
Hitting The Gym

Sale Forecast

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Introduction

- Jen's Gem Gym is looking to identify new locations with strong revenue potential
- Currently has 20 potential new locations under consideration
- Our Brief: Develop sales forecast model to guide site selection for Jen's Gem Gym

Methodology

- Literature was our starting point to identify variables that are key determinants of gym sales revenue
- Key drivers of Gym sales revenue include;
 - Income
 - Location
 - Ease of Access
 - Proximity to convenience retail locations
- Based on the importance of location/ease of access, we decided to largely focus on variables at the 9TO level

Sales Forecast Model

Linear Regression Model

$$\begin{aligned} \text{SALES} = & \beta_0 + \beta_1 \text{AGE_ADULT18P_9TO} + \beta_2 \text{CMDSC_COMP_B_1RO} + \beta_3 \text{HH_9TO} + \beta_4 \\ & \text{COMMUTE_AVG_9TO} + \beta_5 \text{HHSZ_AVG_9TO} + \beta_6 \text{POCHH_2RO} + \beta_7 \\ & \text{POPGROW5YR_9TO} + \beta_8 \text{POPGROWSINCE2010_9TO} + \beta_9 \text{VEH_AVG_18TO} + \\ & \beta_{10} \text{HHINC_MED_COLADJ_9TO} + \beta_{11} \text{POP_9TO} \end{aligned}$$

Dependent Variable

Sales = Location Sales for different states

The determination of sales for 20 different locations in different states was forecasted. Among those states we selected the top 5 highest amounts and their locations to determine which would be best to open a new gym.

Independent Variables

Variable name	Variable Description
age_adult18p_9to	Adult age 18 and up within 9 minute drive time
cmdsc_comp_b_1ro	Distance from Competitor B within a 1 mile radius
commute_avg_9to	Commute Time :Average within 9 minute drive time
hhinc_med_coladj_9to	Household Income: Median within 9 minute drive time
hhsz_avg_9to	Household Size: Average Size within 9 minute drive time
hh_9to	Households within a 9 minute drive
pochh_2ro	Households with Children within a 2 mile radius
popgrow5yr_9to	Population 5yr growth projection within 9 minute drive time
popgrowsince2010_9to	Population:Growth since 2010 within 9 minute drive time
pop_9to	Population total within a 9 minute drive time

Descriptive Stats for Selected Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
buxtonid	567	2.79e+07	4451432	1.95e+07	3.94e+07
sales	547	4877067	1542698	1497600	1.05e+07
age_adult1~o	567	30699.5	15738.76	2121	114795
cmdsc_comp~o	567	.5361552	.8985745	0	6
commute_av~o	567	26.51323	5.775489	15	48
hhinc_med_~o	567	74342.46	22534.48	20147	183747
hhsz_avg_9to	567	2.410935	.5030862	2	4
hh_9to	567	15753.3	7958.036	1262	58700
pochh_2ro	567	5005.173	2394.549	955	16191
popgrow5yr~o	567	5.426808	6.382218	-3	35
popgrowsin~o	567	7.985891	6.751506	-3	42
pop_9to	567	39082.23	20145.04	2574	145114
veh_avg_18to	567	1.996473	.0593389	1	2

Regression Results: Original Model

Source	SS	df	MS
Model	2.1427e+14	11	1.9479e+13
Residual	1.0852e+15	535	2.0283e+12
Total	1.2994e+15	546	2.3799e+12

Number of obs = 547
 F(11, 535) = 9.60
 Prob > F = 0.0000
 R-squared = 0.1649
 Adj R-squared = 0.1477
 Root MSE = 1.4e+06

sales	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age_adult18p_9to	21.95479	51.73234	0.42	0.671	-79.66863	123.5782
cmdsc_comp_b_lro	182709.9	70577.58	2.59	0.010	44066.72	321353
commute_avg_9to	-26267.7	13964.81	-1.88	0.061	-53700.28	1164.884
hhinc_med_coladj_9to	16.43222	3.362657	4.89	0.000	9.826593	23.03785
hhsz_avg_9to	247545.1	190606.5	1.30	0.195	-126884	621974.1
hh_9to	125.7724	41.28768	3.05	0.002	44.66658	206.8783
pochh_2ro	121.8329	41.79652	2.91	0.004	39.72748	203.9383
popgrow5yr_9to	-57408.64	14729.88	-3.90	0.000	-86344.12	-28473.15
popgrowsince2010_9to	48027.5	13010.85	3.69	0.000	22468.88	73586.11
pop_9to	-61.38119	37.48899	-1.64	0.102	-135.0249	12.26248
veh_avg_l8to	-261816.2	1027123	-0.25	0.799	-2279504	1755872
_cons	3233460	2137481	1.51	0.131	-965425.7	7432345

Regression Results: Adjusted Model

Linear regression

Number of obs = 158
F(9, 148) = 3.67
Prob > F = 0.0004
R-squared = 0.1734
Root MSE = .30763

lnsales	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
lnage	.2161108	.3836154	0.56	0.574	-.5419602	.9741817
lncm	.1068761	.0585057	1.83	0.070	-.0087384	.2224906
lncom	-.3139577	.1469933	-2.14	0.034	-.6044344	-.023481
lnhhinc	.1982404	.1008224	1.97	0.051	-.000997	.3974778
lnhhsz	.0464265	.1845329	0.25	0.802	-.318233	.4110861
lnhh_9to	-.16432	.3680518	-0.45	0.656	-.8916354	.5629953
lnpochh_2	.1134038	.0884923	1.28	0.202	-.0614679	.2882754
lnpopgrow5yr	-.0718057	.0287797	-2.50	0.014	-.128678	-.0149334
lnpopgrowsince2010	.1092406	.0380919	2.87	0.005	.0339663	.184515
_cons	12.41227	1.127177	11.01	0.000	10.18483	14.63971

Top 6 potential locations

S/No	BUXTONID	State	Predicted_Sales_ Revenue	Average Sales Revenue for State
1	23075043	TX	\$ 6,124,992.50	\$ 5,337,600.00
2	28466264	TX	\$ 5,723,517.50	\$ 5,337,600.00
3	30970738	CA	\$ 5,110,107.50	\$ 4,887,869.00
4	31891265	OH	\$ 5,062,705.50	\$ 4,926,158.00
5	27129340	MI	\$ 4,957,618.50	\$ 4,674,545.00
6	24747787	UT	\$ 4,900,421.00	\$ 4,810,629.00

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