

Etsy Jewelry Market Analysis

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1. Introduction

This project analyzes the Etsy jewelry market using top-seller and listing-level data from eRank. The goals are to: Understand market-level dynamics: sales concentration, store maturity, and growth efficiency. Explore product-level performance: best-selling categories, pricing effects, and engagement metrics (views/favorites) related to sales. Provide actionable insights for potential new sellers and existing shops considering product and pricing strategies. The analysis uses Python (pandas, NumPy, seaborn, scikit-learn) for data wrangling, visualization, and basic modeling.

2. Data Description and Preparation

Datasets

Two main sources were used: Market-level file (df0) – eRank - Top Sellers.xlsx

Each row represents a shop with total estimated sales and the year established. Listing-level files (df1–df10) – individual shop listing exports

Combined into a single DataFrame df using:

Import Libraries and load data

In [116...]

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

```
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import Lasso
from sklearn.linear_model import LinearRegression

In [117... df0 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/eRank - Top Sellers.xlsx",s

In [118... print(df0.columns)

Index(['RANK', 'SHOP', 'SALES', 'COUNTRY', 'YEAR ', 'CATEGORY'], dtype='object')

In [119... sales_col = 'SALES'
shop_col = 'SHOP'

df0[sales_col] = (
    df0[sales_col]
    .astype(str)
    .replace('[\$,]', '', regex=True)
    .replace(',', '', regex=True)
    .astype(float)
)

top10 = df0.sort_values(by=sales_col, ascending=False).head(10)

print(top10[[shop_col, sales_col]])
plt.figure(figsize=(8,5))
sns.barplot(
    data=top10,
    x=sales_col,
    y=shop_col,
    palette='viridis',
    order=top10.sort_values(by=sales_col, ascending=True)[shop_col])

plt.title("Top 10 Sellers by Sales", fontsize=14)
plt.xlabel("Sales", fontsize=12)
plt.ylabel("Shop Name", fontsize=12)
plt.xlim(0, 3_600_000)
```

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

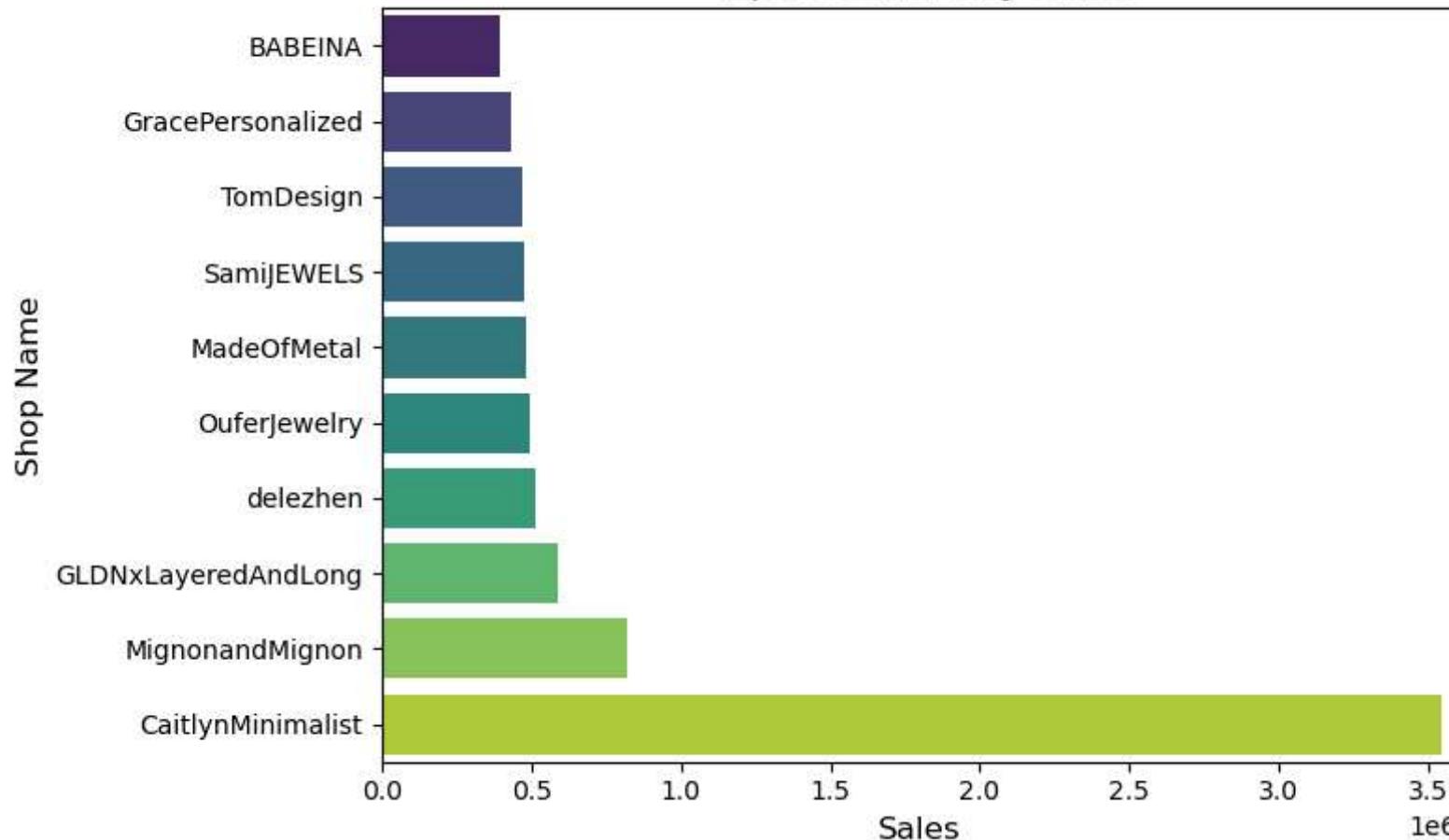
	SHOP	SALES
0	CaitlynMinimalist	3546010.0
1	MignonandMignon	820464.0
2	GLDNxLayeredAndLong	590726.0
3	delezhen	513180.0
4	OuferJewelry	494179.0
5	MadeOfMetal	483190.0
6	SamiJEWELS	476468.0
7	TomDesign	471552.0
8	GracePersonalized	429587.0
9	BABEINA	396046.0

```
<>:7: SyntaxWarning: invalid escape sequence '\$'  
<>:7: SyntaxWarning: invalid escape sequence '\$'  
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\1014710288.py:7: SyntaxWarning: invalid escape sequence '\$'  
    .replace('[\$,]', '', regex=True)  
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\1014710288.py:17: FutureWarning:
```

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

```
sns.barplot(
```

Top 10 Sellers by Sales



```
In [120...]: df1 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/CaitlynMinimalist - Shop lis...
In [121...]: df2 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/MignonandMignon - Shop listi...
In [122...]: df3 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/GLDNxLayeredAndLong - Shop l...
In [123...]: df4 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/delezhen - Shop listings.xls...
In [124...]: df5 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/OuferJewelry - Shop listings...
```

```
In [125... df6 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/MadeOfMetal - Shop listings.xlsx")
In [126... df7 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/SamiJEWELS - Shop listings.xlsx")
In [127... df8 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/TomDesign - Shop listings.xlsx")
In [128... df9 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/GracePersonalized - Shop listings.xlsx")
In [129... df10 = pd.read_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/BABEINA - Shop listings.xlsx")
In [130... df = pd.concat([df1, df2, df3, df4, df5, df6, df7, df8, df9, df10], ignore_index=True)
In [131... df.to_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/Top10seller Listings.xlsx", index=False)
```

Data Wrangling

Several columns were originally stored as strings with symbols (commas, currency marks). These were converted to numeric:

```
In [132... df["EST. SALES"] = (
    df["EST. SALES"]
    .astype(str)
    .str.replace(r"[^0-9.]", "", regex=True)
    .astype(float)
)

In [133... df["LISTING AGE"] = (
    df["LISTING AGE"]
    .astype(str)
    .str.replace(r"[^0-9.]", "", regex=True)
    .astype(float)
)

In [134... df["EST. REVENUE"] = (
    df["EST. REVENUE"]
    .astype(str)
    .str.replace(r"[^0-9.]", "", regex=True)
```

```
    .astype(float)
)
```

```
In [135... df[ "PRICE" ] = (
    df[ "PRICE" ]
    .astype(str)
    .str.replace(r"[^0-9.]", "", regex=True)
    .astype(float)
)
```

```
In [136... df[ "TOTAL VIEWS" ] = (
    df[ "TOTAL VIEWS" ]
    .astype(str)
    .str.replace(r"[^0-9.]", "", regex=True)
    .astype(float)
)
```

```
In [137... df[ "FAVORITES" ] = (
    df[ "FAVORITES" ]
    .astype(str)
    .str.replace(r"[^0-9.]", "", regex=True)
    .astype(float)
)
```

For the market-level data df0, additional transformations were applied:

```
In [138... df0[ "SALES" ] = (
    df0[ "SALES" ]
    .astype(str)
    .str.replace(r"[^0-9.]", "", regex=True)
    .astype(float)
)

df0[ "YEAR" ] = (
    df0[ "YEAR " ]
    .astype(str)
    .str.extract(r"(\d{4})", expand=False)
    .astype(float)
)
```

```
current_year = 2025
df0["STORE AGE"] = current_year - df0["YEAR"]
df0["STORE AGE"] = df0["STORE AGE"].replace(0, np.nan)
df0["SALES DENSITY"] = df0["SALES"] / df0["STORE AGE"]
```

```
In [139...]: df["AVG_DAILY_SALES"] = df["EST. SALES"] / df["LISTING AGE"]
```

```
In [140...]: df = df.drop(columns=["TAGS", "LAST UPDATED", "#"], axis=1)
```

```
In [141...]: df
```

Out[141...]

		LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
0	Moonstone Bezel Stud Earrings by Caitlyn Minim...	1887201708		1976.0	163.0	37.0	980.5	26.5	199.0	9.93	0.185930
1	Diamond Huggie Earrings by Caitlyn Minimalist ...	945311140		1907671.0	82747.0	35864.0	950396.0	26.5	1722.0	1107.82	20.826945
2	Beaded Pearl Heart Drop Earrings by Caitlyn Mi...	4329336635		228.0	44.0	3.0	94.5	31.5	117.0	1.95	0.025641
3	Butterfly Necklace in Sterling Silver, Gold & ...	794411468		171376.0	9435.0	2245.0	94290.0	42.0	1994.0	85.95	1.125878
4	Dainty Name Charm Necklace by CaitlynMinimalis...	1153406329		182243.0	5401.0	2514.0	93018.0	37.0	1392.0	130.92	1.806034
...
3886	Pave Letter Initial Necklace with Birthstone, ...	1330008360		24088.0	724.0	387.0	11610.0	30.0	1088.0	22.14	0.355699
3887	18K Gold Angel Number Anklet, Personalized Gif...	1189436822		2807.0	133.0	52.0	1482.0	28.5	1318.0	2.13	0.039454
3888	Extra Jewelry Box	1335308012		887.0	14.0	22.0	242.0	11.0	1081.0	0.82	0.020352
3889	Engraved Padlock Necklace, Mini Lock Initial P...	1593407330		19681.0	601.0	316.0	9796.0	31.0	723.0	27.22	0.437068
3890	Add Gift Wrap (For Valentines Day, Mothers Da...	901676181		4201.0	39.0	105.0	1365.0	13.0	1818.0	2.31	0.057756

3891 rows × 10 columns

3. Market-Level Analysis

3.1 Sales Concentration (Pareto Analysis)

To measure how concentrated the market is, shops were sorted by total SALES and cumulative sales share was computed:

```
In [142...]: df0_sorted = df0.sort_values("SALES", ascending=False).reset_index(drop=True)

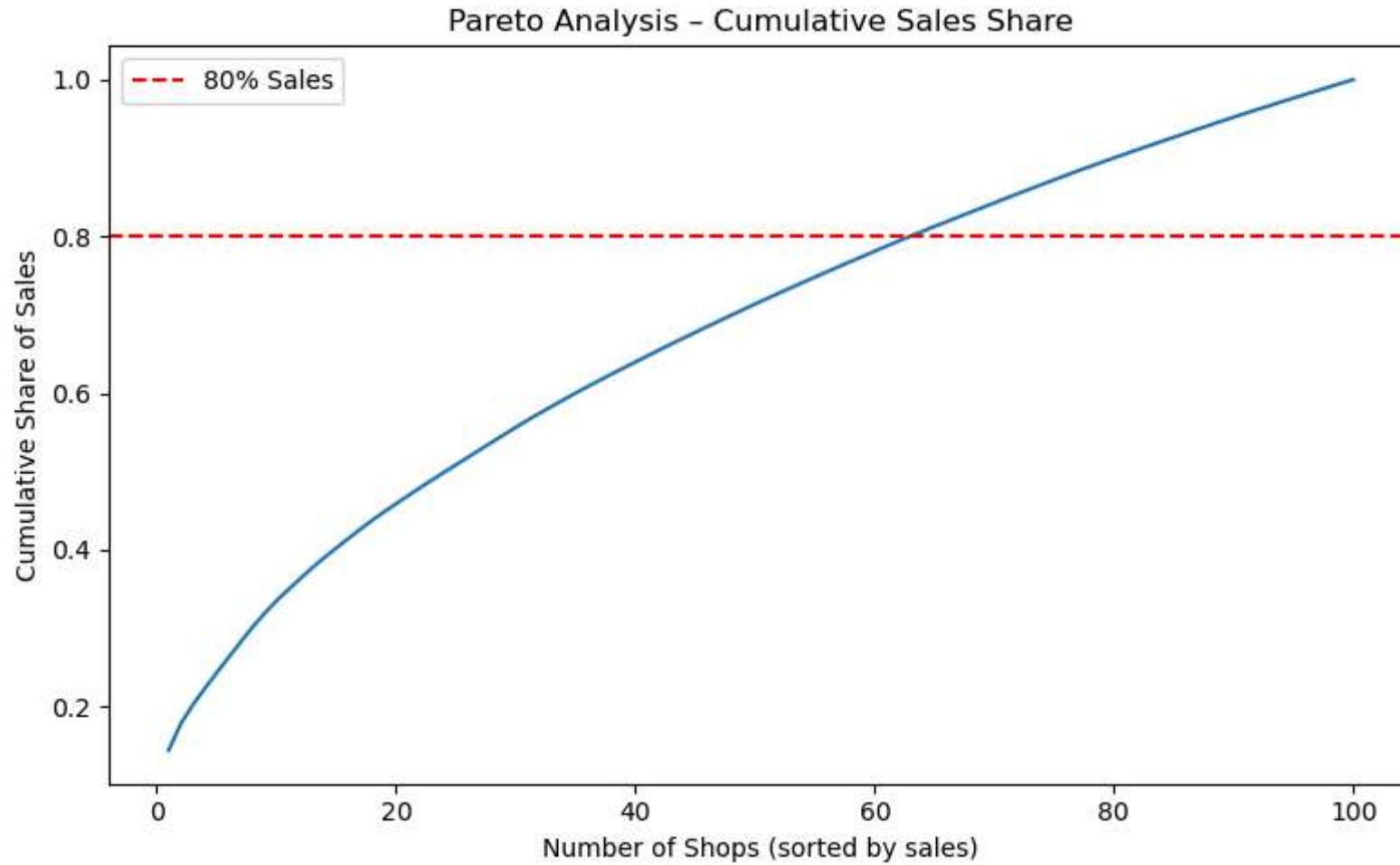
# Cumulative sales and cumulative share
total_sales = df0_sorted["SALES"].sum()
df0_sorted["CUM_SALES"] = df0_sorted["SALES"].cumsum()
df0_sorted["CUM_SHARE"] = df0_sorted["CUM_SALES"] / total_sales

# How many top sellers account for 80% of sales?
top_80 = df0_sorted[df0_sorted["CUM_SHARE"] <= 0.8]
num_top_80 = len(top_80)
print(f"Top {num_top_80} shops account for ~80% of total sales.")
```

