Business Case: Aerofit - Descriptive Statistics & Probability

About Aerofit

Aerofit is a leading brand in the field of fitness equipment. Aerofit provides a product range including machines such as treadmills, exercise bikes, gym equipment, and fitness accessories to cater to the needs of all categories of people.

Summary of Datasets

Jupiter Notebook Link: https://drive.google.com/file/d/1J_arhrnRfHegpBPSX5jHkf9JPlgZ-7vw/view?usp=sharing

Shape: (180,9)-> 180 unique contents, each with 9 columns providing various details about it.

Columns:

Product Purchased:	KP281, KP481, or KP781
Age:	In years
Gender:	Male/Female
Education:	In years
MaritalStatus:	Single or partnered
Usage:	The average number of times the customer plans to use the treadmill each week.
Income:	Annual income (in $)
Fitness:	Self-rated fitness on a 1-to-5 scales, where 1 is the poor shape and 5 is the excellent shape.
Miles:	The average number of miles the customer expects to walk/run each week.

Datatype and No. of Nulls in each column:

#	Column	Non Null Count	Dtype	New Dtype
0	Product	180 non null	object	category
1	Age	180 non null	int64	int64
2	Gender	180 non null	object	category
3	Education	180 non null	int64	int64
4	MaritalStatus	180 non null	object	category
5	Usage	180 non null	int64	int64
6	Fitness	180 non null	int64	int64
7	Income	180 non null	int64	int64
8	Miles	180 non null	int64	int64

No. of Unique Values in each column:

Product	3
Age	32
Gender	2
Education	8
MaritalStatus	2
Usage	6
Fitness	5
Income	62
Miles	37

Since unique element of Product, Gender and MaritalStatus are 3,2 and 2 respectively, the data type of these columns was converted from object to category to improve memory efficiency and query speed.

Product Portfolio:
- The KP281 is an entry-level treadmill that sells for $1,500.
- The KP481 is for mid-level runners that sell for $1,750.
- The KP781 treadmill is having advanced features that sell for $2,500.

Distribution of 3 types of Treadmill:
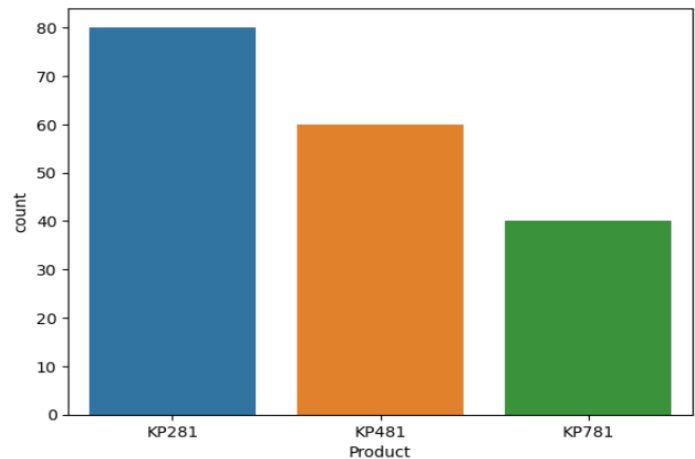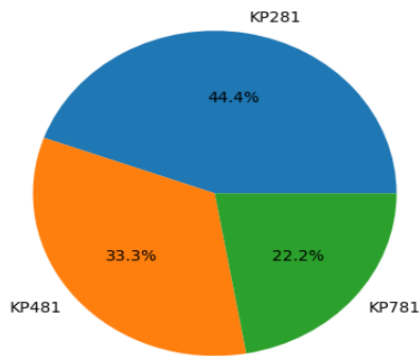
We can observe from the entire dataset that people were bought,

1. Low- level Treadmill – 44.4% (80 Treadmills)
2. Medium-level Treadmill – 33.3% (60 Treadmills)
3. High-level Treadmill – 22.2% (40 Treadmills)

Statistically, the likelihood of a random person picking the treadmill is as follows:

