Project Management Analysis

Using the functions and capabilities of Python and the data analyis libraries, we tackle the analysis of the Project Management dataset. We will explore the key attributes: Project Name, Project Description, Project Type, Project Manager, Region, Department, Project Cost, Project Benefit, Complexity, Status, Completion, Phase, Year, Month, Start Date & End Date to gain insight on what influences the projects' progress and state. Visualizing the findings using data visualization techniques and conducting analysis to identify: trends, patterns and correlations within the dataset to provide a satisfactory report.

Import Library

+ Code + Markdown

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

Python

Import CSV File

```
df = pd.read_csv("12_Project Management Analysis.csv")
```

Python

Data Preprocessing

.head()

Using .head() to display the first 5 rows of our dataset.

```
df.head()
```

Python

	Project Name	Project Description	Project Type	Project Manager	Region	Department	Project Cost	Project Benefit	Complexity	Status	Completion%	Phase	Year	Month	Start Date	End Date
0	Rhinestone	Associations Now Is A Casual Game To Teach You...	INCOME GENERATION	Yael Wilcox	North	Admin & BI	3648615	8443980	High	In - Progress	77%	Phase 4 - Implement	2021	2	2/1/2021	6/1/2021
1	A Triumph Of Softwares	Is A Fully Managed Content Marketing Software ...	INCOME GENERATION	Brenda Chandler	West	eCommerce	4018835	9012225	High	Cancelled	80%	Phase 2 - Develop	2021	3	3/1/2021	6/1/2021
2	The Blue Bird	Most Content Marketers Know The Golden Rule: Y...	INCOME GENERATION	Nyasia Hunter	North	Warehouse	4285483	9078339	High	Completed	100%	Phase 4 - Implement	2021	3	3/1/2021	6/1/2021
3	Remembering Our Ancestors	Utilize And Utilizes (Verb Form) The Open, Inc...	PROCESS IMPROVEMENT	Brenda Chandler	East	Sales and Marketing	5285864	8719006	High	Cancelled	75%	Phase 5 - Measure	2021	3	3/1/2021	6/1/2021
4	Skyhawks	Is A Solution For Founders Who Want To Win At ...	WORKING CAPITAL IMPROVEMENT	Jaylyn Mckenzie	East	eCommerce	5785601	8630148	High	Completed	100%	Phase 1 - Explore	2021	3	3/1/2021	6/1/2021

.tail()

Using .tail() to show the last 5 rows of the dataset.

Using .tail() to show the last 5 rows of the dataset.

```
df.tail()
```

Python

	Project Name	Project Description	Project Type	Project Manager	Region	Department	Project Cost	Project Benefit	Complexity	Status	Completion%	Phase	Year	Month	Start Date	End Date
94	Strive Training	Was Built To Help Founders Create Optimized Co...	WORKING CAPITAL IMPROVEMENT	Nyasia Hunter	South	Supply Chain	5259436	8817917	Medium	On - Hold	80%	Phase 2 - Develop	2025	8	8/1/2025	11/1/2025
95	Debug Entity	In This Ecosystem, Association Content Is Simp...	INCOME GENERATION	Kamari Norris	North	Warehouse	4790417	8872443	Medium	In - Progress	73%	Phase 4 - Implement	2025	9	9/1/2025	12/1/2025
96	Made By Me	With 15 Five, We Take The Guesswork Out Of Con...	PROCESS IMPROVEMENT	Yael Wilcox	West	Supply Chain	4283481	8895152	Low	Completed	100%	Phase 3 - Plan	2025	11	11/1/2025	3/1/2026
97	Revolution	Was Founded To Help Founders And Entrepreneurs...	COST REDUCTION	Jaylyn Mckenzie	East	eCommerce	4606575	8658343	High	In - Progress	77%	Phase 4 - Implement	2025	11	11/1/2025	3/1/2026
98	7Th Annual Workshop	Welcome To The Future Of Content Creation. The...	WORKING CAPITAL IMPROVEMENT	Nyasia Hunter	West	Sales and Marketing	5054482	8422578	High	In - Progress	83%	Phase 3 - Plan	2025	12	12/1/2025	3/1/2026

.shape

With .shape, we can get the total rows and columns of the dataset.

```
df.shape
```

Python

```
(99, 16)
```

.columns

.columns allow us to identify all columns present in the dataset.

```
df.columns
```