Top 62 shops account for ~80% of total sales.

```
In [143...]: import matplotlib.pyplot as plt
import seaborn as sns

plt.figure(figsize=(8,5))
sns.lineplot(
    data=df0_sorted,
    x=df0_sorted.index + 1,
    y="CUM_SHARE"
)
plt.axhline(0.8, color="red", linestyle="--", label="80% Sales")
plt.title("Pareto Analysis - Cumulative Sales Share")
plt.xlabel("Number of Shops (sorted by sales)")
plt.ylabel("Cumulative Share of Sales")
plt.legend()
plt.tight_layout()
plt.show()
```



Result:

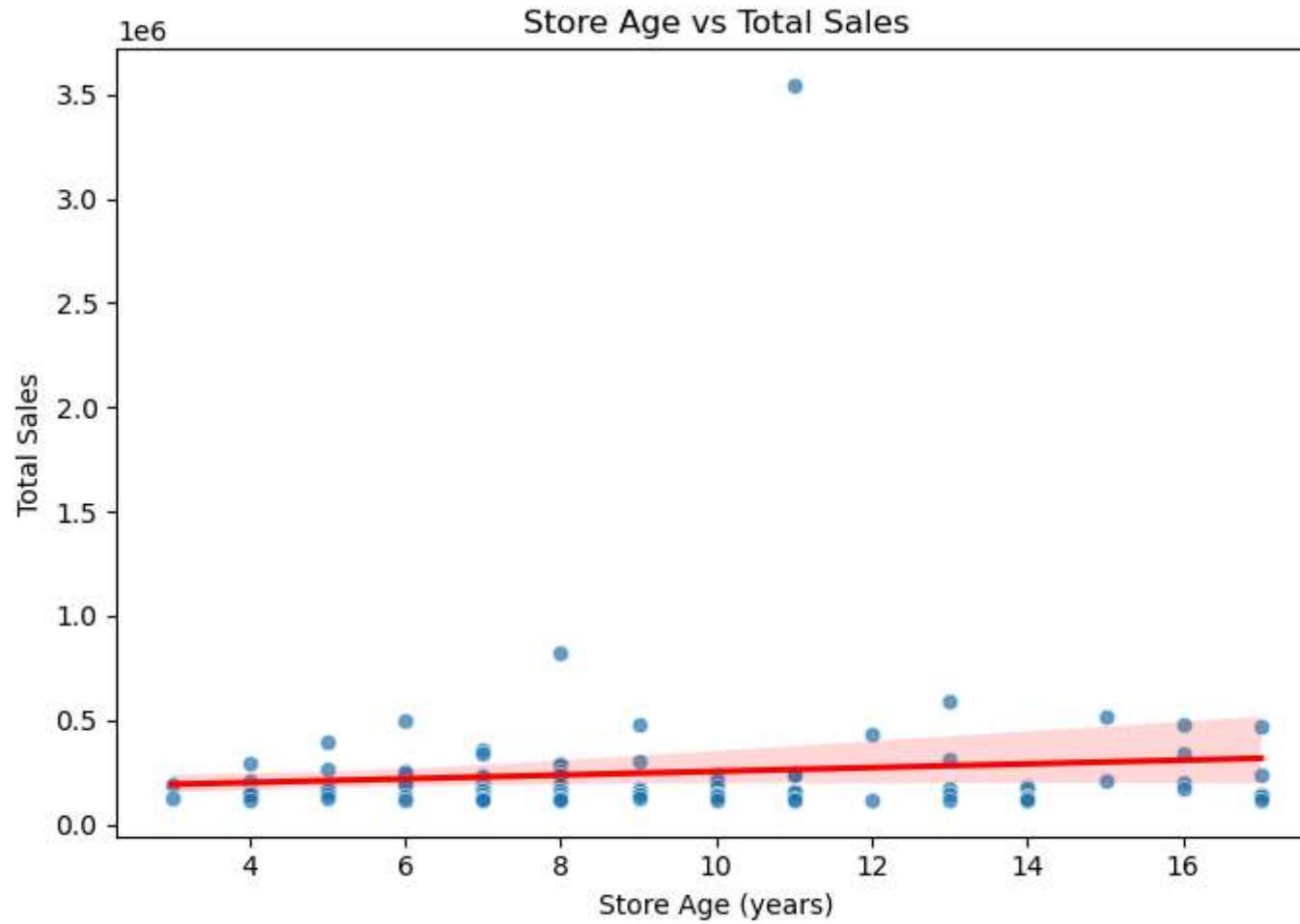
Top 62 shops account for approximately 80% of total sales. A Pareto chart of cumulative share vs. number of shops shows a steep increase at the beginning, confirming a highly concentrated market where a relatively small group of sellers dominates overall sales.

Interpretation: The Etsy jewelry market has strong winner-take-most dynamics. New entrants face established competitors with large market shares, but there is still a long tail of smaller shops.

3.2 Store Age vs. Total Sales

To explore whether older stores necessarily perform better, we plotted STORE_AGE against SALES with a regression line

```
In [144...]  
plt.figure(figsize=(7,5))  
sns.scatterplot(data=df0, x="STORE_AGE", y="SALES", alpha=0.7)  
sns.regplot(  
    data=df0,  
    x="STORE_AGE",  
    y="SALES",  
    scatter=False,  
    color="red"  
)  
plt.title("Store Age vs Total Sales")  
plt.xlabel("Store Age (years)")  
plt.ylabel("Total Sales")  
plt.tight_layout()  
plt.show()
```



Findings:

There is a positive relationship between store age and total sales (older shops have had more time to accumulate sales), but: There is large dispersion: some relatively young shops have very high sales. Many older shops are still mid-range performers.

Conclusion:

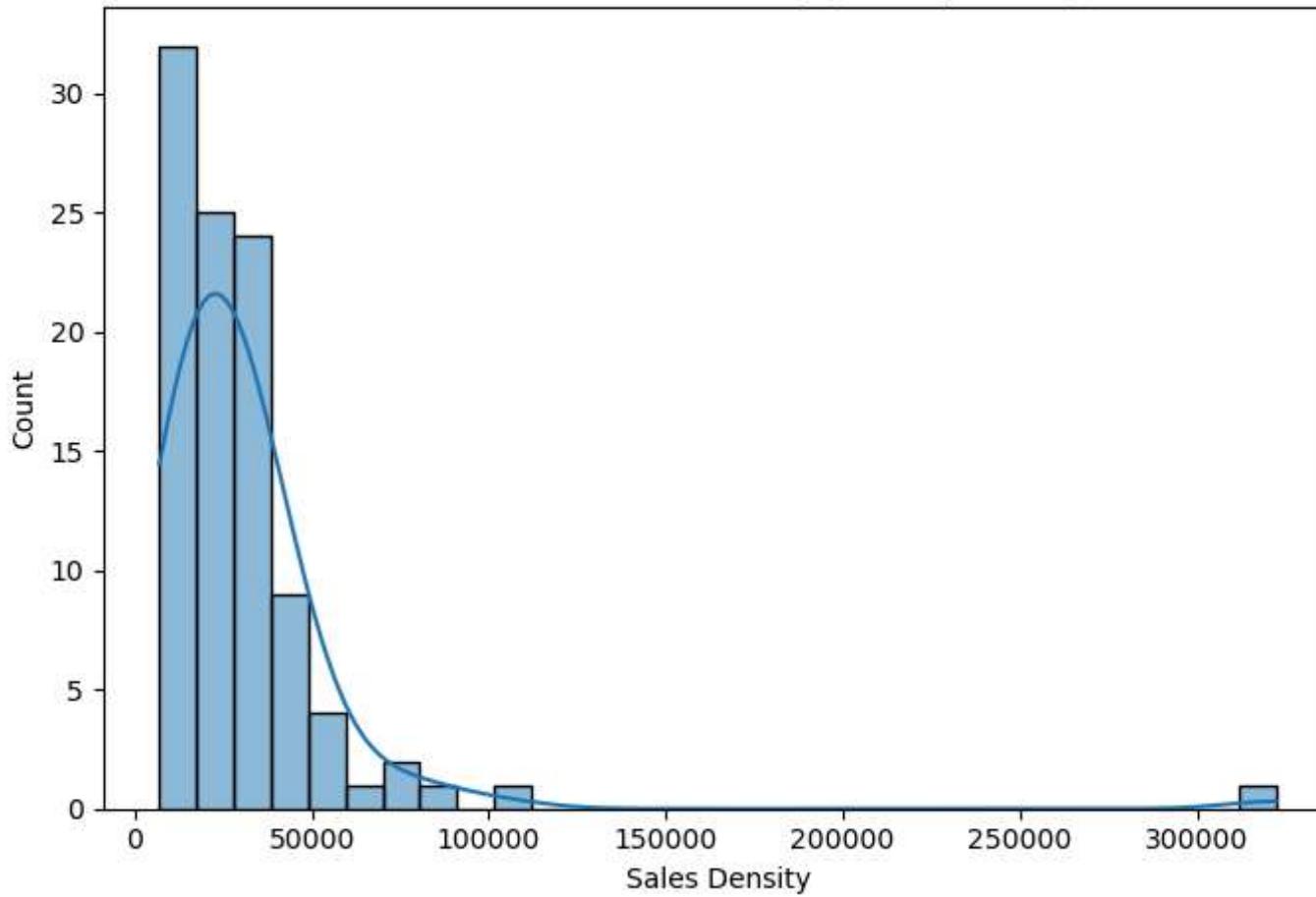
Being older helps, but store age alone does not guarantee success. New shops can still achieve high sales with the right product and positioning.

3.3 Sales Density (Growth Efficiency)

In [145...]

```
plt.figure(figsize=(7,5))
sns.histplot(df0["SALES_DENSITY"], bins=30, kde=True)
plt.title("Distribution of Sales Density (Sales per Year)")
plt.xlabel("Sales Density")
plt.tight_layout()
plt.show()
```

Distribution of Sales Density (Sales per Year)



Top 10 shops by Sales Density include:

CaitlynMinimalist – Sales Density \approx 322,365 MignonandMignon – \approx 102,558 OuferJewelry – \approx 82,363 BABEINA, TonyscollectionUS, and others follow. A histogram of SALES_DENSITY shows a long right tail: most shops have moderate growth efficiency, while a small set of very efficient shops grow extremely fast.

Implications:

High-density shops combine strong demand with relatively short operating histories, indicating rapid scaling. New shops can benchmark themselves against these density values to assess if they are on a high-growth path.

3.4 Top 10 most efficient stores

In [146...]

```
top_density = (
    df0
    .sort_values("SALES_DENSITY", ascending=False)
    .head(10)[["SHOP", "SALES", "STORE_AGE", "SALES_DENSITY"]]
)
print(top_density)
```

	SHOP	SALES	STORE_AGE	SALES_DENSITY
0	CaitlynMinimalist	3546010.0	11.0	322364.545455
1	MignonandMignon	820464.0	8.0	102558.000000
4	OuferJewelry	494179.0	6.0	82363.166667
9	BABEINA	396046.0	5.0	79209.200000
15	TonyscollectionUS	293762.0	4.0	73440.500000
41	Aftersundayy	188654.0	3.0	62884.666667
18	CamelliaAndLove	265163.0	5.0	53032.600000
6	SamiJEWELS	476468.0	9.0	52940.888889
34	DaintyPersonalizedCo	207435.0	4.0	51858.750000
10	EveandkUS	354982.0	7.0	50711.714286