1. Low- level Treadmill ~ 0.44
2. Medium-level Treadmill ~ 0.33
3. High-level Treadmill ~ 0.22

## Univariate Analysis:
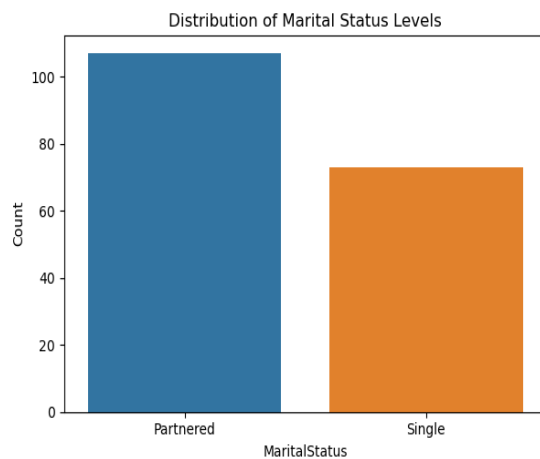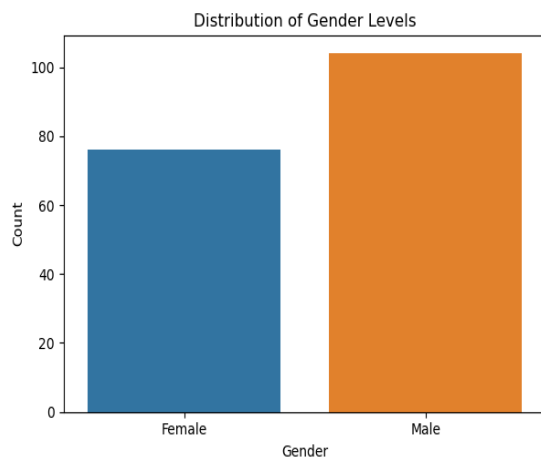
Insights:

- Males are slightly more interested in buying treadmills than females. But this does not imply that females are uninterested.
- Similarly, those in the Partnered status purchased more treadmills than those who are single.

With this, we can say that probability of buying treadmill by a

- Female is 0.42 i.e. 42%
- Male is 0.58 i.e. 58%

And probability of buying treadmill by a

- Partnered is 0.59 i.e. 59%
- Single is 0.41 i.e. 41%
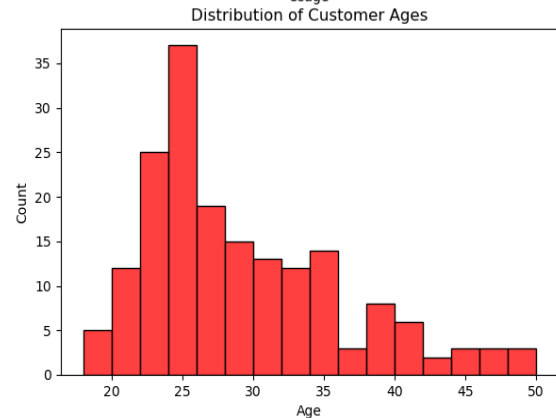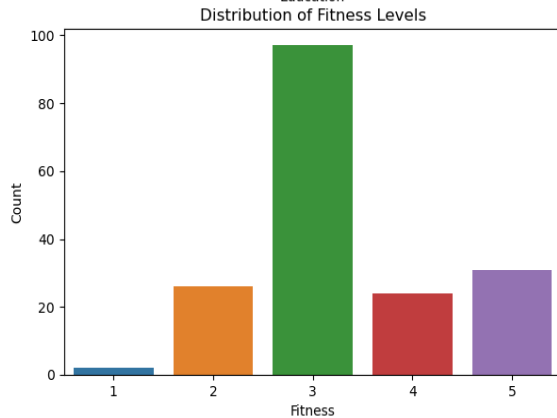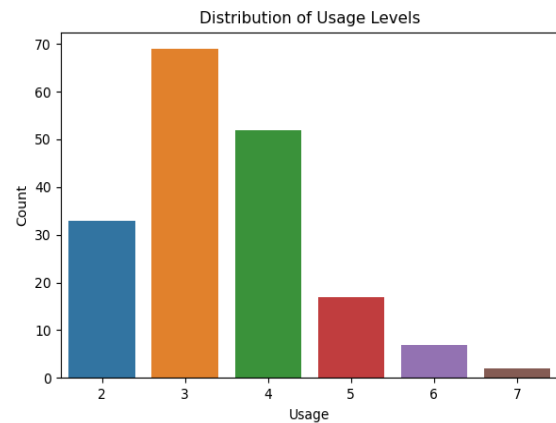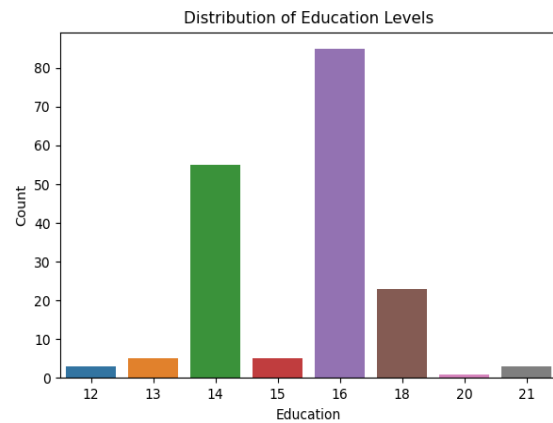
Insights:

- We could see that people with education levels 14 and 16 purchased more treadmills than others. People with an education level of 20 are extremely unlikely to purchase treadmills.
- The distribution of usage levels is skewed to the left, with more likely values ranging from 2 to 5 than 6 and 7. More buyers planned to use the treadmill for 3 to 4 days per week. People are unlikely to use treadmill of 1 day.
- We can't find value 1 on the x axis of the usage distribution plot. It states no one wants to buy a treadmill merely to utilize it for one day.
- The Distribution of Fitness Levels plot shows that those with average fitness, i.e. 3, are more likely to purchase a treadmill, whereas those with low fitness, i.e. 1, are less likely to purchase any products.
- People with good fitness i.e. 5 also preferred to buy treadmill. People with Fitness level 2 and 4 are almost equally distributed.
- When it comes to people's ages, the data was skewed to the left, with more people likely to buy between the ages of 23 and 26. The normal age range is 18 to 50.
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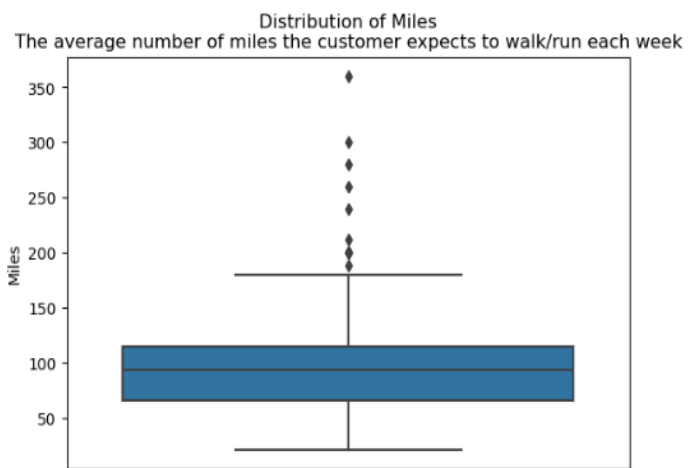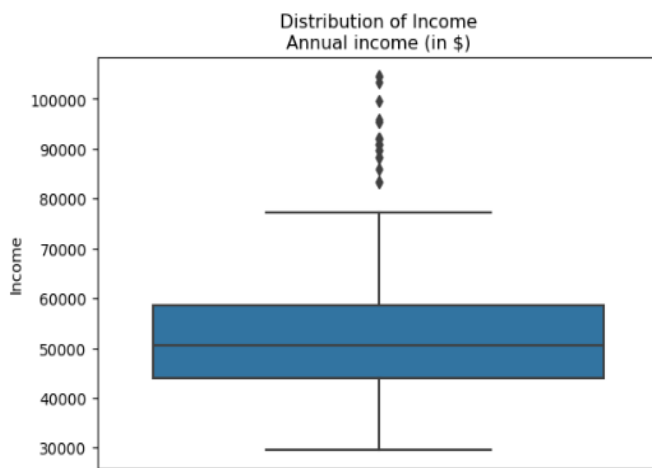
Insights:

Based on the distribution of income plots, we observe that,

     Mean: $53719.57

     Std: $16506.68

     Min: $29562

     25%: $44058.75

     50%: $50596.50

     75%: $58668

     Max: $104581

     IQR: $14609.25

Similarly, based on the distribution of miles plots, we observe that,

     Mean: 103.194444 mi

     Std: 51.86 mi

     Min: 21 mi

     25%: 66 mi

     50%: 94 mi

     75%: 114.75mi

     Max: 360 mi

     IQR: 48.75 mi

Bivariate and Multivariate Analysis:

Marital Status Distribution for Each Product
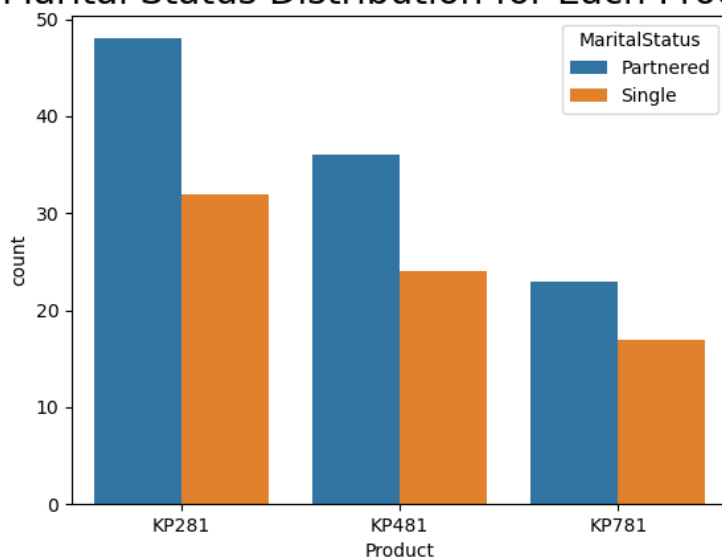
MaritalStatus	Partnered	Single	All
Product			
KP281	48	32	80
KP481	36	24	60
KP781	23	17	40
All	107	73	180

Insights:

- Here, we can observe that those with Partnered status purchased over 19% more treadmills than singles.
- Even though low-level treadmills sold more, the number of mid-level treadmills purchased by partners is 2.2% higher than the number of low-level treadmills purchased by singles.
- Probability of buying Advance treadmill by single is less compared to others. i.e. 9.4%

Product-wise Gender Comparison of Avg Miles expect to walk/run each week
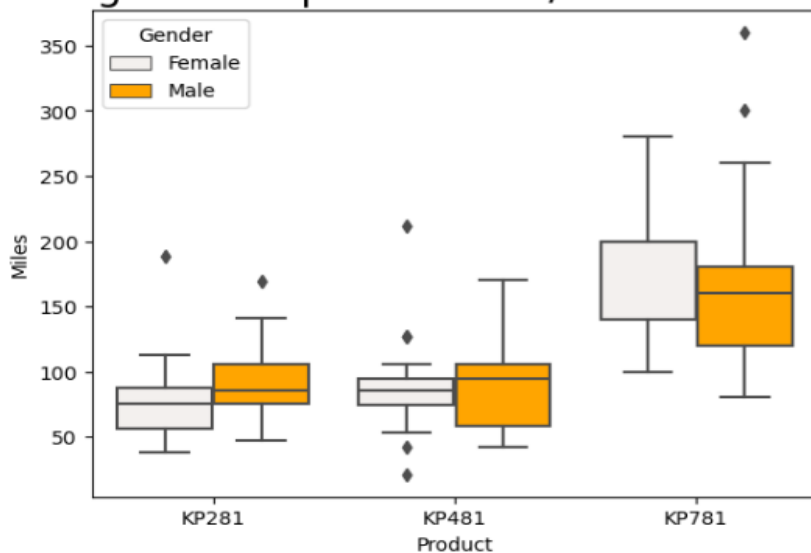
Gender	Female	Male	All
MaritalStatus			
Partnered	46	61	107
Single	30	43	73
All	76	104	180

Insights:

- According to the table above, men are more likely than women to purchase treadmills. 57.8 and 42.2%, respectively. Similarly, partnered status contributes far more than single status. 59.4% and 49.6%, respectively.
- Females with an average mileage of 27-125 (approximate) prefer low and mid-level treadmills, while those with an average mileage of 100-300 (approximate) prefer advanced treadmills.
- Almost KP281 and KP481 are in the same range. If we look closely, we can observe that most male buyers purchased KP481, even for a low average mile.
- The median values for male buyers in KP281 and female buyers in KP481 were the same.