Python

```
Index(['Project Name', 'Project Description', 'Project Type',
       'Project Manager', 'Region', 'Department', ' Project Cost ',
       ' Project Benefit ', 'Complexity', 'Status', 'Completion%', 'Phase',
       'Year', 'Month', 'Start Date', 'End Date'],
      dtype='object')
```

.dtypes

With .dtypes, we can identify the data types assigned to each column

```
df.dtypes
```

Python

```
Project Name           object
Project Description    object
Project Type           object
Project Manager        object
Region                 object
Department             object
 Project Cost           int64
 Project Benefit        int64
Complexity             object
```

.unique()

.unique() shows the unique values in a specified column.

```
df['Project Type'].unique()
```

Python

```
array(['INCOME GENERATION', 'PROCESS IMPROVEMENT',
       'WORKING CAPITAL IMPROVEMENT', 'COST REDUCTION'], dtype=object)
```

.nunique()

.nunique() on the other hand provides us the number of unique values in each columns.

```
df.nunique()
```

Python

```
Project Name           99
Project Description    95
Project Type            4
Project Manager         7
Region                  4
Department              5
 Project Cost          99
 Project Benefit       99
Complexity              3
Status                  4
Completion%            22
Phase                   5
Year                    5
Month                  12
Start Date             49
End Date               43
dtype: int64
```

.describe()

Shows the count, mean, median, etc. of columns with Int64 datatypes.

```
df.describe()
```

Python

	Project Cost	Project Benefit	Year	Month
count	9.900000e+01	9.900000e+01	99.000000	99.000000
mean	4.156649e+06	8.828178e+06	2022.747475	7.151515
std	1.076544e+06	2.164019e+05	1.402210	3.211471
min	2.418301e+06	8.422578e+06	2021.000000	1.000000
25%	3.251948e+06	8.656248e+06	2022.000000	4.500000
50%	4.172827e+06	8.846243e+06	2022.000000	7.000000
75%	5.063288e+06	9.019234e+06	2024.000000	10.000000
max	5.974815e+06	9.165877e+06	2025.000000	12.000000

.value_counts()

Returns the number of all unique values in a column.

```
df['Project Type'].value_counts()
```

Python

```
Project Type
INCOME GENERATION              27
PROCESS IMPROVEMENT            25
WORKING CAPITAL IMPROVEMENT    25
COST REDUCTION                 22
Name: count, dtype: int64
```

.isnull()

Checks for null values.

```
df.isnull()
```

Python

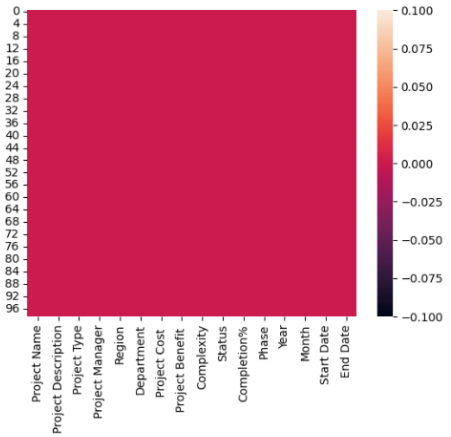
	Project Name	Project Description	Project Type	Project Manager	Region	Department	Project Cost	Project Benefit	Complexity	Status	Completion%	Phase	Year	Month	Start Date	End Date
0	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
94	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
95	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
96	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
97	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False
98	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False	False

99 rows × 16 columns

```
sns.heatmap(df.isnull())
```

Python

```
<Axes: >
```



Data Analysis

```
print(df)
```

Python

```
                Project Name  \
0                  Rhinestone
1      A Triumph Of Softwares
2                The Blue Bird
3   Remembering Our Ancestors
4                    Skyhawks
..                        ...
94            Strive Training
95               Debug Entity
96                 Made By Me
97                 Revolution
98        7Th Annual Workshop

                                    Project Description  \
0   Associations Now Is A Casual Game To Teach You...
1   Is A Fully Managed Content Marketing Software ...
2   Most Content Marketers Know The Golden Rule: Y...
3   Utilize And Utilizes (Verb Form) The Open, Inc...
4   Is A Solution For Founders Who Want To Win At ...
..                                                ...
94  Was Built To Help Founders Create Optimized Co...
95  In This Ecosystem, Association Content Is Simp...
96  With 15 Five, We Take The Guesswork Out Of Con...
97  Was Founded To Help Founders And Entrepreneurs...
98  Welcome To The Future Of Content Creation. The...
...
97  Phase 4 - Implement  2025     11  11/1/2025   3/1/2026
98       Phase 3 - Plan  2025     12  12/1/2025   3/1/2026

[99 rows x 16 columns]
```

Output is truncated. View as a scrollable element or open in a text editor. Adjust cell output settings...