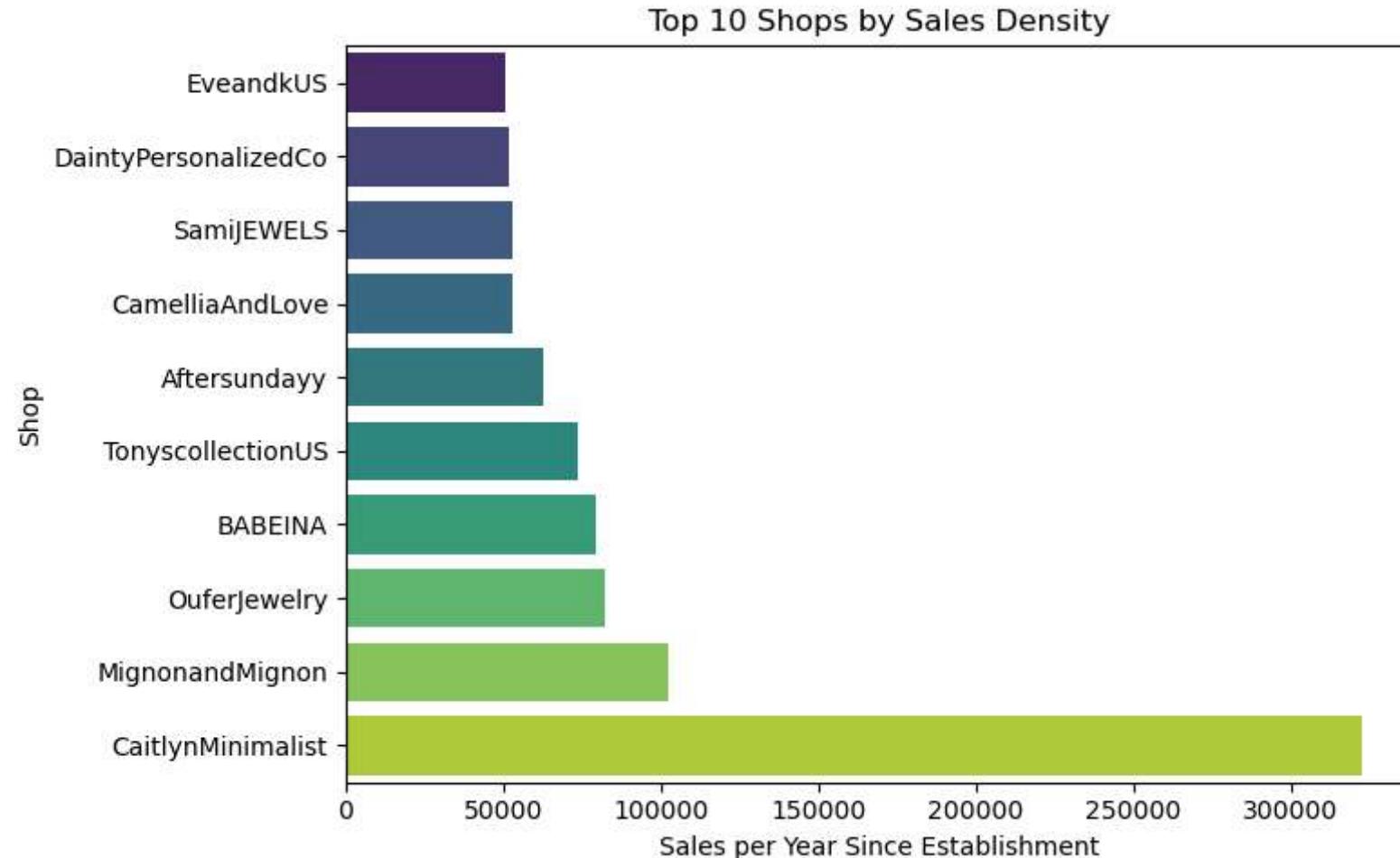
In [147...]

```
plt.figure(figsize=(8,5))
sns.barplot(
    data=top_density,
    x="SALES_DENSITY",
    y="SHOP",
    order=top_density.sort_values("SALES_DENSITY")["SHOP"],
    palette="viridis"
)
plt.title("Top 10 Shops by Sales Density")
plt.xlabel("Sales per Year Since Establishment")
plt.ylabel("Shop")
plt.tight_layout()
plt.show()
```

```
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\4204379207.py:2: FutureWarning:
```

```
Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.
```

```
sns.barplot(
```



```
In [ ]:
```

4. Product-Level Analysis

4.1 Top-Performing Products within Categories

Earrings

```
In [148...]: df_earrings = df[df["LISTING"].str.contains("Earrings", case=False, na=False)]
```

```
In [149...]: df_earrings = df_earrings.sort_values(by="EST. REVENUE", ascending=False)
```

```
In [150...]: df_earrings
```

Out[150...]

		LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
1	Diamond Huggie Earrings by Caitlyn Minimalist ...	945311140	1907671.0	82747.0	35864.0	950396.0	26.5	1722.0	1107.82	20.826945	
142	Huggie Earrings by Caitlyn Minimalist • Most F...	845499603	1078959.0	38968.0	22334.0	457847.0	20.5	1918.0	562.54	11.644421	
143	Opal Inlay Huggie Earrings Set by Caitlyn Mini...	1136507412	901363.0	45797.0	14511.0	457096.5	31.5	1398.0	644.75	10.379828	
162	Double Hoop Huggie Earrings by Caitlyn Minimal...	992281232	860065.0	48271.0	11868.0	427248.0	36.0	1649.0	521.57	7.197089	
215	Hinged Huggie Earrings by Caitlyn Minimalist • ...	902097645	675148.0	34045.0	12692.0	336338.0	26.5	1812.0	372.60	7.004415	
...	
2381	Flower Earrings, Statement Earrings, Pearl Ear...	4326058514	56.0	7.0	0.0	0.0	59.0	124.0	0.45	0.000000	
2382	Flower Earrings, Statement Earrings, Pearl Ear...	4319973904	74.0	6.0	0.0	0.0	59.0	136.0	0.54	0.000000	
2421	Spiral Earrings, Pearl Drop Earrings, Boho Ear...	4324960795	60.0	4.0	0.0	0.0	54.0	126.0	0.48	0.000000	
497	Marquise Diamond Jewelry Set by Caitlyn Minima...	4392103982	0.0	1.0	0.0	0.0	59.0	4.0	0.00	0.000000	
2542	Pearl Drop Earrings, Spiral Earrings, Pearl	4319980544	51.0	5.0	0.0	0.0	48.0	136.0	0.38	0.000000	

LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
Earrings									

775 rows × 10 columns

```
In [151... df_earrings.to_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/Top10sellersearring.xlsx", )

In [152... # Sort by Estimated Revenue (descending) and select top 25
top25_revenue = df_earrings.sort_values(by='EST. REVENUE', ascending=False).head(25)

# Sort by Daily Views (descending) and select top 25
top25_views = df_earrings.sort_values(by='DAILY VIEWS', ascending=False).head(25)

In [153... # Display the results
print("Top 25 Earrings by Estimated Revenue:")
print(top25_revenue[['LISTING', 'EST. REVENUE', ]])

print("\nTop 25 Earrings by Daily Views:")
print(top25_views[['LISTING', 'DAILY VIEWS']])
```

Top 25 Earrings by Estimated Revenue:

		LISTING	EST. REVENUE
1	Diamond Huggie Earrings by Caitlyn Minimalist ...	950396.00	
142	Huggie Earrings by Caitlyn Minimalist • Most F...	457847.00	
143	Opal Inlay Huggie Earrings Set by Caitlyn Mini...	457096.50	
162	Double Hoop Huggie Earrings by Caitlyn Minimal...	427248.00	
215	Hinged Huggie Earrings by Caitlyn Minimalist •...	336338.00	
256	Starburst Huggie Earrings by Caitlyn Minimalis...	277959.00	
257	Dangling Hoop Earrings by Caitlyn Minimalist •...	277455.00	
274	Dangle Link Earrings by Caitlyn Minimalist • C...	247286.00	
297	Pave Petite Hoop Earrings by Caitlyn Minimalis...	211059.00	
2497	Daryl-Ann's Sunburst Earrings	192576.00	
846	Raw Crystal Huggies Hoops Gold, Crystal Hoop E...	187408.00	
2846	Gemstone Stud Earrings • Birthstone Post Earri...	180512.00	
1659	16G Dragon Claws Cartilage Earring/Septum Ring...	173434.30	
366	Diamond Drop Earrings by Caitlyn Minimalist • ...	169455.00	
367	Inside Out Diamond Huggies by CaitlynMinimalis...	168750.00	
370	Dainty Diamond Threader Earrings by Caitlyn Mi...	164008.50	
3592	Gold Hoop Earrings, Antitarnish Hoops, STAINLE...	161980.00	
379	Knot Pearl Drop Earrings by Caitlyn Minimalist...	153192.00	
2893	Emerald Stud Earrings • Emerald Post Earrings ...	141952.00	
398	Love Knot Earrings • Dainty Stud Earrings • Mi...	138979.00	
402	Art Deco Diamond Earrings By Caitlyn Minimalis...	134796.00	
409	Birthstone Hoop Earrings by Caitlyn Minimalist...	129690.00	
1685	18g 316L Surgical Steel Gold Hinged Segment/Ca...	114928.33	
1464	16G Celetial Zodiac Cartilage Earring Studs/Co...	113497.02	
437	Opal Huggie Hoops by Caitlyn Minimalist • Opal...	106392.00	

Top 25 Earrings by Daily Views:

		LISTING	DAILY VIEWS
1	Diamond Huggie Earrings by Caitlyn Minimalist ...	1107.82	
143	Opal Inlay Huggie Earrings Set by Caitlyn Mini...	644.75	
142	Huggie Earrings by Caitlyn Minimalist • Most F...	562.54	
257	Dangling Hoop Earrings by Caitlyn Minimalist •...	543.33	
162	Double Hoop Huggie Earrings by Caitlyn Minimal...	521.57	
367	Inside Out Diamond Huggies by CaitlynMinimalis...	402.50	
846	Raw Crystal Huggies Hoops Gold, Crystal Hoop E...	402.37	
215	Hinged Huggie Earrings by Caitlyn Minimalist •...	372.60	
1342	16G/18G/20G Gold Implant Grade Titanium Hinged...	307.56	
168	Flat Back Gemstone Earrings by Caitlyn Minimal...	294.17	
256	Starburst Huggie Earrings by Caitlyn Minimalis...	288.75	

1392	16G Star/Moon/Planet Dangle Septum Ring/Daith ...	274.67
274	Dangle Link Earrings by Caitlyn Minimalist • C...	273.92
1394	16G Spiral Butterfly Gold Sliver Helix Earring...	251.25
1659	16G Dragon Claws Cartilage Earring/Septum Ring...	247.56
1464	16G Celetial Zodiac Cartilage Earring Studs/Co...	243.54
2497	Daryl-Ann's Sunburst Earrings	241.95
438	Sun Huggie Hoop Earrings by Caitlyn Minimalist...	241.04
379	Knot Pearl Drop Earrings by Caitlyn Minimalist...	236.72
2846	Gemstone Stud Earrings • Birthstone Post Earri...	227.40
297	Pave Petite Hoop Earrings by Caitlyn Minimalis...	225.39
370	Dainty Diamond Threader Earrings by Caitlyn Mi...	220.82
1367	20G Double Hoop Nose Ring Silver Gold/Cartilag...	216.26
402	Art Deco Diamond Earrings By Caitlyn Minimalis...	209.62
409	Birthstone Hoop Earrings by Caitlyn Minimalist...	203.27

In [154...]

```
# Visualize top 25 by Estimated Revenue
plt.figure(figsize=(10,6))
sns.barplot(data=top25_revenue, x='EST. REVENUE', y='LISTING', palette='viridis')
plt.title("Top 25 Earrings by Estimated Revenue", fontsize=14)
plt.xlabel("Estimated Revenue")
plt.ylabel("Listing Title")
plt.tight_layout()
plt.show()
```

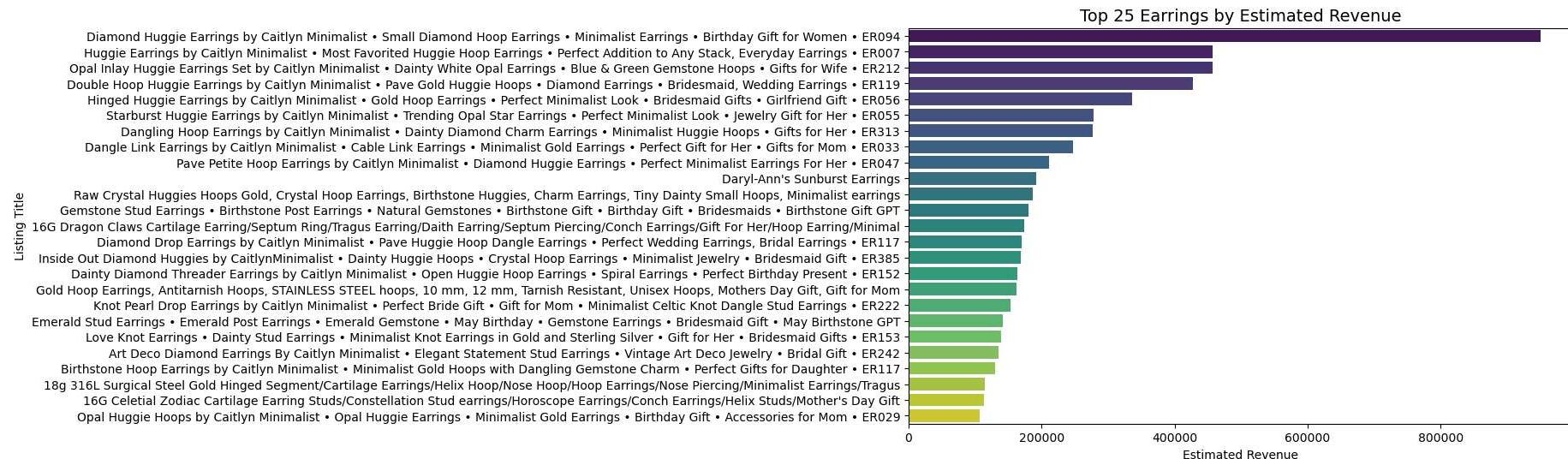
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\2462438088.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

```
sns.barplot(data=top25_revenue, x='EST. REVENUE', y='LISTING', palette='viridis')
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\2462438088.py:7: UserWarning: Tight layout not applied. The left and right margins cannot be made large enough to accommodate all axes decorations.

```
plt.tight_layout()
```



In [155...]

```
# Visualize top 25 by Daily Views
plt.figure(figsize=(10,6))
sns.barplot(data=top25_views, x='DAILY VIEWS', y='LISTING', palette='cool')
plt.title("Top 25 Earrings by Daily Views", fontsize=14)
plt.xlabel("Daily Views")
plt.ylabel("Listing Title")
plt.tight_layout()
plt.show()
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\3589481778.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

```
sns.barplot(data=top25_views, x='DAILY VIEWS', y='LISTING', palette='cool')
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\3589481778.py:7: UserWarning: Tight layout not applied. The left and right margins cannot be made large enough to accommodate all axes decorations.