Relationship Between Age and Income, by Product
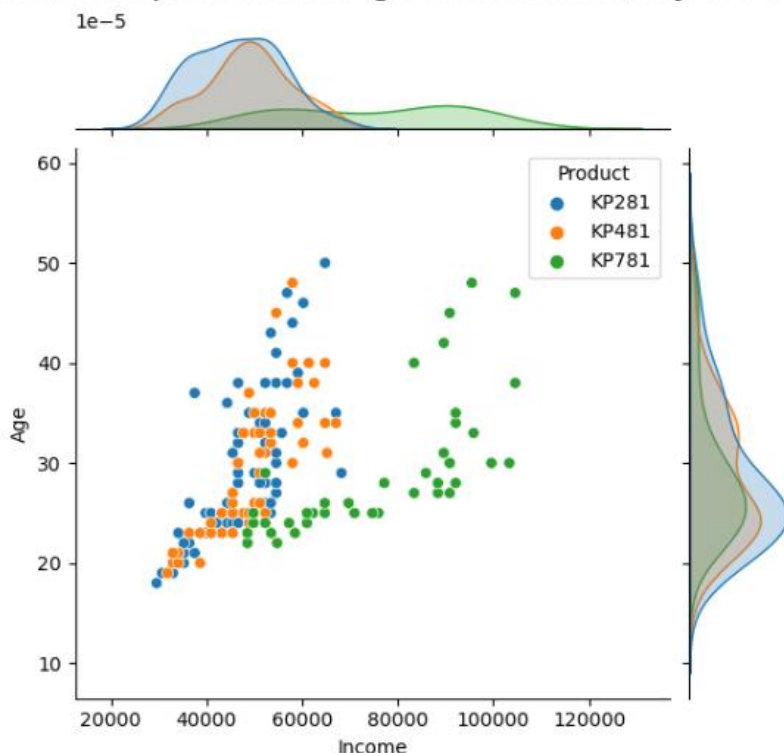
Table 1:

Age_catagory	0-20	21-30	31-40	41-50	All
Gender					
Female	3	48	22	3	76
Male	7	62	26	9	104
All	10	110	48	12	180

Table 2:

Age_catagory	0-20	21-30	31-40	41-50	All
Product					
KP281	6	49	19	6	80
KP481	4	31	23	2	60
KP781	0	30	6	4	40
All	10	110	48	12	180

Insights:

- According to Table 1 above, 61.1% of buyers are between the ages of 21 and 30, while 26.67% are between the ages of 31 and 40.
- Based on Table 2, the majority of purchasers are between the ages of 21 and 30, and they spread across all product categories.
- There are a few more KP481 customers than KP281, with an age range of 31 to 40.
- Similarly, from Table 2, individuals under the age of 21 are unlikely to purchase an advanced treadmill. i.e. 0.
- From the above scatter plot, we generally say that individuals earning less than Rs.60,000 are more likely to choose KP281 and KP481, whereas those earning more than Rs.60,000 are more likely to select KP781.
- Buyers under 21 have a salary of less than Rs.40,000, while other age groupings have a wide variety of salaries.
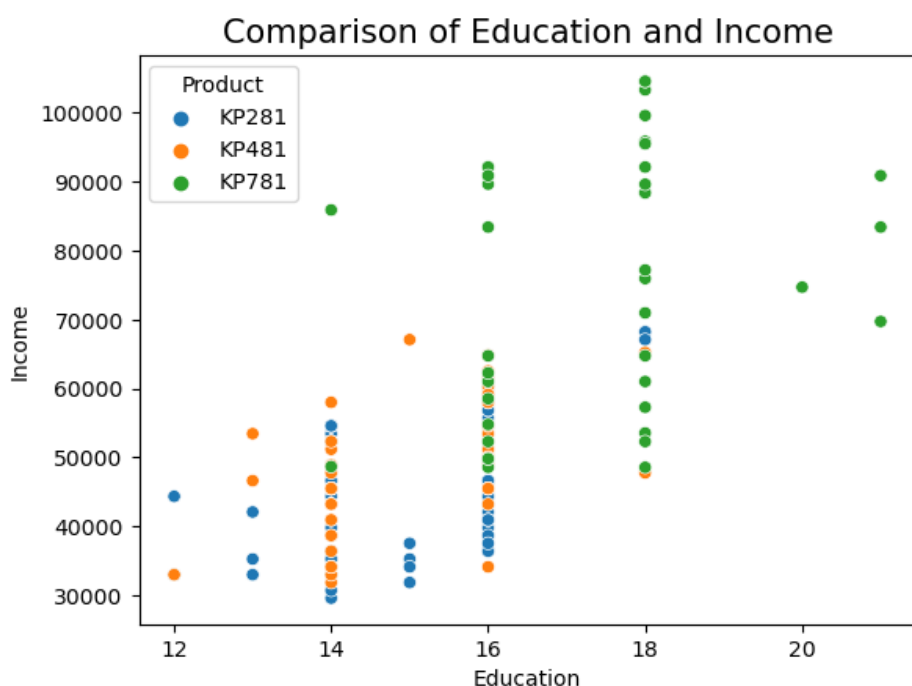