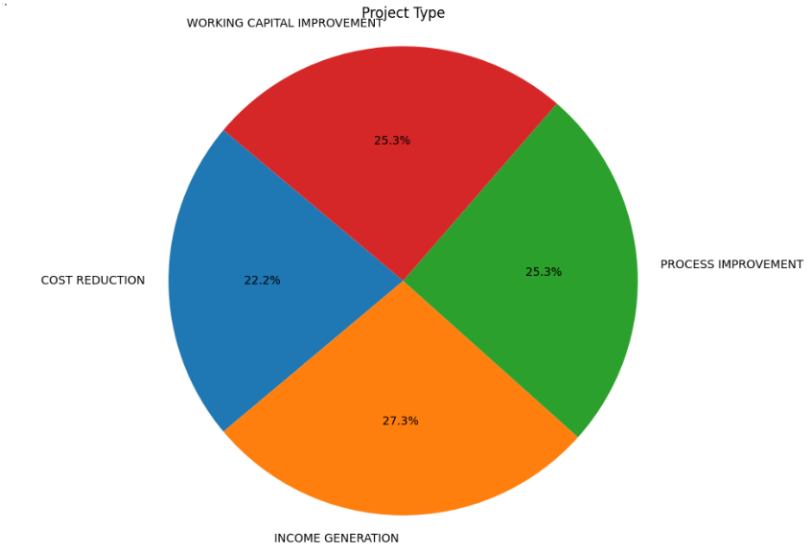
Data Visualization

```
ptype = df.groupby('Project Type').size()
reg = df.groupby('Region').size()
dep = df.groupby('Department').size()
stats = df.groupby('Status').size()
comp = df.groupby('Complexity').size()
pha = df.groupby('Phase').size()
```

Python

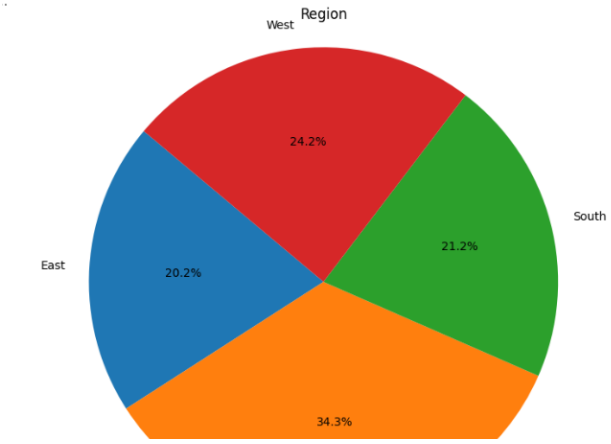
```
plt.figure(figsize=(8,8))
plt.pie(ptype, labels=ptype.index,autopct='%1.1f%%', startangle=140)
plt.title('Project Type')
plt.axis('equal')
plt.show()
```

Python




```
plt.figure(figsize=(8,8))
plt.pie(reg, labels=reg.index,autopct='%1.1f%%', startangle=140)
plt.title('Region')
plt.axis('equal')
plt.show()
```

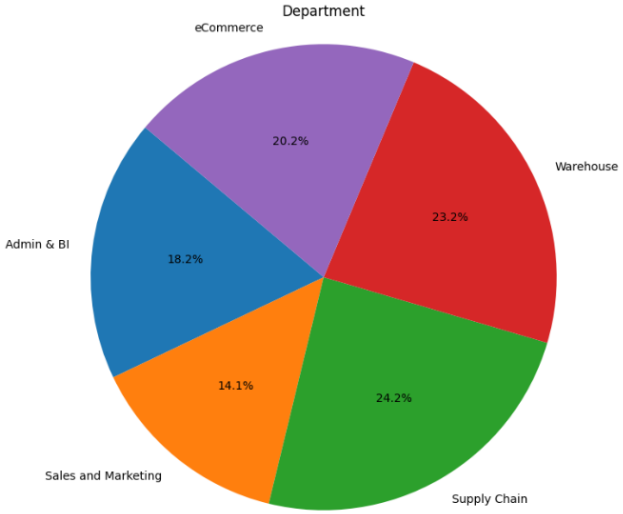
[4] Python




```
plt.figure(figsize=(8,8))
plt.pie(dep, labels=dep.index,autopct='%1.1f%%', startangle=140)
plt.title('Department')
plt.axis('equal')
plt.show()
```