```
plt.tight_layout()
```



Necklaces

```
In [156...]: df_necklaces = df[df["LISTING"].str.contains("Necklace", case=False, na=False)]
```

```
In [157...]: df_necklaces = df_necklaces.sort_values(by="EST. REVENUE", ascending=False)
```

```
In [158...]: df_necklaces
```

Out[158...]

		LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
327	Personalized Name Necklace by Caitlyn Minimali...	990762977	4602193.0	120765.0	60288.0	2532096.0	42.00	1673.0	2750.86	36.035864	
326	Personalized Name Necklace by Caitlyn Minimali...	990762977	4602193.0	120765.0	60288.0	2532096.0	42.00	1673.0	2750.86	36.035864	
3582	18K Gold Chain Necklace, Cable Chain, Papercli...	1022193192	2941945.0	70801.0	55308.0	1493316.0	27.00	1602.0	1836.42	34.524345	
476	Family Necklace • Personalized Gift • Linked C...	492227219	2467103.0	96512.0	32319.0	1357398.0	42.00	3267.0	755.16	9.892562	
897	Personalized Jewelry Gift for Mom from Husband...	276448272	2014434.0	84711.0	21554.0	1077700.0	50.00	3489.0	577.37	6.177701	
...
3648	2 Pcs Layer Necklace Set, Gold Necklace Stack:...	4392628367	28.0	2.0	0.0	0.0	45.00	9.0	3.11	0.000000	
3559	Teardrop Birthstone Necklace by GracePersonaliz...	4379175583	36.0	0.0	0.0	0.0	79.55	32.0	1.13	0.000000	
3560	Emerald Birthstone Necklace by GracePersonaliz...	4379165322	47.0	0.0	0.0	0.0	85.34	32.0	1.47	0.000000	
3561	Dainty Round Birthstone Necklace by GracePerso...	4378560081	29.0	2.0	0.0	0.0	77.65	33.0	0.88	0.000000	
3562	Round Birthstone Necklace by GracePersonalized...	4378557313	18.0	0.0	0.0	0.0	78.79	33.0	0.55	0.000000	

1288 rows × 10 columns

```
In [159... df_necklaces.to_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/Top10sellernecklaces.xlsx")
```

```
In [160... # Sort by Estimated Revenue (descending) and select top 25
top25_revenue = df_necklaces.sort_values(by='EST. REVENUE', ascending=False).head(25)

# Sort by Daily Views (descending) and select top 25
top25_views = df_necklaces.sort_values(by='DAILY VIEWS', ascending=False).head(25)
```

```
In [161... # Display the results
print("Top 25 Necklaces by Estimated Revenue:")
print(top25_revenue[['LISTING', 'EST. REVENUE', ]])

print("\nTop 25 Necklaces by Daily Views:")
print(top25_views[['LISTING', 'DAILY VIEWS']])
```

Top 25 Necklaces by Estimated Revenue:

		LISTING	EST. REVENUE
327	Personalized Name Necklace by Caitlyn Minimali...	2532096.00	
326	Personalized Name Necklace by Caitlyn Minimali...	2532096.00	
3582	18K Gold Chain Necklace, Cable Chain, Papercli...	1493316.00	
476	Family Necklace • Personalized Gift • Linked C...	1357398.00	
897	Personalized Jewelry Gift for Mom from Husband...	1077700.00	
484	Letter Necklace by Caitlyn Minimalist • Name N...	1069485.00	
513	Custom Birthstone Necklace for Mom Push Gift f...	811634.59	
3581	Heart Locket Necklace with Photo, Big Heart Lo...	742118.00	
901	Raw Crystal Necklace, Rose quartz, Carnelian C...	692639.00	
3435	Personalized Letter Name Necklace by GracePers...	543104.33	
116	Dainty Initial Tag Necklace by Caitlyn Minimal...	533360.00	
812	Layered Necklace Set, 3 Initial Disk Necklaces...	525616.00	
3357	Custom Name Necklace on Curb Chain by GracePer...	486455.00	
155	Marquise Diamond Necklace by CaitlynMinimalist...	438252.50	
845	Custom Raw Birthstone Necklace, Mother of 3 Un...	420121.00	
521	Custom Necklace Engraved Necklace Personalized...	415838.36	
166	Dainty Mama Necklace by Caitlyn Minimalist in ...	412920.00	
651	Custom Dog Mom Necklace, Pet Memorial Gift for...	387180.16	
684	Personalized Disk Necklace, Custom Tiny Initia...	385476.00	
202	Teardrop Diamond Necklace by Caitlyn Minimalis...	377874.00	
3590	Cross Necklace, Dainty Cross Necklace, Crystal...	365104.00	
205	Baguette Diamond Necklace in Gold, Rose Gold, ...	360612.00	
837	Delicate Gemstone Choker, Labradorite Beaded N...	357544.00	
209	Initial Pendant Necklace by Caitlyn Minimalist...	353406.50	
838	Family Charm Necklace, Custom Birthstone Initi...	349950.00	

Top 25 Necklaces by Daily Views:

		LISTING	DAILY VIEWS
327	Personalized Name Necklace by Caitlyn Minimali...	2750.86	
326	Personalized Name Necklace by Caitlyn Minimali...	2750.86	
3581	Heart Locket Necklace with Photo, Big Heart Lo...	1837.06	
3582	18K Gold Chain Necklace, Cable Chain, Papercli...	1836.42	
484	Letter Necklace by Caitlyn Minimalist • Name N...	1120.69	
116	Dainty Initial Tag Necklace by Caitlyn Minimal...	891.32	
476	Family Necklace • Personalized Gift • Linked C...	755.16	
3598	14k Gold Tiny Initial Tag Necklace by Babeina,...	690.34	
513	Custom Birthstone Necklace for Mom Push Gift f...	644.77	
897	Personalized Jewelry Gift for Mom from Husband...	577.37	
3583	14k Solid Gold Name Necklace, Personalized Gif...	505.41	

155	Marquise Diamond Necklace by CaitlynMinimalist...	499.37
209	Initial Pendant Necklace by Caitlyn Minimalist...	491.16
841	Green Raw Emerald Beaded Gemstone Choker Neckl...	484.10
3435	Personalized Letter Name Necklace by GracePers...	448.87
166	Dainty Mama Necklace by Caitlyn Minimalist in ...	436.92
202	Teardrop Diamond Necklace by Caitlyn Minimalis...	432.96
311	Fingerprint Necklace by Caitlyn Minimalist • P...	432.44
412	Toi et Moi Gemstone Necklace by CaitlynMinimal...	431.51
3606	Angel Number Necklace 444, Dainty Numerology ...	428.47
354	Personalized Name Necklace by Caitlyn Minimali...	426.78
281	Locket Necklaces by CaitlynMinimalist • Gold H...	419.15
901	Raw Crystal Necklace, Rose quartz, Carnelian C...	375.37
205	Baguette Diamond Necklace in Gold, Rose Gold, ...	373.66
213	Linked Pendant Necklace by Caitlyn Minimalist ...	370.06

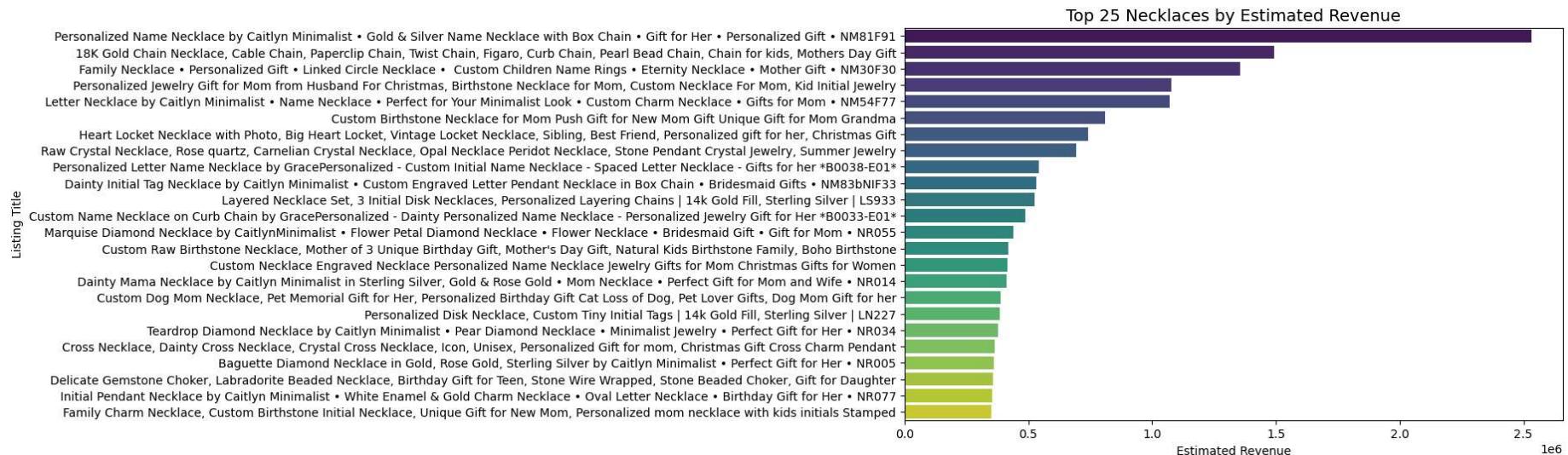
In [162...]

```
# Visualize top 25 by Estimated Revenue
plt.figure(figsize=(10,6))
sns.barplot(data=top25_revenue, x='EST. REVENUE', y='LISTING', palette='viridis')
plt.title("Top 25 Necklaces by Estimated Revenue", fontsize=14)
plt.xlabel("Estimated Revenue")
plt.ylabel("Listing Title")
plt.tight_layout()
plt.show()
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\3783832568.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

```
sns.barplot(data=top25_revenue, x='EST. REVENUE', y='LISTING', palette='viridis')
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\3783832568.py:7: UserWarning: Tight layout not applied. The left and right margins cannot be made large enough to accommodate all axes decorations.
    plt.tight_layout()
```



In [163...]

```
# Visualize top 25 by Daily Views
plt.figure(figsize=(10,6))
sns.barplot(data=top25_views, x='DAILY VIEWS', y='LISTING', palette='cool')
plt.title("Top 25 Necklaces by Daily Views", fontsize=14)
plt.xlabel("Daily Views")
plt.ylabel("Listing Title")
plt.tight_layout()
plt.show()
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\945624575.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

```
sns.barplot(data=top25_views, x='DAILY VIEWS', y='LISTING', palette='cool')
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\945624575.py:7: UserWarning: Tight layout not applied. The left and right margins cannot be made large enough to accommodate all axes decorations.

```
plt.tight_layout()
```



Bracelet

```
In [164]: df_bracelets = df[df["LISTING"].str.contains("Bracelet", case=False, na=False)]
```

```
In [165]: df_bracelets = df_bracelets.sort_values(by="EST. REVENUE", ascending=False)
```

```
In [166]: df_bracelets
```

Out[166...]

		LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
339	Handwriting Bracelet • Custom Actual Handwriti...	209384686	4209479.0	187154.0	58090.0	2149330.00	37.00	4012.0	1049.22	14.479063	
568	Personalized Bracelet Custom Bracelet Engraved...	546098844	1020312.0	28768.0	21120.0	497798.40	23.57	2956.0	345.17	7.144790	
160	Minimalist Bracelet Chains by Caitlyn Minimali...	882615239	787772.0	32115.0	14810.0	429490.00	29.00	1847.0	426.51	8.018408	
3346	Custom Name Bracelet on Curb Chain by Grace Pe...	790069466	638791.0	30203.0	4216.0	408994.16	97.01	2009.0	317.96	2.098556	
190	Duo Bead Chain Bracelet • Perfect Birthday Gif...	1016875279	715585.0	34916.0	9875.0	390062.50	39.50	1631.0	438.74	6.054568	
...
1288	Labradorite Crystal Bracelet, Transformation C...	1782460190	60.0	10.0	0.0	0.00	34.00	410.0	0.15	0.000000	
490	Heart Station Jewelry Set by Caitlyn Minimalis...	4394194729	0.0	1.0	0.0	0.00	67.00	0.0	0.00	NaN	
491	Heart Station Jewelry Set by Caitlyn Minimalis...	4394194729	0.0	1.0	0.0	0.00	67.00	0.0	0.00	NaN	
3595	2PCS Stack Bracelet SET, Rope - Herringbone Br...	4383083204	57.0	4.0	0.0	0.00	64.00	25.0	2.28	0.000000	
2374	Paperclip Chain and Diamond Link Bracelet,	4392478696	56.0	7.0	0.0	0.00	62.00	3.0	18.67	0.000000	

LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	Avg_Daily_Sales
		Dai...							

455 rows × 10 columns

```
In [167... df_bracelets.to_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/Top10sellerbracelets.xlsx")  
In [168... # Sort by Estimated Revenue (descending) and select top 25  
top25_revenue = df_bracelets.sort_values(by='EST. REVENUE', ascending=False).head(25)  
  
# Sort by Daily Views (descending) and select top 25  
top25_views = df_bracelets.sort_values(by='DAILY VIEWS', ascending=False).head(25)  
  
In [169... # Display the results  
print("Top 25 Bracelets by Estimated Revenue:")  
print(top25_revenue[['LISTING', 'EST. REVENUE', ]])  
  
print("\nTop 25 Bracelets by Daily Views:")  
print(top25_views[['LISTING', 'DAILY VIEWS']])
```

Top 25 Bracelets by Estimated Revenue:

		LISTING	EST. REVENUE
339	Handwriting Bracelet • Custom Actual Handwriti...	2149330.00	
568	Personalized Bracelet Custom Bracelet Engraved...	497798.40	
160	Minimalist Bracelet Chains by Caitlyn Minimali...	429490.00	
3346	Custom Name Bracelet on Curb Chain by Grace Pe...	408994.16	
190	Duo Bead Chain Bracelet • Perfect Birthday Gif...	390062.50	
719	Dainty Personalized Bar Bracelet for Names, Da...	372072.00	
2857	Dainty Bracelet Set - Bracelets for Women, Ini...	280728.00	
633	Personalized Bracelet For Woman Engraved Name ...	279440.03	
3385	Custom Engraved Name Bar Bracelet on Curb Chai...	264472.67	
2405	Turquoise Bracelet, Turquoise Tennis Bracelet,...	217745.00	
727	Super Dainty Initial Bracelet, Personalized Ti...	211736.00	
2433	Tennis Bracelet, Gold Tennis Bracelet, Cubic Z...	200876.00	
2699	Two Delicate Bracelets Set, Dainty Bracelet Se...	191120.00	
2989	Zodiac Bracelet • Astrology Bracelet • Zodiac ...	189926.00	
3616	18k Gold Chain Bracelet Necklace Anklet, Figar...	169356.00	
3377	Engraved Affirmation Cuff Bracelet by GracePer...	152524.28	
795	Delicate Dewdrop Bracelet, Dainty Layering Cha...	152292.00	
2359	Tennis Bracelet, Gold Tennis Bracelet, Cubic Z...	143780.00	
2919	Crystal Bracelet - Bridesmaid Gifts, Bridesmai...	141372.00	
559	Family Birthstone Bracelets for Mom Jewelry Mo...	139935.09	
399	Beaded Hand Chain Bracelet by Caitlyn Minimali...	137618.00	
400	Dainty Bracelet Chains by Caitlyn Minimalist •...	136735.00	
554	Beauty and the Beast Bracelet Birthday Gift Ro...	125910.94	
2993	Mama Bracelet • Name Bracelet • Personalized C...	119472.00	
2354	Bangle Bracelet by Sami Jewels, Minimalist Bra...	119448.00	

