Key Processes & Methods in the Road Accident Analysis Dashboard

1. Data Preparation & Cleaning (Sheet: *Road Accident Cleaned Dataset*)

- **Process:** The raw accident dataset was cleaned and structured into a usable format.
- **Methods:**
    - Removal of duplicates, missing, and inconsistent records.
    - Standardization of categorical fields (e.g., "Fatal", "Serious", "Slight" severity codes).
    - Transformation of dates into **month-year formats** for time-series analysis.
    - Creation of derived columns (e.g., accident severity grouping, vehicle type categories).

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2. KPI Development (Sheet: *KPI's*)

- **Process:** Computation of key performance indicators (KPIs) aligned with the problem statement.
- **Methods:**
    - **Primary KPIs:**
        - Total casualties.
        - Casualties by severity (Fatal, Serious, Slight) with % contribution.
        - Casualties by vehicle type.
    - **Secondary KPIs:**
        - Cross-tabulations between accident severity and vehicle types.
        - Proportion analysis using pivot tables (e.g., % of car-related casualties).
    - Results stored in structured tables for easy linking to the dashboard visuals.

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3. Time-Series & Trend Analysis (Sheet: *Monthly Trends*)

- **Process:** Understanding how casualties vary across months and years.
- **Methods:**
    - Grouping accidents by month and year.
    - Creating a **Year-over-Year (YoY) comparison** for 2021 vs 2022.
    - Line charts and bar graphs prepared to identify peaks and troughs in accident occurrences.

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4. Spatial & Environmental Analysis

- **Sheets: *Pvt. Casualties by Road Type* and *Pvt. Casualties by Road Surface***
- **Process:** Exploring the relationship between casualties and external conditions.
- **Methods:**
    - Pivot tables aggregating casualties by **road type** (Motorways, A-roads, B-roads, etc.).
    - Distribution analysis across **road surfaces** (Dry, Wet, Icy).
    - Donut charts / bar charts used to highlight relative shares of each factor.

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5. Correlation Analysis (Sheet: *Other Pvt's and Donut Charts*)

- **Process:** Examining combined factors such as casualties by **Area (Urban vs Rural)** and **Time (Day vs Night)**.
- **Methods:**
    - Cross-tabulation (2D pivot tables) between area type and time of day.
    - Visualization through donut/pie charts to make proportional relationships intuitive.

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6. Data Consolidation & Storytelling (Sheet: *Data Analysis*)

- **Process:** Collecting intermediate outputs into a structured analytical layer.
- **Methods:**
    - Linking cleaned datasets with KPIs and pivot summaries.
    - Preparing lookup tables for slicers (Year, Vehicle type, Severity).
    - Ensuring consistency across sheets for dashboard integration.

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7. Dashboard Design (Sheet: *Dashboard*)

- **Process:** Creating an interactive visualization interface.
- **Methods:**
    - **Pivot charts** for each KPI:
        - Line chart → Monthly trends.
        - Column chart → Vehicle type breakdown.
        - Donut/pie charts → Road surface & day/night distribution.
        - Bar chart → Casualties by road type.
    - **Slicers & filters** for interactivity (Year, Severity, Vehicle type).

- Use of **Excel dashboard principles**: clear layout, color coding by severity, minimal clutter.

Summary of Analytical Workflow

1. **Data Cleaning & Structuring** → Built a reliable base dataset.
2. **KPI Calculation** → Aligned with client's problem statement.
3. **Exploratory Pivot Analysis** → Trends, distributions, correlations.
4. **Visualization Layer** → Dashboard charts, slicers, interactivity.
5. **Storytelling for Decision-Making** → Translating insights into actionable findings.