[15] Python

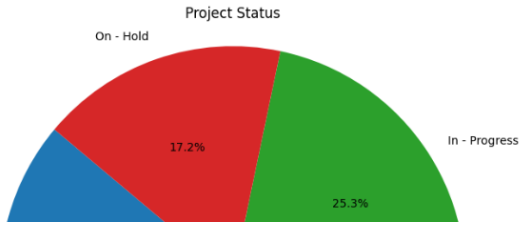
...

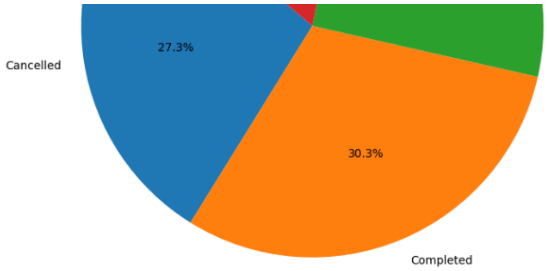



```
plt.figure(figsize=(8,8))
plt.pie(stats, labels=stats.index,autopct='%1.1f%%', startangle=140)
plt.title('Project Status')
plt.axis('equal')
plt.show()
```

[18] Python

...

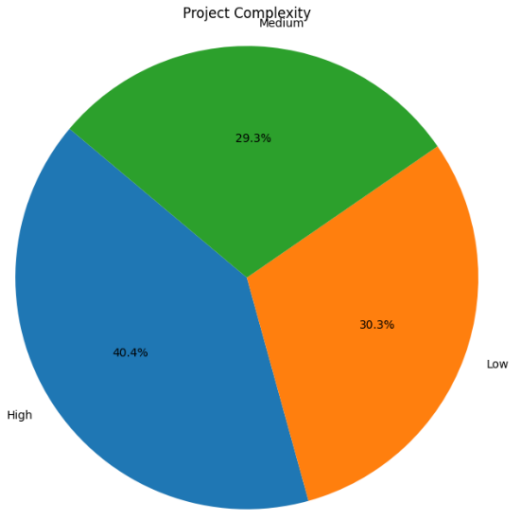





```
plt.figure(figsize=(8,8))
plt.pie(comp, labels=comp.index,autopct='%1.1f%%', startangle=140)
plt.title('Project Complexity')
plt.axis('equal')
plt.show()
```

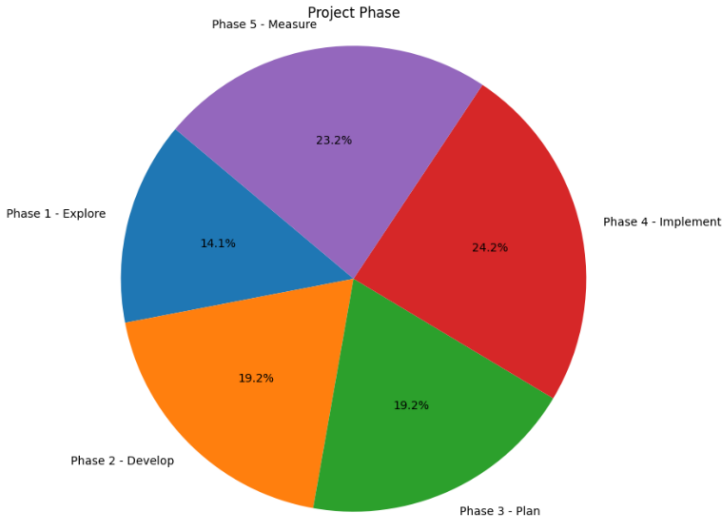
[11] Python

...