Top 25 Bracelets by Daily Views:

		LISTING	DAILY VIEWS
339	Handwriting Bracelet • Custom Actual Handwriti...	1049.22	
3385	Custom Engraved Name Bar Bracelet on Curb Chai...	526.50	
2843	Build your Own Charm Bracelet - Anti-Tarnish, ...	501.61	
3377	Engraved Affirmation Cuff Bracelet by GracePer...	488.19	
190	Duo Bead Chain Bracelet • Perfect Birthday Gif...	438.74	
160	Minimalist Bracelet Chains by Caitlyn Minimali...	426.51	
2408	Turquoise Tennis Bracelet, Turquoise Jewelry, ...	426.45	
2359	Tennis Bracelet, Gold Tennis Bracelet, Cubic Z...	384.47	
568	Personalized Bracelet Custom Bracelet Engraved...	345.17	
2699	Two Delicate Bracelets Set, Dainty Bracelet Se...	328.35	
3346	Custom Name Bracelet on Curb Chain by Grace Pe...	317.96	

3340	Engraved Dainty Name Bar Bracelet by GracePers...	309.57
399	Beaded Hand Chain Bracelet by Caitlyn Minimali...	303.50
2354	Bangle Bracelet by Sami Jewels, Minimalist Bra...	275.78
2405	Turquoise Bracelet, Turquoise Tennis Bracelet,...	257.81
3616	18k Gold Chain Bracelet Necklace Anklet, Figar...	245.97
2861	Add a Charm - Custom Charm Necklaces and Brace...	242.13
559	Family Birthstone Bracelets for Mom Jewelry Mo...	217.13
2857	Dainty Bracelet Set - Bracelets for Women, Ini...	216.20
2433	Tennis Bracelet, Gold Tennis Bracelet, Cubic Z...	201.26
145	Triple Herringbone Chain Bracelet by Caitlyn M...	187.27
719	Dainty Personalized Bar Bracelet for Names, Da...	174.96
633	Personalized Bracelet For Woman Engraved Name ...	168.65
2989	Zodiac Bracelet • Astrology Bracelet • Zodiac ...	159.55
2398	Two Tone Tennis Bracelet, Bezel Tennis Bracele...	156.96

In [170...]

```
# Visualize top 25 by Estimated Revenue
plt.figure(figsize=(10,6))
sns.barplot(data=top25_revenue, x='EST. REVENUE', y='LISTING', palette='viridis')
plt.title("Top 25 Bracelets by Estimated Revenue", fontsize=14)
plt.xlabel("Estimated Revenue")
plt.ylabel("Listing Title")
plt.tight_layout()
plt.show()
```

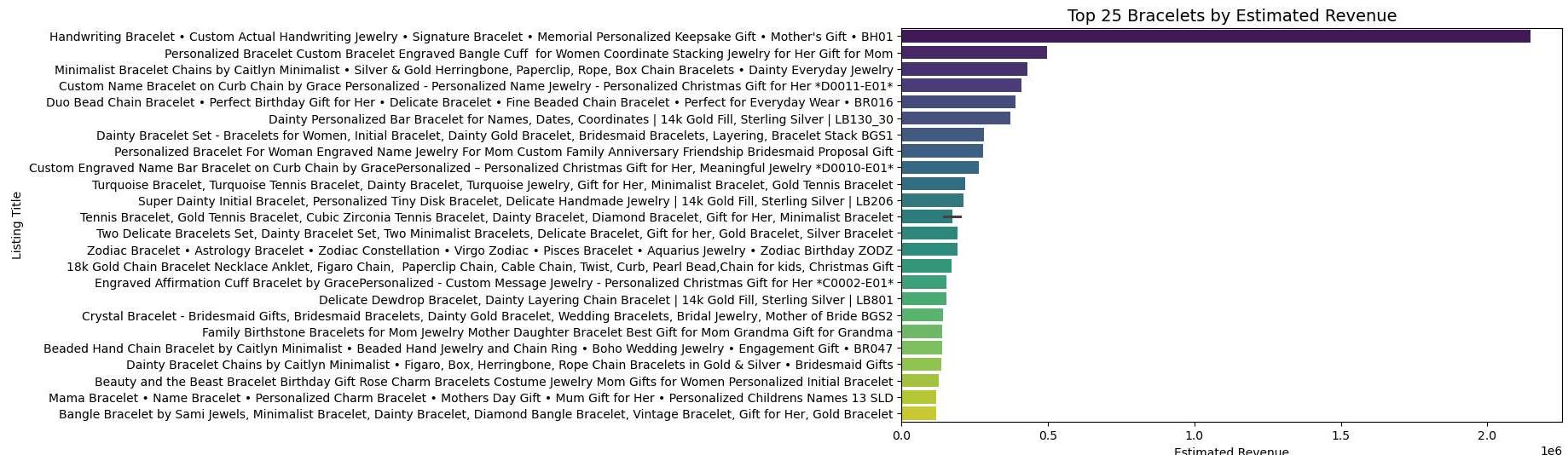
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\497374329.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

sns.barplot(data=top25_revenue, x='EST. REVENUE', y='LISTING', palette='viridis')

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\497374329.py:7: UserWarning: Tight layout not applied. The left and right margins cannot be made large enough to accommodate all axes decorations.

plt.tight_layout()



In [171...]

```
# Visualize top 25 by Daily Views
plt.figure(figsize=(10,6))
sns.barplot(data=top25_views, x='DAILY VIEWS', y='LISTING', palette='cool')
plt.title("Top 25 Bracelets by Daily Views", fontsize=14)
plt.xlabel("Daily Views")
plt.ylabel("Listing Title")
plt.tight_layout()
plt.show()
```

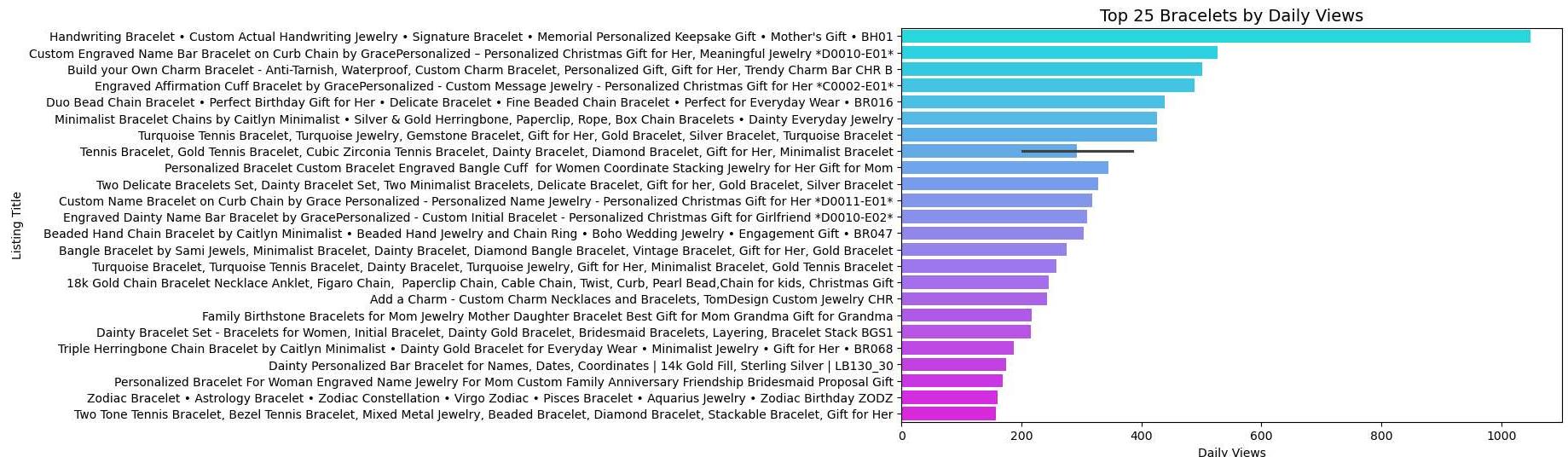
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\2118218609.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

```
sns.barplot(data=top25_views, x='DAILY VIEWS', y='LISTING', palette='cool')
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\2118218609.py:7: UserWarning: Tight layout not applied. The left and right margins cannot be made large enough to accommodate all axes decorations.

```
plt.tight_layout()
```



Rings

```
In [172...]: df_rings = df[df["LISTING"].str.contains("Ring", case=False, na=False)]
```

```
In [173...]: df_rings = df_rings.sort_values(by="EST. REVENUE", ascending=False)
```

```
In [174...]: df_rings
```

Out[174...]

		LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
453	Double Name Ring • Two Name Ring in Sterling S...	776377544	3928401.0	171971.0	63247.0	1992280.50	31.50	2039.0	1926.63	31.018637	
470	Custom Delicate Name Ring • Custom Stacking Ri...	469538833	3041275.0	139548.0	57175.0	1515137.50	26.50	3374.0	901.39	16.945762	
476	Family Necklace • Personalized Gift • Linked C...	492227219	2467103.0	96512.0	32319.0	1357398.00	42.00	3267.0	755.16	9.892562	
1	Diamond Huggie Earrings by Caitlyn Minimalist ...	945311140	1907671.0	82747.0	35864.0	950396.00	26.50	1722.0	1107.82	20.826945	
3356	Dainty Stacking Name Ring by Grace Personalize...	784021190	1427042.0	52333.0	12843.0	881286.66	68.62	2022.0	705.76	6.351632	
...
1793	16G Surgical Steel Petal Flower Daith Earring/...	4371789025	16.0	1.0	0.0	0.00	15.99	45.0	0.36	0.000000	
3727	Layering Necklace Set - 2Pcs: Disc Sequin Cha...	4392644932	11.0	2.0	0.0	0.00	45.00	9.0	1.22	0.000000	
2671	Emerald Earrings, May Birthstone, Huggie Earri...	4325035997	48.0	3.0	0.0	0.00	43.00	126.0	0.38	0.000000	
2824	Toe Ring, Adjustable Toe Ring, Foot Jewelry, B...	4390726679	15.0	5.0	0.0	0.00	28.00	6.0	2.50	0.000000	
497	Marquise Diamond Jewelry Set by Caitlyn	4392103982	0.0	1.0	0.0	0.00	59.00	4.0	0.00	0.000000	

LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	Avg_Daily_Sales
Minima...									

2055 rows × 10 columns

```
In [175... df_rings.to_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/Top10sellerrings.xlsx", index=
```

```
In [176... # Sort by Estimated Revenue (descending) and select top 25
top25_revenue = df_rings.sort_values(by='EST. REVENUE', ascending=False).head(25)

# Sort by Daily Views (descending) and select top 25
top25_views = df_rings.sort_values(by='DAILY VIEWS', ascending=False).head(25)
```

```
In [177... # Display the results
print("Top 25 Rings by Estimated Revenue:")
print(top25_revenue[['LISTING', 'EST. REVENUE', ]])

print("\nTop 25 Rings by Daily Views:")
print(top25_views[['LISTING', 'DAILY VIEWS']])
```

Top 25 Rings by Estimated Revenue:

		LISTING	EST. REVENUE
453	Double Name Ring • Two Name Ring in Sterling S...	1992280.50	
470	Custom Delicate Name Ring • Custom Stacking Ri...	1515137.50	
476	Family Necklace • Personalized Gift • Linked C...	1357398.00	
1	Diamond Huggie Earrings by Caitlyn Minimalist ...	950396.00	
3356	Dainty Stacking Name Ring by Grace Personalize...	881286.66	
49	Initial Birthstone Ring • Letter Ring by Caitl...	745127.00	
73	Memorial Handwriting Ring • Actual Handwriting...	674982.00	
78	Duo Baguette Birthstone Ring by Caitlyn Minima...	639040.50	
812	Layered Necklace Set, 3 Initial Disk Necklaces...	525616.00	
142	Huggie Earrings by Caitlyn Minimalist • Most F...	457847.00	
143	Opal Inlay Huggie Earrings Set by Caitlyn Mini...	457096.50	
159	Minimalist Birthstone Ring • Gemstone Ring in ...	429677.50	
160	Minimalist Bracelet Chains by Caitlyn Minimali...	429490.00	
162	Double Hoop Huggie Earrings by Caitlyn Minimal...	427248.00	
2425	Multi Stone Ring, Diamond Wedding Band, Marqui...	418541.00	
167	Custom Gemstone Signet Ring by Caitlyn Minimal...	402989.00	
627	Custom Engraved Stackable Rings Unique Gift fo...	354948.69	
210	Custom Baguette Gemstone Ring by Caitlyn Minim...	350658.00	
215	Hinged Huggie Earrings by Caitlyn Minimalist ...	336338.00	
225	Thin Stacking Rings • Set of 3: Midi Ring, Twi...	327600.00	
229	Dainty Engraved Flower Ring by CaitlynMinimali...	315906.50	
230	Dainty Diamond Ring Set by Caitlyn Minimalist ...	313908.00	
3606	Angel Number Necklace 444, Dainty Numerology ...	313689.00	
790	Dainty Personalized Wrap Ring, Custom Initials...	290880.00	
254	Custom Paw Print Ring • Your Actual Pet Print ...	283533.00	

Top 25 Rings by Daily Views:

		LISTING	DAILY VIEWS
453	Double Name Ring • Two Name Ring in Sterling S...	1926.63	
78	Duo Baguette Birthstone Ring by Caitlyn Minima...	1139.34	
1	Diamond Huggie Earrings by Caitlyn Minimalist ...	1107.82	
470	Custom Delicate Name Ring • Custom Stacking Ri...	901.39	
49	Initial Birthstone Ring • Letter Ring by Caitl...	881.35	
345	Mini Toi et Moi Birthstone Ring by Caitlyn Min...	866.81	
268	Emerald & Pear Cut Birthstone Ring by Caitlyn ...	828.66	
2425	Multi Stone Ring, Diamond Wedding Band, Marqui...	818.31	
167	Custom Gemstone Signet Ring by Caitlyn Minimal...	801.66	
476	Family Necklace • Personalized Gift • Linked C...	755.16	
210	Custom Baguette Gemstone Ring by Caitlyn Minim...	719.77	

3356	Dainty Stacking Name Ring by Grace Personalize...	705.76
230	Dainty Diamond Ring Set by Caitlyn Minimalist ...	686.60
143	Opal Inlay Huggie Earrings Set by Caitlyn Mini...	644.75
142	Huggie Earrings by Caitlyn Minimalist • Most F...	562.54
2493	Thin Starburst Diamond Ring, Star Setting Cele...	562.12
270	Diamond Stacking Ring Set by Caitlyn Minimalis...	547.96
257	Dangling Hoop Earrings by Caitlyn Minimalist •...	543.33
352	Agate Earring Set by Caitlyn Minimalist • Gree...	539.75
162	Double Hoop Huggie Earrings by Caitlyn Minimal...	521.57
73	Memorial Handwriting Ring • Actual Handwriting...	503.57
310	Agate Emerald Ring by Caitlyn Minimalist • Gre...	494.96
229	Dainty Engraved Flower Ring by CaitlynMinimali...	490.79
841	Green Raw Emerald Beaded Gemstone Choker Neckl...	484.10
3360	Dainty Initial Signet Ring by GracePersonalize...	478.27

In [178...]