Comparison of Education and Income

Table 1:

Education	12	13	14	15	16	18	20	21	All
Age_category									
0-20	1	1	7	1	0	0	0	0	10
21-30	1	3	41	3	44	15	1	2	110
31-40	1	1	7	1	32	5	0	1	48
41-50	0	0	0	0	9	3	0	0	12
All	3	5	55	5	85	23	1	3	180

Table 2:

Education	12	13	14	15	16	18	20	21	All
Fitness									
1	0	0	0	0	1	1	0	0	2
2	1	2	11	1	11	0	0	0	26
3	2	2	35	3	50	4	0	1	97
4	0	1	8	1	8	5	0	1	24
5	0	0	1	0	15	13	1	1	31
All	3	5	55	5	85	23	1	3	180

Insights:
- Almost everyone who purchased KP281 and KP481 had an education year between 12 and 16, whereas KP781 purchasers had an education year between 16 and 21. We can observe that Education 16 has a diverse group of customers.
- Here, we can observe that as the number of years in education increases, so does income. i.e. linear growth.
- Similarly, when education in years increases, choosing from KP281 and KP481 is moved to KP781.
- Table 1 illustrates the correlation between age group and education. As previously said, those aged 21 to 30 purchased more treadmills, the majority of whom were in their 14 and 16 years of education. i.e. 47.22%. Similarly, almost 67% people from the age group 31-40 lies in 16 years of education.
- Table 2 shows the relationship between fitness and education. More people were present at the intersection of fitness 3 and years of schooling 14 and 16.

Customer Profiling:

1.Fitness Enthusiast with Moderate Income:

Product Purchased: KP781 (Advanced Treadmill)

Age: 21-30

Gender: Male

Education: 16-18 years

Marital Status: Single/Partnered

Usage: 4-7 times per week

Income: more than $48,000

Fitness: 4-5 (Excellent Shape)

Miles: 100-240 miles per week

Description: This segment consists of individuals, mainly males, aged 21-30 with a relatively higher education level and income. They are serious about fitness and prefer the advanced features offered by KP781 treadmills. They have a high fitness level and are committed to using the treadmill regularly to achieve their fitness goals.

2.Budget-Conscious Beginner:

Product Purchased: KP281 (Entry-Level Treadmill)

Age: 18-30

Gender: Both Male and Female

Education: 12-16 years

Marital Status: Single/Partnered

Usage: 2-4 times per week

Income: Below $45,000

Fitness: 2-3 (Average Shape)

Miles: 40-120 miles per week

Description: This segment includes young adults aged 18-30 who are new to fitness and are looking for affordable options to start their fitness journey. They have varying education levels and incomes but prioritize budget-friendly options like the KP281 treadmill. They aim to use the treadmill regularly but may not have high fitness goals yet.

3.Active Family:

Product Purchased: KP481 (Mid-Level Treadmill)

Age: 20-40

Gender: Both Male and Female

Education: 14-16 years

Marital Status: Partnered

Usage: 3-5 times per week

Income: $40,000 - $60,000

Fitness: 3-4 (Good Shape)

Miles: 60-180 miles per week

Description: This segment consists of partnered individuals aged 20-40 who prioritize family fitness. They prefer the mid-level features offered by the KP481 treadmill, balancing quality and affordability. They have moderate fitness levels and incomes, aiming to use the treadmill regularly to maintain their health and well-being.

Recommendation:

- Consider introducing more entry-level and mid-level treadmill options to cater to the preferences of customers with varying fitness levels and income brackets. This can include budget-friendly options with basic features for customers with lower incomes.
- Invest in customer service and support to ensure a positive buying experience for customers. Offer personalized assistance, easy returns, and warranty options to build trust and loyalty among customers.
- Foster a sense of community and engagement among customers through online forums, social media groups, and fitness challenges. Encourage customers to share their fitness journeys, success stories, and tips for using Aerofit products effectively. Building a supportive community enhances brand loyalty and encourages repeat purchases.
- Explore partnerships with fitness influencers, gyms, wellness brands, or healthcare providers to expand Aerofit's reach and visibility. Collaborate on co-branded marketing campaigns, sponsored events, or exclusive promotions to leverage the audience and credibility of partner organizations. Strategic partnerships can amplify Aerofit's marketing efforts and attract new customers.