Implementation Report

Manufacturing Downtime Analysis

4.1 Source Code Structure

The implementation consists of two primary coding languages: **M-Code** (Power Query) for ETL and **DAX** for Analysis.

A. Power Query (ETL) Highlights

- **Data Cleaning:** Promoted headers and changed types for all tables.

- **Unpivoting:** The Line Downtime table was transformed from a wide format (Columns 1-12) to a long format (Attribute, Value) to allow analysis by factor.

- **Standardization:**

  o Cleaned Size column in dimProducts (Converted "2 L" to "2000" integer).

  o Generated dimDate using a custom M-function dynamic list.

B. DAX Measure Implementation

Key measures developed for the analysis:

1. Overall Production Efficiency

```
Overall Production Efficiency =
DIVIDE (
    [Total Productive Time (Min)],
    [Total Production Time (Min)],
    0
)
```

2. Top Downtime Factor

```
Top Downtime Factor =
VAR Summary =
    ADDCOLUMNS (
        SUMMARIZE('dimDowntimeFactors',
'dimDowntimeFactors'[DowntimeFactorID]),
        "Count", CALCULATE (COUNTROWS('factLineDowntime'))
    )
VAR TopFactor = TOPN (1, Summary, [Count], DESC)
RETURN CALCULATE (SELECTEDVALUE('dimDowntimeFactors'[Description]),
KEEPFILTERS(TopFactor))
```

3. Shift Time Calculation (Calculated Column)

```
Shift Time =
SWITCH (
    TimeTable[Period],
    "AM", "Day Shift",
    "PM", "Night Shift"
)
```

4.2 Deployment & Execution

Prerequisites:

- Microsoft Power BI Desktop (Latest Version).

- Source Excel File: Manufacturing_Line_Productivity.xlsx.

Execution Steps:

1. Open Manufacturing Analysis.pbix.

2. Navigate to "Transform Data" -> "Data Source Settings" to update the file path to the local Excel file location.

3. Click "Refresh" to load the latest data.

4. Interact with the dashboard via the "Home" navigation button.