```
# Visualize top 25 by Estimated Revenue
plt.figure(figsize=(10,6))
sns.barplot(data=top25_revenue, x='EST. REVENUE', y='LISTING', palette='viridis')
plt.title("Top 25 Rings by Estimated Revenue", fontsize=14)
plt.xlabel("Estimated Revenue")
plt.ylabel("Listing Title")
plt.tight_layout()
plt.show()
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\1436278091.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

```
sns.barplot(data=top25_revenue, x='EST. REVENUE', y='LISTING', palette='viridis')
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\1436278091.py:7: UserWarning: Tight layout not applied. The left and right margins cannot be made large enough to accommodate all axes decorations.

```
plt.tight_layout()
```



In [179...]

```
# Visualize top 25 by Daily Views
plt.figure(figsize=(10,6))
sns.barplot(data=top25_views, x='DAILY VIEWS', y='LISTING', palette='cool')
plt.title("Top 25 Rings by Daily Views", fontsize=14)
plt.xlabel("Daily Views")
plt.ylabel("Listing Title")
plt.tight_layout()
plt.show()
```

C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\3152272756.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.

```
sns.barplot(data=top25_views, x='DAILY VIEWS', y='LISTING', palette='cool')
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\3152272756.py:7: UserWarning: Tight layout not applied. The left and right margins cannot be made large enough to accommodate all axes decorations.
plt.tight_layout()
```



Top 50 best seller items

```
In [180]: df = df.sort_values(by="EST. REVENUE", ascending=False)
```

```
In [181]: df.head(50)
```

Out[181...]

		LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
326	Personalized Name Necklace by Caitlyn Minimalist ...	990762977	4602193.0	120765.0	60288.0	2532096.00	42.00	1673.0	2750.86	36.035864	
327	Personalized Name Necklace by Caitlyn Minimalist ...	990762977	4602193.0	120765.0	60288.0	2532096.00	42.00	1673.0	2750.86	36.035864	
339	Handwriting Bracelet • Custom Actual Handwriti...	209384686	4209479.0	187154.0	58090.0	2149330.00	37.00	4012.0	1049.22	14.479063	
453	Double Name Ring • Two Name Ring in Sterling S...	776377544	3928401.0	171971.0	63247.0	1992280.50	31.50	2039.0	1926.63	31.018637	
470	Custom Delicate Name Ring • Custom Stacking Ri...	469538833	3041275.0	139548.0	57175.0	1515137.50	26.50	3374.0	901.39	16.945762	
3582	18K Gold Chain Necklace, Cable Chain, Papercli...	1022193192	2941945.0	70801.0	55308.0	1493316.00	27.00	1602.0	1836.42	34.524345	
476	Family Necklace • Personalized Gift • Linked C...	492227219	2467103.0	96512.0	32319.0	1357398.00	42.00	3267.0	755.16	9.892562	
897	Personalized Jewelry Gift for Mom from Husband...	276448272	2014434.0	84711.0	21554.0	1077700.00	50.00	3489.0	577.37	6.177701	
484	Letter Necklace by Caitlyn Minimalist • Name N...	870847843	2094578.0	65474.0	28905.0	1069485.00	37.00	1869.0	1120.69	15.465490	
1	Diamond Huggie Earrings by Caitlyn Minimalist ...	945311140	1907671.0	82747.0	35864.0	950396.00	26.50	1722.0	1107.82	20.826945	

		LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
3356	Dainty Stacking Name Ring by Grace Personalize...	784021190	1427042.0	52333.0	12843.0	881286.66	68.62	2022.0	705.76	6.351632	
513	Custom Birthstone Necklace for Mom Push Gift f...	656895401	1641572.0	47894.0	26429.0	811634.59	30.71	2546.0	644.77	10.380597	
49	Initial Birthstone Ring • Letter Ring by Caitl...	974677317	1495647.0	67373.0	28118.0	745127.00	26.50	1697.0	881.35	16.569240	
3581	Heart Locket Necklace with Photo, Big Heart Lo...	1597028497	1355750.0	52579.0	21827.0	742118.00	34.00	738.0	1837.06	29.575881	
901	Raw Crystal Necklace, Rose quartz, Carnelian C...	462945859	1281500.0	67186.0	14737.0	692639.00	47.00	3414.0	375.37	4.316637	
73	Memorial Handwriting Ring • Actual Handwriting...	633417265	1330936.0	45900.0	21428.0	674982.00	31.50	2643.0	503.57	8.107454	
78	Duo Baguette Birthstone Ring by Caitlyn Minima...	1312706604	1260109.0	43030.0	20287.0	639040.50	31.50	1106.0	1139.34	18.342676	
3435	Personalized Letter Name Necklace by GracePers...	697558243	1076383.0	33483.0	5381.0	543104.33	100.93	2398.0	448.87	2.243953	
116	Dainty Initial Tag Necklace by Caitlyn Minimal...	1303426333	1017888.0	38257.0	13334.0	533360.00	40.00	1142.0	891.32	11.676007	
812	Layered Necklace Set, 3 Initial Disk Necklaces...	228368305	691764.0	20657.0	3458.0	525616.00	152.00	3862.0	179.12	0.895391	
568	Personalized Bracelet Custom Bracelet	546098844	1020312.0	28768.0	21120.0	497798.40	23.57	2956.0	345.17	7.144790	

	LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	Avg_Daily_Sales
Engraved...										
3357	Custom Name Necklace on Curb Chain by GracePer...	746893509	802584.0	26237.0	4012.0	486455.00	121.25	2202.0	364.48	1.821980
142	Huggie Earrings by Caitlyn Minimalist • Most F...	845499603	1078959.0	38968.0	22334.0	457847.00	20.50	1918.0	562.54	11.644421
143	Opal Inlay Huggie Earrings Set by Caitlyn Mini...	1136507412	901363.0	45797.0	14511.0	457096.50	31.50	1398.0	644.75	10.379828
155	Marquise Diamond Necklace by CaitlynMinimalist...	1028655767	803992.0	51236.0	11095.0	438252.50	39.50	1610.0	499.37	6.891304
159	Minimalist Birthstone Ring • Gemstone Ring in ...	727001267	965487.0	40637.0	19985.0	429677.50	21.50	2274.0	424.58	8.788478
160	Minimalist Bracelet Chains by Caitlyn Minimali...	882615239	787772.0	32115.0	14810.0	429490.00	29.00	1847.0	426.51	8.018408
162	Double Hoop Huggie Earrings by Caitlyn Minimal...	992281232	860065.0	48271.0	11868.0	427248.00	36.00	1649.0	521.57	7.197089
845	Custom Raw Birthstone Necklace, Mother of 3 Un...	606677047	725635.0	28261.0	9505.0	420121.00	44.20	2763.0	262.63	3.440101
2425	Multi Stone Ring, Diamond Wedding Band, Marqui...	1464552200	738118.0	26864.0	7897.0	418541.00	53.00	902.0	818.31	8.754989
521	Custom Necklace Engraved Necklace	258992801	793943.0	17190.0	14926.0	415838.36	27.86	3616.0	219.56	4.127765

	LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	Avg_Daily_Sales
Personalized...										
166	Dainty Mama Necklace by Caitlyn Minimalist in ...	880526189	808737.0	41442.0	11160.0	412920.00	37.00	1851.0	436.92	6.029173
3346	Custom Name Bracelet on Curb Chain by Grace Pe...	790069466	638791.0	30203.0	4216.0	408994.16	97.01	2009.0	317.96	2.098556
167	Custom Gemstone Signet Ring by Caitlyn Minimal...	1440453774	750358.0	98368.0	9829.0	402989.00	41.00	936.0	801.66	10.501068
190	Duo Bead Chain Bracelet • Perfect Birthday Gif...	1016875279	715585.0	34916.0	9875.0	390062.50	39.50	1631.0	438.74	6.054568
651	Custom Dog Mom Necklace, Pet Memorial Gift for...	646479493	940288.0	45563.0	21344.0	387180.16	18.14	2589.0	363.19	8.244110
684	Personalized Disk Necklace, Custom Tiny Initia...	594352062	646467.0	15582.0	4589.0	385476.00	84.00	2750.0	235.08	1.668727
202	Teardrop Diamond Necklace by Caitlyn Minimalis...	959976583	745128.0	28546.0	11996.0	377874.00	31.50	1721.0	432.96	6.970366
719	Dainty Personalized Bar Bracelet for Names, Da...	237685641	661685.0	56477.0	5028.0	372072.00	74.00	3782.0	174.96	1.329455
3590	Cross Necklace, Dainty Cross Necklace, Crystal...	800398511	696269.0	17650.0	9608.0	365104.00	38.00	2016.0	345.37	4.765873
205	Baguette Diamond Necklace in Gold, Rose Gold, ...	839300908	711071.0	24386.0	11448.0	360612.00	31.50	1903.0	373.66	6.015765

		LISTING	LISTING ID	TOTAL VIEWS	FAVORITES	EST. SALES	EST. REVENUE	PRICE	LISTING AGE	DAILY VIEWS	AVG_DAILY_SALES
837	Delicate Gemstone Choker, Labradorite Beaded N...	657639443	653209.0	31374.0	10516.0	357544.00	34.00	2550.0	256.16	4.123922	
627	Custom Engraved Stackable Rings Unique Gift fo...	561253977	827994.0	29902.0	17139.0	354948.69	20.71	2950.0	280.68	5.809831	
209	Initial Pendant Necklace by Caitlyn Minimalist...	1198420247	648334.0	36737.0	8947.0	353406.50	39.50	1320.0	491.16	6.778030	
210	Custom Baguette Gemstone Ring by Caitlyn Minim...	1454235998	660029.0	30121.0	10626.0	350658.00	33.00	917.0	719.77	11.587786	
838	Family Charm Necklace, Custom Birthstone Initi...	489997879	654177.0	25846.0	6999.0	349950.00	50.00	3283.0	199.26	2.131892	
925	Crystal Birthstone Necklace for Mom, Personalized...	475841344	651195.0	20296.0	6967.0	348350.00	50.00	3287.0	198.11	2.119562	
213	Linked Pendant Necklace by Caitlyn Minimalist ...	885934521	680913.0	37820.0	9396.0	347652.00	37.00	1840.0	370.06	5.106522	
3598	14k Gold Tiny Initial Tag Necklace by Babeina,...	1475138314	616472.0	19457.0	9925.0	343405.00	34.60	893.0	690.34	11.114222	
215	Hinged Huggie Earrings by Caitlyn Minimalist •...	902097645	675148.0	34045.0	12692.0	336338.00	26.50	1812.0	372.60	7.004415	

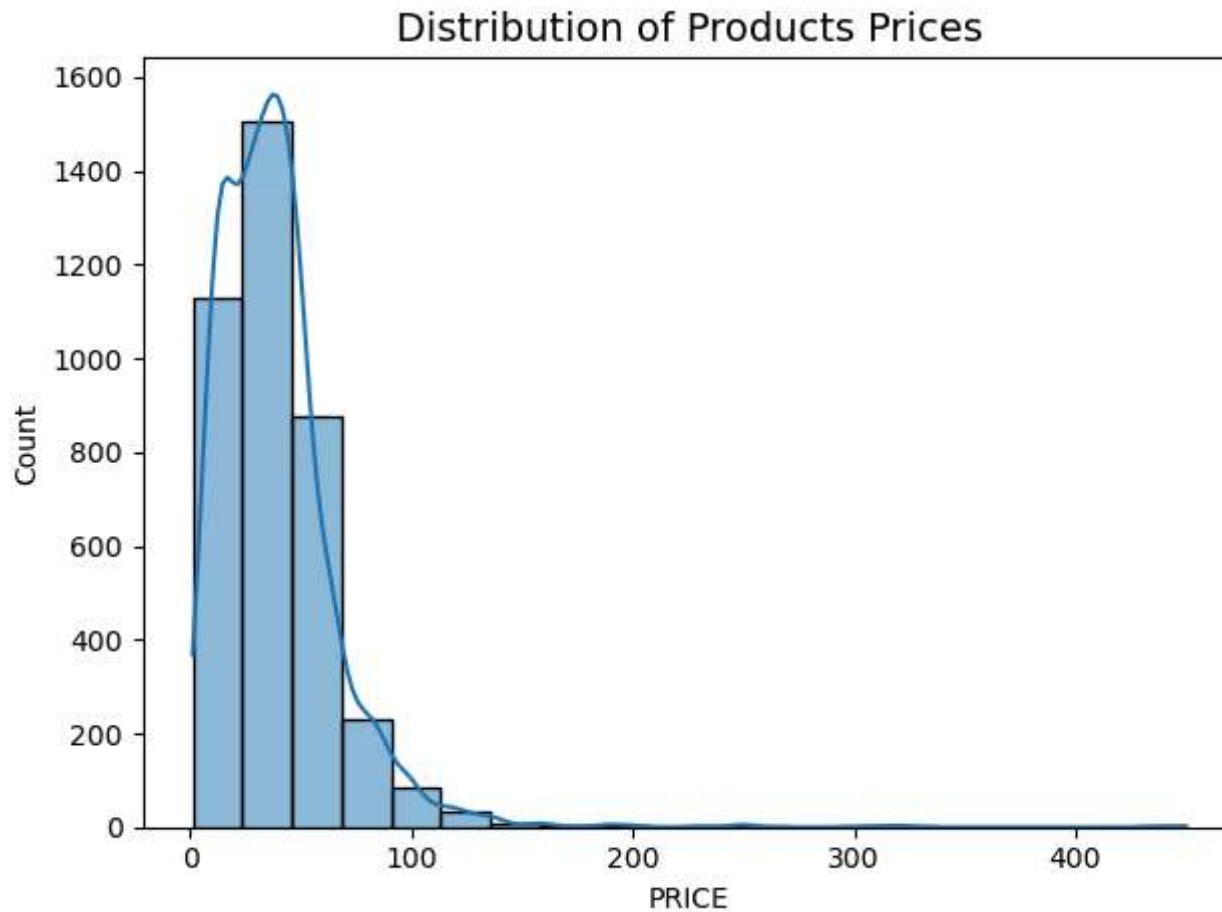
In [182]:

```
df.to_excel("C:/2024 2025 SETON HALL/Fall 2025/Data Analytics in Accounting/Final Project/Top10sellerTop50BestSellerItems.xlsx")
```

4.2 Distribution of products prices

In [183...]

