```
import pandas as pd
import numpy as np
from sklearn.decomposition import PCA
from sklearn.preprocessing import MinMaxScaler
import matplotlib.pyplot as plt

# Sample dataset
data = {
    'Feature1': [10, 20, 30, 40, 50],
    'Feature2': [5, 15, 25, 35, 45],
    'Feature3': [8, 18, 28, 38, 48]
}

# Create DataFrame
df = pd.DataFrame(data)

# Display the original dataset
print("Original Dataset:")
print(df)

# Data Reduction using PCA
pca = PCA(n_components=2)  # Reduce to 2 components
reduced_data = pca.fit_transform(df)

# Create DataFrame for reduced data
df_reduced = pd.DataFrame(data=reduced_data, columns=['PC1', 'PC2'])

# Display the reduced dataset
print("\nReduced Dataset:")
print(df_reduced)

# Data Transformation using Min-Max scaling
scaler = MinMaxScaler()
transformed_data = scaler.fit_transform(df)

# Create DataFrame for transformed data
df_transformed = pd.DataFrame(data=transformed_data,
columns=df.columns)

# Display the transformed dataset
print("\nTransformed Dataset:")
print(df_transformed)

# Visualize the original and transformed datasets
fig, axs = plt.subplots(1, 2, figsize=(12, 5))

# Original dataset
for i in range(len(df.columns)):
```

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    axs[0].scatter(df.index, df.iloc[:, i], label=df.columns[i])

axs[0].set_title('Original Dataset')
axs[0].set_xlabel('Index')
axs[0].set_ylabel('Value')
axs[0].legend()

# Transformed dataset
for i in range(len(df_transformed.columns)):
    axs[1].scatter(df_transformed.index, df_transformed.iloc[:, i],
label=df_transformed.columns[i])

axs[1].set_title('Transformed Dataset')
axs[1].set_xlabel('Index')
axs[1].set_ylabel('Scaled Value')
axs[1].legend()

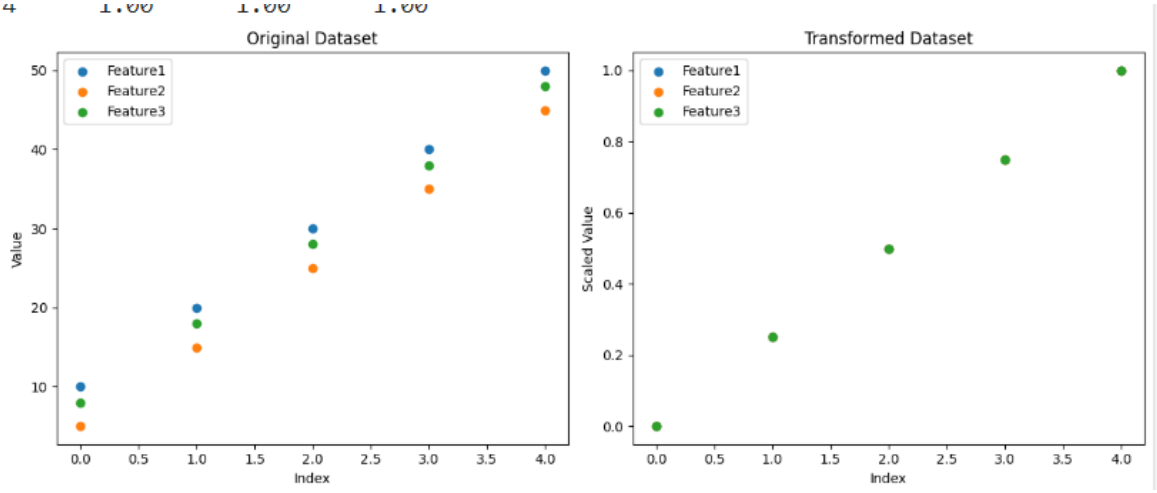
plt.tight_layout()
plt.show()
```

```
Original Dataset:
   Feature1  Feature2  Feature3
0        10         5         8
1        20        15        18
2        30        25        28
3        40        35        38
4        50        45        48

Reduced Dataset:
          PC1  PC2
0   34.641016  0.0
1   17.320508  0.0
2   -0.000000  0.0
3  -17.320508  0.0
4  -34.641016  0.0

Transformed Dataset:
   Feature1  Feature2  Feature3
0      0.00      0.00      0.00
1      0.25      0.25      0.25
2      0.50      0.50      0.50
3      0.75      0.75      0.75
4      1.00      1.00      1.00
```

4 1.00 1.00 1.00


Original Dataset
Feature1
Feature2
Feature3
Value
Index
Transformed Dataset
Feature1
Feature2
Feature3
Scaled Value
Index