly understand costs and production metrics across CKD plants.

**Data Modelling**

In the data modeling phase, the four milestone tables (FC03, FC06, FC09, and MBBP) were merged into a single consolidated table to simplify analysis across all milestones.

The milestone tables were transformed into the following way:



Individual Milestone (FC03, FC06, FC09, MBBP) Table Format



FC\_Table Format

A diagram of a table

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At the top, each milestone (FC03, FC06, FC09, MBBP) has its own wide table, with countries spread across columns. This format makes it hard to compare, filter, or analyze data - especially when we want to combine information from multiple milestones or countries.

The bottom part shows the new FC Table Format, where all the data is stacked into a single, organized table. Instead of having separate columns for each country, we now have one column for Milestone, one for Country, and one for Cost—making the table longer rather than wider and easy for visualization purposes.

Once the milestone data was consolidated in the FC\_Table, it was then **merged with the Volume of Cars Produced table**, using common fields like **Milestone** and **Country** in the following way:

 + 

Volume of Cars Table Format FC\_Table Format



Volume\_Table Format

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This transformation allowed for a comprehensive view showing the volume of cars produced by each plant in each milestone, enabling further analysis such as cost per car.

**Visual Design**

After organizing the data, we created interactive visuals to make it easy for user to understand the costs and production of the CKD plants. The following visuals are present in the dashboard:

* **Milestone Slicer**

A chiclet slicer where the user can select one or more milestones. One can choose multiple milestones at once, and all the charts will automatically update to show data for the selected milestones. This lets you compare and analyze different phases easily.

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* **Waterfall Chart**

This chart breaks down the total cost by each CKD plant, showing how much each plant contributes to the overall expenses. It helps identify which plants have the biggest or smallest impact on costs.

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* **Drill-Down Column Chart**

A versatile chart that lets you explore costs in detail. You start by seeing costs by plant, then click to drill down into cost categories, categories, subcategories, and items - all within the same chart. This makes it simple to find exactly what drives the costs.

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Cost per CKD Plant

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Cost per Cost Category in a CKD Plant

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Cost per Category under a Cost Category (IT Services w/o TAF) under a CKD Plant (India)

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Cost per Subcategory under a Category (Non-ITO Services Application) under a Cost Category (IT Services w/o TAF) under a CKD Plant (India)

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Cost per Item under a Subcategory (R&D) under a Category (Non-ITO Services Application) under a Cost Category (IT Services w/o TAF) under a CKD Plant (India)

* **Line Chart**

This chart compares the cost of IT services required to manufacture one car across different CKD plants, providing insight into the efficiency and cost-effectiveness of IT support at each location. It helps identify which plants manage IT costs better relative to their production volume.

A graph of a number of companies

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* **Production Number Tile**

A clear tile that shows the total number of cars produced. This gives important context by relating costs to the volume of production.

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This dashboard offers an integrated view of the project’s progress and cost structure, focusing on multiple milestones, CKD plant-specific expenses, and IT service costs associated with manufacturing each car. It combines several interactive visual elements to provide insights into how costs evolve across different project stages and locations, highlighting the impact of each CKD plant on the overall budget and efficiency. Users can easily track production volume alongside costs to better understand cost per unit and identify opportunities for optimization.

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**Functionality**

The dashboard has the following features:

* Easily filter data to answer questions like, “Which CKD plant had the highest IT service costs during selected milestones?”
* Quickly identify the biggest cost categories for any specific plant.
* All visuals update instantly and work together to show consistent, relevant insights when milestones change.
* Clean, intuitive design makes the dashboard easy to use for everyone—from beginners to experts.
* Empowers smarter, faster decisions about CKD plant performance and cost management.

**Future Scope**

This solution has the potential to be scaled beyond the initial five CKD plants. As the system proves effective, it can be extended to include other CKD plants across the global network, ensuring a unified approach to service reporting across all locations.

Additionally, while the current focus is on tracking IT service usage, the application can be expanded to capture data for other categories of services involved in the manufacturing process—such as logistics, facility management, quality assurance, or maintenance services. This would provide an even more comprehensive view of operational costs and performance.

By evolving into a broader service tracking platform, the solution can serve as a central hub for multi-category cost reporting, benchmarking, and strategic planning at both regional and global levels.