```
sns.histplot(df['PRICE'], bins=20, kde=True)
plt.title("Distribution of Products Prices", fontsize=14)
plt.tight_layout()
plt.show()
```



Findings:

The majority of products are priced in a moderate range, with a dense cluster in lower to mid-price points. There is a long tail of higher-priced items, but these are less frequent.

Implication:

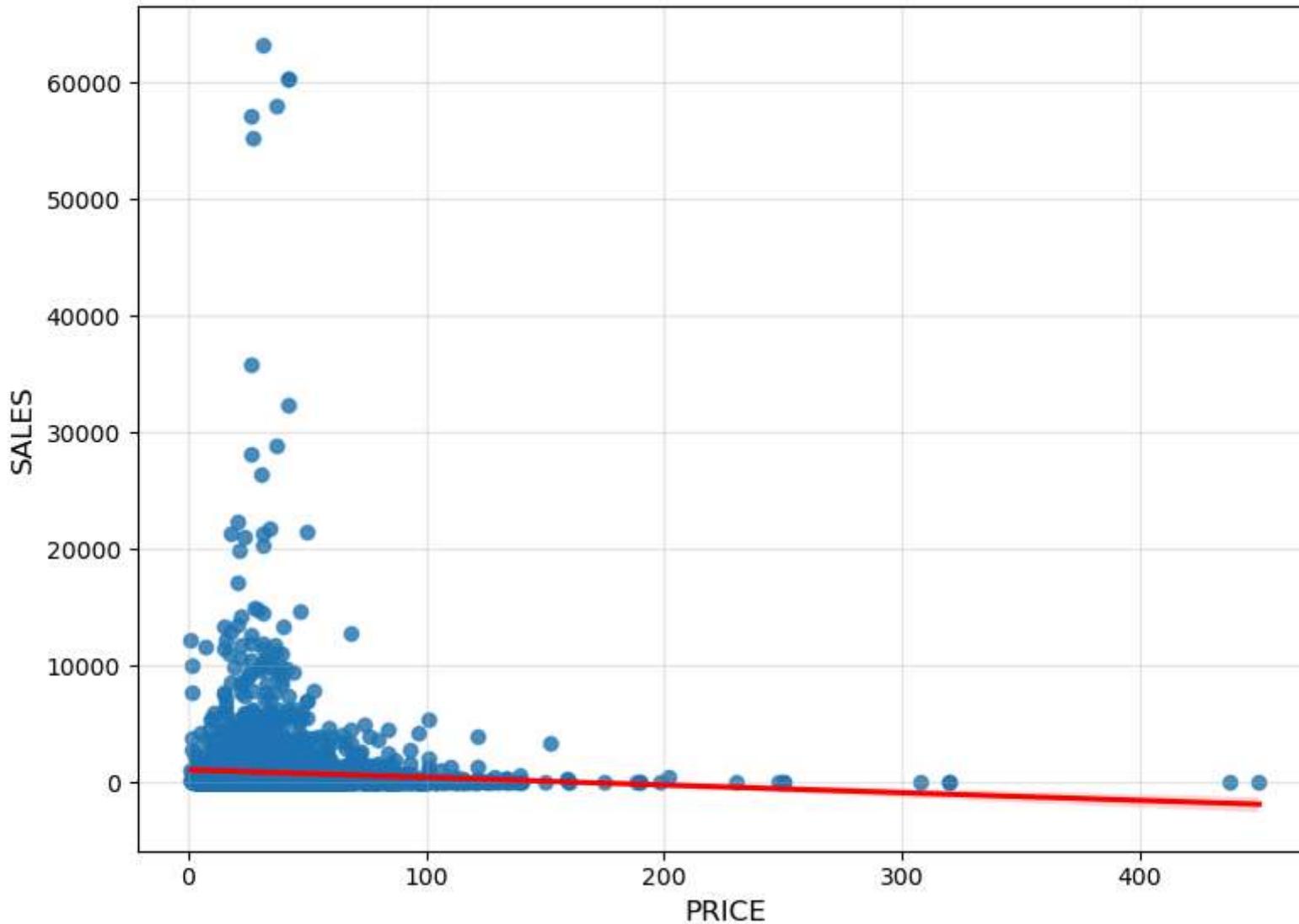
The market is competitive in mid-price segments. Extreme high price points are less common and likely require strong differentiation (e.g., fine materials, solid gold, or high-end customization).

4.3 Price vs. sales relationship (scatter + regression)

To explore how price affects sales, a scatter plot and regression line were created:

```
In [184...]:  
plt.figure(figsize=(8,6))  
sns.scatterplot(data=df, x=df["PRICE"], y=df["EST. SALES"], color='steelblue', alpha=0.6)  
  
sns.regplot(data=df, x=df["PRICE"], y=df["EST. SALES"], scatter_kws={'alpha':0.6}, line_kws={'color':'red'})  
  
plt.title("Price vs. Sales Scatter Plot", fontsize=16)  
plt.xlabel("PRICE", fontsize=12)  
plt.ylabel("SALES", fontsize=12)  
plt.grid(alpha=0.3)  
plt.tight_layout()  
plt.show()
```

Price vs. Sales Scatter Plot



```
In [185]:  
from sklearn.linear_model import LinearRegression  
  
X = df[["PRICE"]].values  
y = df["EST. SALES"].values
```

```
model = LinearRegression()
model.fit(X, y)

print("Slope (change in sales per $1 price):", model.coef_[0])
print("Intercept:", model.intercept_)
print("R^2:", model.score(X, y))
```

```
Slope (change in sales per $1 price): -6.583023596568647
```

```
Intercept: 1112.0065626300889
```

```
R^2: 0.0034503689370892765
```

Interpretation:

There is no strong linear relationship between price and estimated sales across all listings. Successful products exist at various price points; other factors such as design, personalization, photos, and reviews likely play more important roles than price alone.

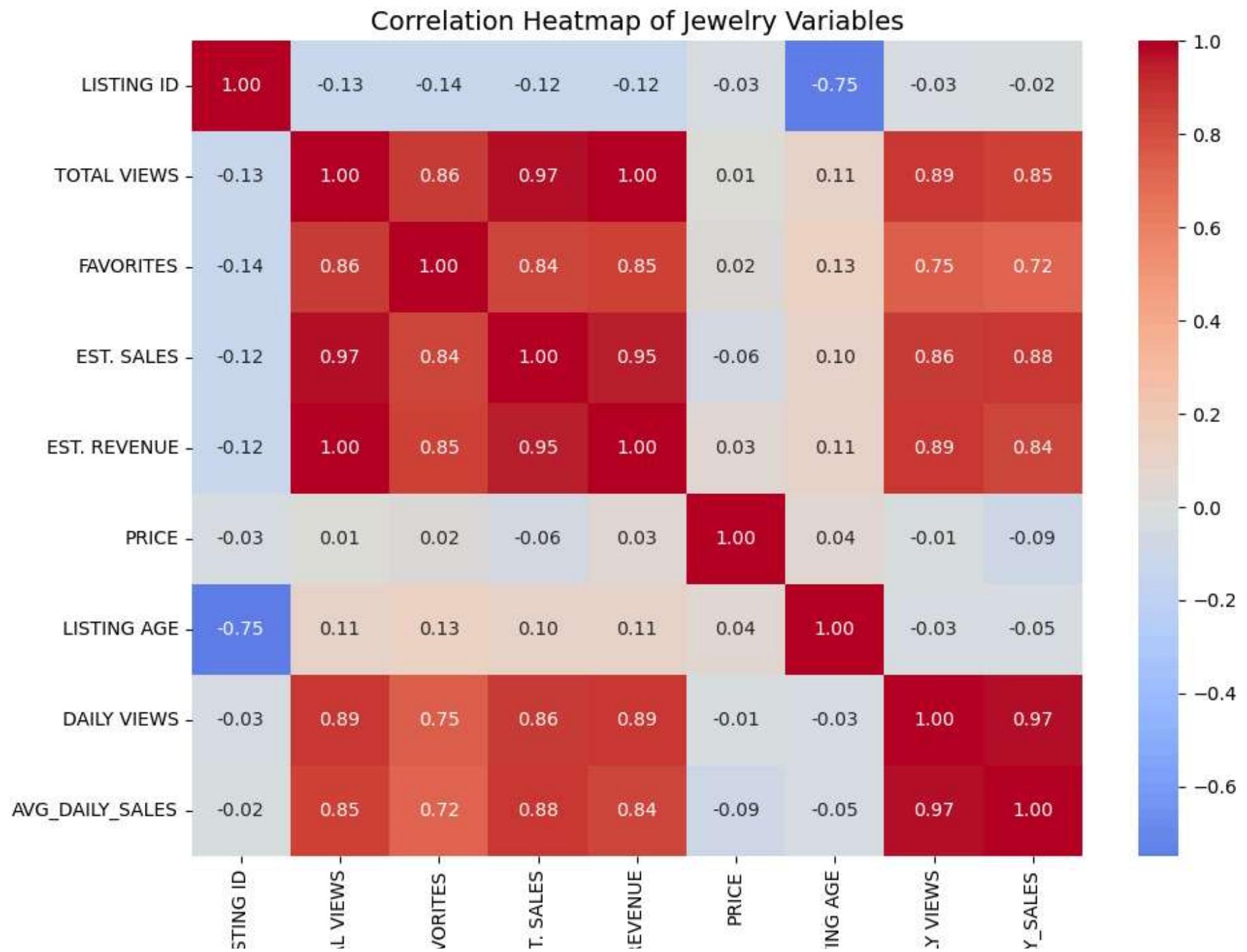
4.4 Correlation Analysis of Reviews, Favorites, and Sales

A correlation matrix of numeric variables was computed and visualized via heatmap:

```
In [186...]: corr_matrix = df.corr(numeric_only=True)

plt.figure(figsize=(10, 8))
sns.heatmap(corr_matrix,
            annot=True,
            fmt=".2f",
            cmap='coolwarm',
            center=0)

plt.title('Correlation Heatmap of Jewelry Variables', fontsize=14)
plt.tight_layout()
plt.show()
```





High-level patterns:

EST. SALES and EST. REVENUE are, as expected, very strongly positively correlated. TOTAL VIEWS, FAVORITES, and DAILY VIEWS show moderate to strong positive correlations with EST. SALES and EST. REVENUE. PRICE has weak correlation with sales and revenue, supporting the regression result.

Insight:

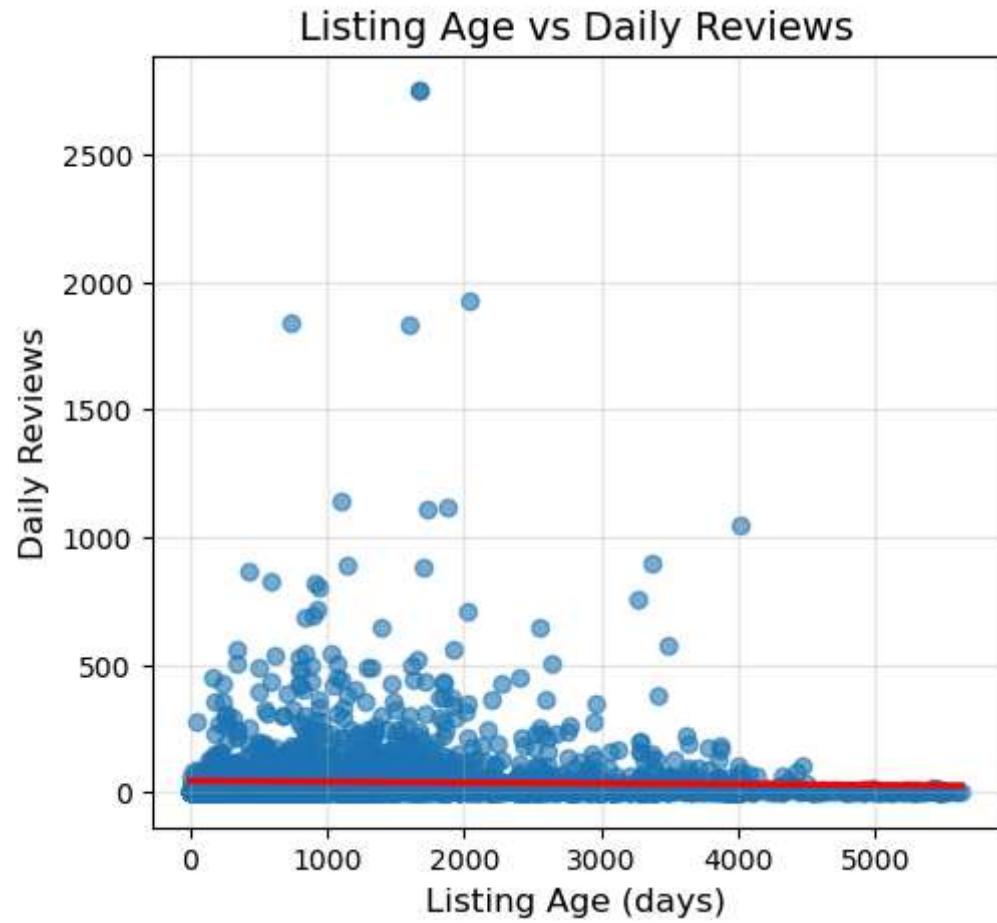
Customer engagement metrics (views and favorites) are more predictive of sales and revenue than price. Driving traffic and favorites is critical.

4.6 Listing Age and Daily Activity (Life Cycle)

To understand product life cycles, LISTING AGE was compared with DAILY VIEWS:

```
In [187]: plt.figure(figsize=(12,5))

# Listing Age vs Daily Reviews
plt.subplot(1,2,1)
sns.regplot(data=df, x=df["LISTING AGE"], y=df["DAILY VIEWS"],
            scatter_kws={'alpha':0.6}, line_kws={'color':'red'})
plt.title("Listing Age vs Daily Reviews", fontsize=14)
plt.xlabel("Listing Age (days)", fontsize=12)
plt.ylabel("Daily Reviews", fontsize=12)
plt.grid(alpha=0.3)
```



Observations:

The relationship between listing age and daily views is not purely monotonic: Some older listings still receive substantial daily views, especially established best-sellers. Many newer listings have low daily views until they gain traction through reviews and social proof.

Implication:

Successful products can maintain high engagement over long periods, but new listings require initial exposure and possibly promotion or differentiation to reach that level.

4.7 Best-selling categories (earrings / necklaces / bracelets / rings)

In [188...]