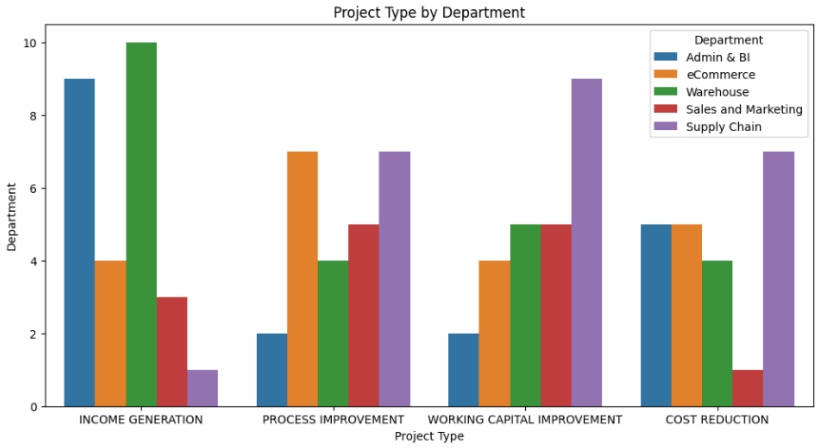

```
plt.figure(figsize=(8,8))
plt.pie(pha, labels=pha.index,autopct='%1.1f%%', startangle=140)
plt.title('Project Phase')
plt.axis('equal')
plt.show()
```

[13] Python



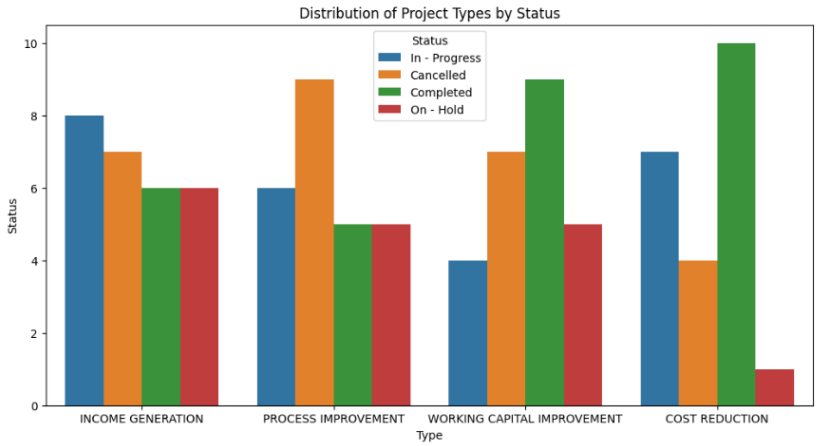

```python
plt.figure(figsize=(12,6))
sns.countplot(data=df, x='Project Type', hue='Department')
plt.xlabel('Project Type')
plt.ylabel('Department')
plt.title('Project Type by Department')
plt.show()
```

Python



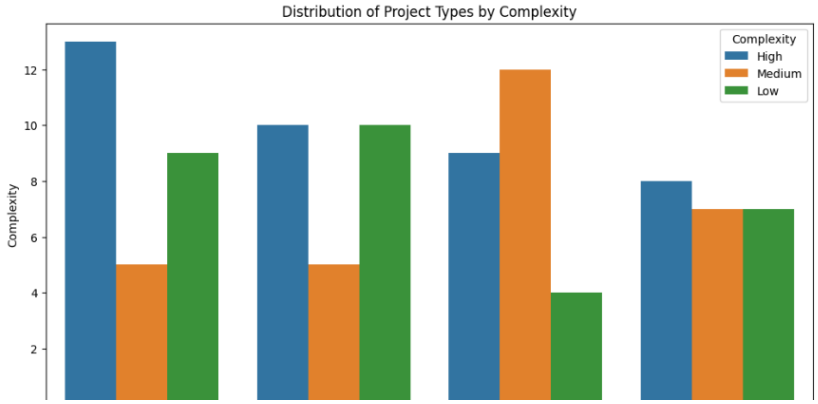
```
plt.figure(figsize=(12,6))
sns.countplot(data=df, x='Project Type', hue='Status')
plt.xlabel('Type')
plt.ylabel('Status')
plt.title('Distribution of Project Types by Status')
plt.show()
```

[16] Python




```
plt.figure(figsize=(12,6))
sns.countplot(data=df, x='Project Type', hue='Complexity')
plt.xlabel('Type')
plt.ylabel('Complexity')
plt.title('Distribution of Project Types by Complexity')
plt.show()
```

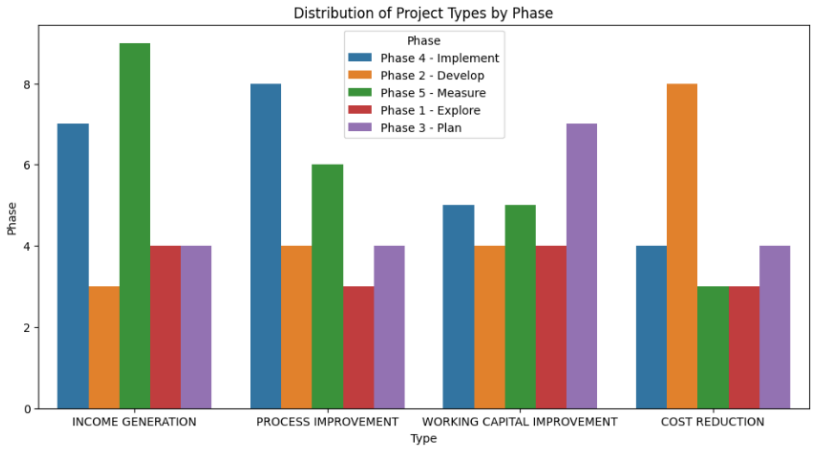
Python




```
plt.figure(figsize=(12,6))
sns.countplot(data=df, x='Project Type', hue='Phase')
plt.xlabel('Type')
plt.ylabel('Phase')
plt.title('Distribution of Project Types by Phase')
plt.show()
```

17] Python

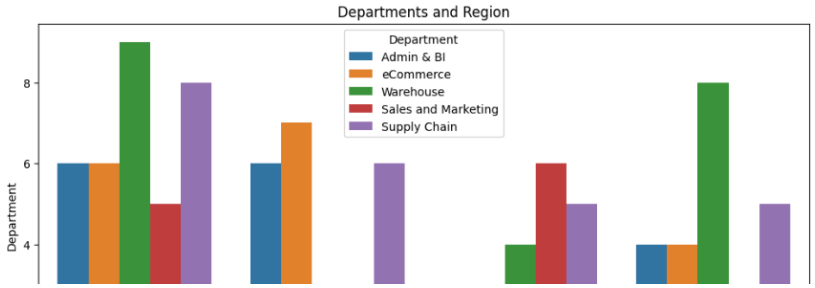
..




```
plt.figure(figsize=(12,6))
sns.countplot(data=df, x='Region', hue='Department')
plt.xlabel('Region')
plt.ylabel('Department')
plt.title('Departments and Region')
plt.show()
```

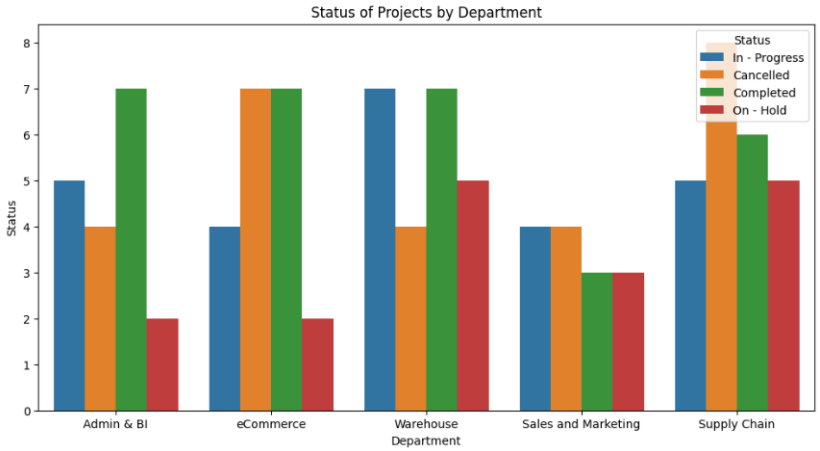
[5] Python

..




```
plt.figure(figsize=(12,6))
sns.countplot(data=df, x='Department', hue='Status')
plt.xlabel('Department')
plt.ylabel('Status')
plt.title('Status of Projects by Department')
plt.show()
```

Python




```
plt.figure(figsize=(12,6))
sns.countplot(data=df, x='Status', hue='Phase')
plt.xlabel('Status')
plt.ylabel('Phase')
plt.title('Status of Projects by the Project Phase')
plt.show()
```

18]

Python