Importing all the necessary libraries for insight generation

In [4]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot  as plt
import seaborn as sns
```

Loading all the datasets to perform EDA

In [67]:
```
Cust =pd.read_csv('/Users/saumyajha/Desktop/Customers.csv')
Prod=pd.read_csv('/Users/saumyajha/Desktop/Products.csv')
Trans =pd.read_csv('/Users/saumyajha/Desktop/Transactions.csv')
```

Getting 5 business Insights from the given dataset

Checking basic stats , data types and memory used

In [68]:
```
print(Cust.info())
print(Prod.info())
print(Trans.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 4 columns):
 #   Column        Non-Null Count  Dtype 
---  ------        --------------  ----- 
 0   CustomerID    200 non-null    object
 1   CustomerName  200 non-null    object
 2   Region        200 non-null    object
 3   SignupDate    200 non-null    object
dtypes: object(4)
memory usage: 6.4+ KB
None
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 4 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   ProductID    100 non-null    object 
 1   ProductName  100 non-null    object 
 2   Category     100 non-null    object 
 3   Price        100 non-null    float64
dtypes: float64(1), object(3)
memory usage: 3.3+ KB
None
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 7 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   TransactionID    1000 non-null   object 
 1   CustomerID       1000 non-null   object 
 2   ProductID        1000 non-null   object 
 3   TransactionDate  1000 non-null   object 
 4   Quantity         1000 non-null   int64  
 5   TotalValue       1000 non-null   float64
 6   Price            1000 non-null   float64
dtypes: float64(2), int64(1), object(4)
memory usage: 54.8+ KB
None
```

Checking for non null and missing values

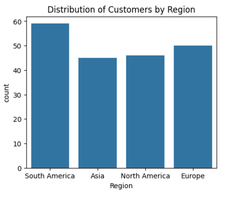
In [69]:
```
Cust.isnull().sum()
Prod.isnull().sum()
Trans.isnull().sum()
```

Out[69]:
```
TransactionID      0
CustomerID         0
ProductID          0
TransactionDate    0
Quantity           0
TotalValue         0
Price              0
dtype: int64
```

Univariate Analysis

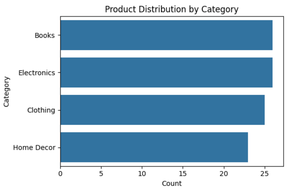
1.Distribution of Customers by Region

In [86]:
```
plt.figure(figsize=(5,4))
sns.countplot(x='Region',data=Cust)
plt.title('Distribution of Customers by Region')
plt.show()
```



1.Distribution of Products by Category

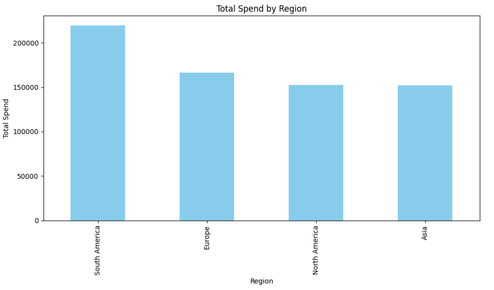
In [90]:
```
plt.figure(figsize=(6,4))
sns.countplot(data=Prod, y='Category', order=Prod['Category'].value_counts().index)
plt.title('Product Distribution by Category')
plt.xlabel('Count')
plt.ylabel('Category')
plt.tight_layout()
plt.savefig('product_distribution_by_category.png')
plt.show()
```



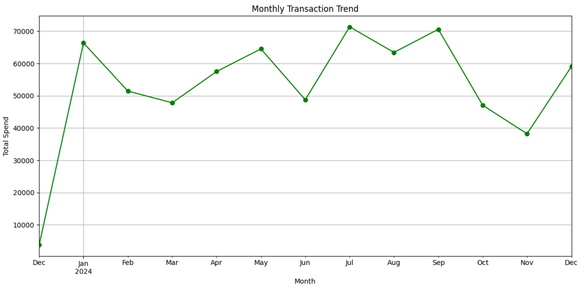
Bivariate Analysis

Total Spend by Region

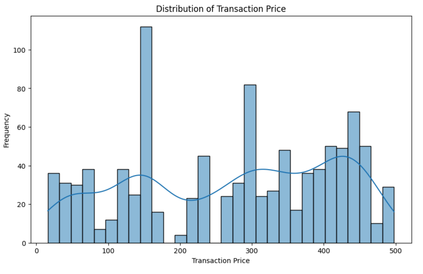
In [91]:
```
merged_data = Trans.merge(Cust, on='CustomerID', how='left')
region_spend = merged_data.groupby('Region')['TotalValue'].sum().sort_values(ascending=False)
plt.figure(figsize=(10, 6))
region_spend.plot(kind='bar', color='skyblue')
plt.title('Total Spend by Region')
plt.xlabel('Region')
plt.ylabel('Total Spend')
plt.tight_layout()
plt.savefig('total_spend_by_region.png')
plt.show()
```



In [92]:
```
Trans['TransactionDate'] = pd.to_datetime(Trans['TransactionDate'])
Trans['Month'] = Trans['TransactionDate'].dt.to_period('M')
monthly_spend = Trans.groupby('Month')['TotalValue'].sum()
plt.figure(figsize=(12, 6))
monthly_spend.plot(kind='line', marker='o', color='green')
plt.title('Monthly Transaction Trend')
plt.xlabel('Month')
plt.ylabel('Total Spend')
plt.grid(True)
plt.tight_layout()
plt.savefig('monthly_transaction_trend.png')
plt.show()
```



In [71]:
```
plt.figure(figsize=(10, 6))
sns.histplot(data=Trans['Price'], bins=30, kde=True)
plt.title('Distribution of Transaction Price')
plt.xlabel('Transaction Price')
plt.ylabel('Frequency')
plt.show()
```



Top 5 Business Insight from the given dataset.

1. The majority of customers are concentrated in specific regions like 'South America' and 'Europe' indicating potential for targeted marketing.

2. Product categories such as 'Electronics' and 'Books' dominate sales, suggesting popular product preferences.

3. Peak transaction periods occur during festive seasons, aligning with months July and September.

4. High-value transactions are predominantly made by customers from urban regions like South America .

5. Majority of Transcstions are concentrated in lower price range between 0 to 200 .