```
def label_category(name):
    name = str(name).lower()
    if "earring" in name:
        return "Earrings"
    if "necklace" in name:
        return "Necklaces"
    if "bracelet" in name:
        return "Bracelets"
    if "ring" in name:
        return "Rings"
    return "Other"

df["CATEGORY"] = df["LISTING"].apply(label_category)

category_sales = (
    df
    .groupby("CATEGORY", as_index=False)
    .agg(
        TotalRevenue=("EST. REVENUE", "sum"),
        TotalSales=("EST. SALES", "sum"),
        AvgPrice=("PRICE", "mean"),
        NumListings=("LISTING ID", "count"),
    )
    .sort_values("TotalRevenue", ascending=False)
)

print(category_sales)
```

	CATEGORY	TotalRevenue	TotalSales	AvgPrice	NumListings
2	Necklaces	51202261.34	1317333.0	49.714490	1274
4	Rings	25371508.40	771417.0	38.085945	688
1	Earrings	17234398.13	721345.0	30.322716	1064
0	Bracelets	12867780.35	346545.0	46.948454	427
3	Other	2478356.49	177036.0	20.580571	438

In [189...]

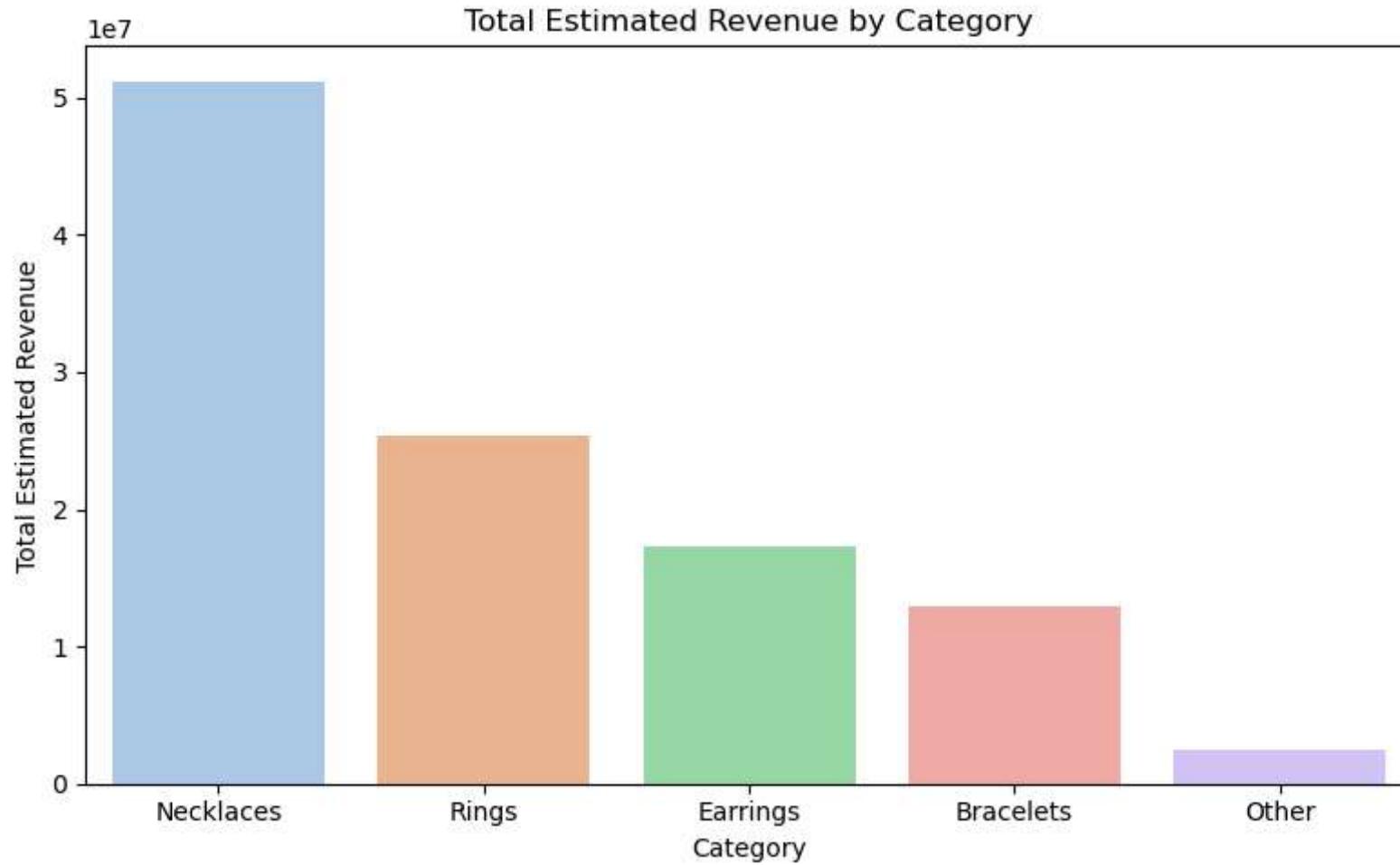
```
plt.figure(figsize=(8,5))
sns.barplot(
```

```
    data=category_sales,
    x="CATEGORY",
    y="TotalRevenue",
    palette="pastel"
)
plt.title("Total Estimated Revenue by Category")
plt.xlabel("Category")
plt.ylabel("Total Estimated Revenue")
plt.tight_layout()
plt.show()
```

```
C:\Users\mingyue_jiang\AppData\Local\Temp\ipykernel_36204\47076162.py:2: FutureWarning:
```

```
Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same effect.
```

```
sns.barplot(
```



A bar chart of Total Estimated Revenue by Category shows that:

Necklaces generate the highest total revenue and have the largest number of listings. Rings and Earrings also contribute significantly. Bracelets have fewer listings but relatively high average prices.

Insight:

Focusing on necklaces provides access to the largest revenue pool, but rings and earrings are also attractive categories with substantial demand.

4.8 Machine Learning (multivariate regression)

In [204...]

```
import pandas as pd
import numpy as np

from sklearn.model_selection import train_test_split

# Keep only the columns we need and drop rows with missing values
model_df = df[[
    "EST. SALES",
    "TOTAL VIEWS",
    "FAVORITES",
    "LISTING AGE",
    "PRICE"
]].dropna()

X = model_df[["TOTAL VIEWS", "FAVORITES", "LISTING AGE", "PRICE"]]
y = model_df["EST. SALES"]
```

In [205...]

```
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42)
```

In [206...]

```
from sklearn.linear_model import LassoCV
lasso_cv = LassoCV(cv=5, max_iter=10000).fit(X_train, y_train)
print("Best alpha:", lasso_cv.alpha_)

lasso = Lasso(alpha=lasso_cv.alpha_, max_iter=100000).fit(X_train, y_train)

# Print coefficients and intercept
print("lasso.coef_:", lasso.coef_)
print("lasso.intercept_:", lasso.intercept_)

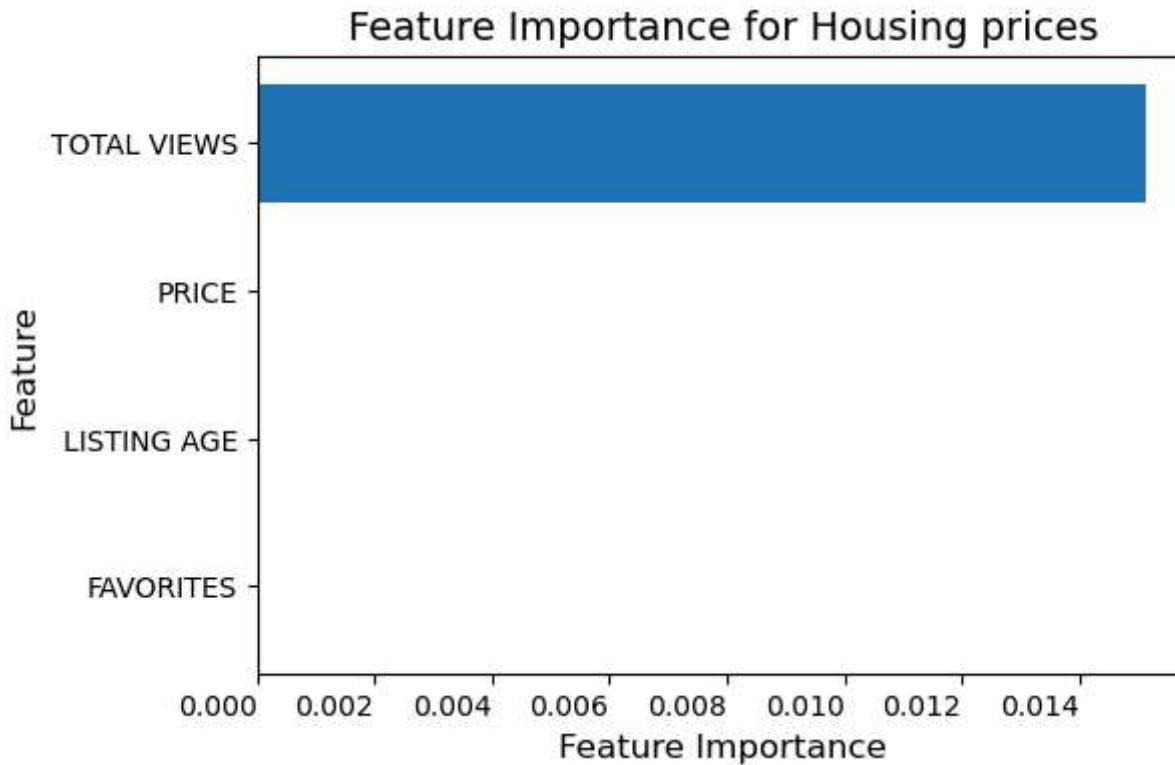
# Print training and test scores
print("Training set Score:", lasso.score(X_train, y_train))
print("Test set Score:", lasso.score(X_test, y_test))
```

```
Best alpha: 614041.10190909
lasso.coef_: [ 0.01511927  0.         -0.         -0.         ]
lasso.intercept_: 30.276912466343447
Training set Score: 0.9404044800082063
Test set Score: 0.9293275359265339
```

```
In [208]: importance_df = pd.DataFrame({'Feature': X.columns, 'Importance': abs(lasso.coef_)}).sort_values(by='Importance', ascending=False)
print(importance_df)

# Plot in ascending order
plt.figure(figsize=(6, 4))
plt.barh(importance_df['Feature'], importance_df['Importance'])
plt.xlabel("Feature Importance", fontsize=12)
plt.ylabel("Feature", fontsize=12)
plt.xticks(ha='right', fontsize=10)
plt.yticks(ha='right', fontsize=10)
plt.title("Feature Importance for Housing prices", fontsize=14)
plt.show()
```

	Feature	Importance
1	FAVORITES	0.000000
2	LISTING AGE	0.000000
3	PRICE	0.000000
0	TOTAL VIEWS	0.015119



Finding:

views are the dominant driver of estimated sales; the other features contribute very little in this regularized model.

5. Key Findings and Business Implications

5.1 Market-Level

Concentrated Sales Distribution

A relatively small number of shops (top 62) generate about 80% of total market sales. New entrants must be prepared to compete against well-established, high-performance shops.

Store Age Matters, But Is Not Everything

Older shops generally have higher total sales, but: Several younger shops achieve high efficiency (sales per year). New sellers can still succeed if they quickly reach high sales density.

High-Growth “Benchmark” Shops

Top shops by Sales Density (e.g., CaitlynMinimalist, MignonandMignon) represent growth benchmarks: New shops can compare their own first-year performance against these benchmarks.

5.2 Product-Level

Necklaces Lead in Total Revenue

Necklaces are the dominant revenue category, followed by rings and earrings. Bracelets comprise fewer listings yet maintain relatively high average prices, implying possible higher margins.

Personalization is a Major Success Driver

Top listings across categories frequently include personalized features: Name/initial jewelry Birthstones Custom engravings/handwriting

Price Alone Does Not Determine Success

Price vs. sales shows weak linear correlation and very low R². Effective offerings exist from low to high price points; value perception and engagement matter more than raw price.

Engagement (Views/Favorites) Strongly Correlates with Sales

Listings with higher TOTAL VIEWS, DAILY VIEWS, and FAVORITES tend to achieve higher sales and revenue. Investment in photography, SEO, and marketing that boosts views and favorites is likely to pay off more than small price adjustments. Product Life Cycle

Some long-standing listings maintain high daily views and continue to generate strong revenue over time. However, many listings remain low-traffic, suggesting that continuous optimization and testing of titles, images, and tags is necessary.

6. Recommendations

For New Sellers:

Consider entering necklaces, rings, or earrings with a strong focus on personalization. Benchmark your early sales against the Sales Density of efficient shops to gauge performance. Focus on increasing views and favorites through high-quality photos, SEO-friendly titles, and marketing rather than competing only on price.

For Existing Shops:

Identify current listings with good engagement but moderate revenue and explore: Slight price optimization, Improved description and photos, Bundling or upsell strategies. Double down on product types (e.g., personalized name jewelry) that are consistently present among market leaders.

For Further Analysis:

Incorporate review ratings (if available) to better understand quality and trust effects. Segment results by price tiers or material types (e.g., gold-filled vs. sterling silver) to refine positioning strategies.

In []: